K8S 14 QUESTIONS

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Que 1 →

- Create 2 Public Docker Hub registries named

cloudethix_master_nginx_yourname & cloudethix_release_nginx_yourname.

- Clone below repository on your system.

https://github.com/zembutsu/docker-sample-nginx.git

- Initialize a local repository & copy the code from above repo to your local

repository in master branch and then create below branches.

release

main

hotfix

- Once code is copied to local repository,from master branch update the

index.html and add word "Cloudethix Master Branch Nginx" and build the

docker image & add meaningful tags and push to Docker Hub registry

cloudethix_master_nginx_yourname.

- Also from release branch update the index.html and add word "Cloudethix

Release Branch Nginx" and build the docker image & add meaningful tags

and push to Docker Hub registry cloudethix_release_nginx_yourname.

- Once Images are copied to Docker hub registries, switch to the main

branch.

- In main branch create directory named kube/clusterIP & inside kube

directory create file named master_pod.yaml with pod name master_nginx &

with label master_nginx & add image that you have pushed in Docker Hub

registry cloudethix_master_nginx_yourname.

- Also create a file release_pod.yaml with pod name release_nginx & with

label release_nginx & add image that you have pushed in Docker Hub

registry cloudethix_release_nginx_yourname.

- Create a file called cluster_ip-service.yaml with service name

cloudethix_clusterip and with Type clusterIP.

- Then, select the pod with label release_nginx in service.
- Create all these three resources in your k8s cluster.
- Now, access master_nginx pod shell & curl the master_nginx pod & check

the result.

- Also try to curl release_nginx pod with DNS name & check the result.
- Then curl the clusterip service with its name and check the result.
- Finally, create a GITHUB remote repository named

cloudethix-k8s-yourname and push all the branches to the remote

repository.

- Take all screenshots and create a well formatted document.

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➢ SOLUTION

root@DESKTOP-8OOG2HF:KUBERNETES-ASSIGNMENTS# mkdir K8S-Questions-Assignment

root@DESKTOP-8OOG2HF:KUBERNETES-ASSIGNMENTS# cd K8S-Questions-Assignment/

root@DESKTOP-8OOG2HF:K8S-Questions-Assignment# ll

total 0

drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:00 ./

drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:00 ../

root@DESKTOP-8OOG2HF:K8S-Questions-Assignment# ll

total 0

drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:00 ./

drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:00 ../

root@DESKTOP-8OOG2HF:K8S-Questions-Assignment# mkdir Question_01

root@DESKTOP-8OOG2HF:K8S-Questions-Assignment# cd Question_01/

root@DESKTOP-8OOG2HF:Question_01# git clone git@github.com:zembutsu/docker-sample-nginx.git

```
Cloning into 'docker-sample-nginx'...
remote: Enumerating objects: 22, done.
remote: Counting objects: 100% (12/12), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 22 (delta 7), reused 6 (delta 6), pack-reused 10
Receiving objects: 100% (22/22), done.
```

```
Resolving deltas: 100% (7/7), done.
```

```
root@DESKTOP-8OOG2HF:Question_01# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:01 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:01 ../
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:01 docker-sample-nginx/
root@DESKTOP-8OOG2HF:Question_01# cd docker-sample-nginx/
root@DESKTOP-8OOG2HF:docker-sample-nginx# ll
total 4
drwxrwxrwx 1 asfiya asfiya  512 Feb 21 12:01 ./
drwxrwxrwx 1 asfiya asfiya  512 Feb 21 12:01 ../
drwxrwxrwx 1 asfiya asfiya  512 Feb 21 12:01 .git/
-rwxrwxrwx 1 asfiya asfiya   95 Feb 21 12:01 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 1084 Feb 21 12:01 LICENSE*
-rwxrwxrwx 1 asfiya asfiya   73 Feb 21 12:01 README.md*
-rwxrwxrwx 1 asfiya asfiya  286 Feb 21 12:01 default.conf*
-rwxrwxrwx 1 asfiya asfiya  103 Feb 21 12:01 index.html*

root@DESKTOP-8OOG2HF:docker-sample-nginx# mkdir local-repository
root@DESKTOP-8OOG2HF:docker-sample-nginx# cd local-repository/
root@DESKTOP-8OOG2HF:local-repository# cp -pr ../Dockerfile  .
root@DESKTOP-8OOG2HF:local-repository# cp -pr ../default.conf  .
root@DESKTOP-8OOG2HF:local-repository# cp -pr ../index.html  .
root@DESKTOP-8OOG2HF:local-repository# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:10 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:08 ../
-rwxrwxrwx 1 asfiya asfiya  95 Feb 21 12:01 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 286 Feb 21 12:01 default.conf*
-rwxrwxrwx 1 asfiya asfiya 103 Feb 21 12:01 index.html*

root@DESKTOP-8OOG2HF:local-repository# git branch  release
root@DESKTOP-8OOG2HF:local-repository# git branch  main
root@DESKTOP-8OOG2HF:local-repository# git branch  hotfix
root@DESKTOP-8OOG2HF:local-repository# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:10 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:08 ../
-rwxrwxrwx 1 asfiya asfiya  95 Feb 21 12:01 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 286 Feb 21 12:01 default.conf*
-rwxrwxrwx 1 asfiya asfiya 103 Feb 21 12:01 index.html*

root@DESKTOP-8OOG2HF:local-repository# vim Dockerfile
```

```
root@DESKTOP-8OOG2HF:local-repository# vim index.html
root@DESKTOP-8OOG2HF:local-repository# cat index.html
<html>
<body>
        <h1>Host: <!--#echo var="HOSTNAME" --></h1>
        Version: 1.1
        Cloudethix Master Branch Nginx
</body>
</html>
root@DESKTOP-8OOG2HF:local-repository# docker image build -t
asfiyask/cloudethix_master_nginx_asfiya:v1.0 .
[+] Building 18.3s (9/9) FINISHED
docker:default
 => [internal] load build definition from Dockerfile
0.1s
 => => transferring dockerfile: 132B
0.0s
 => [internal] load metadata for docker.io/library/nginx:alpine
13.5s
 => [auth] library/nginx:pull token for registry-1.docker.io
0.0s
 => [internal] load .dockerignore
0.0s
 => => transferring context: 2B
0.0s
 => [1/3] FROM
docker.io/library/nginx:alpine@sha256:6a2f8b28e45c4adea04ec207a251fd4a2df03ddc930f782
af51e315ebc76e9a9           4.1s
 => => resolve
docker.io/library/nginx:alpine@sha256:6a2f8b28e45c4adea04ec207a251fd4a2df03ddc930f782
af51e315ebc76e9a9           0.0s
 => => sha256:6a2f8b28e45c4adea04ec207a251fd4a2df03ddc930f782af51e315ebc76e9a9 8.71kB
/ 8.71kB                                  0.0s
 => => sha256:cb0953165f59b5cf2227ae979a49a2284956d997fad4ed7a338eebc6aef3e70b 2.50kB
/ 2.50kB                                  0.0s
 => => sha256:6913ed9ec8d009744018c1740879327fe2e085935b2cce7a234bf05347b670d7
11.74kB / 11.74kB                                 0.0s
 => => sha256:619be1103602d98e1963557998c954c892b3872986c27365e9f651f5bc27cab8 3.40MB
/ 3.40MB                                  0.6s
 => => sha256:018b9065ed0dfedff48bbd11f6014960bb496e71c395f772bfad123ab33a1800 1.90MB
/ 1.90MB                                  0.9s
 => => sha256:c3ea3344e711fd7111dee02f17deebceb725ed1d0ee998f7fb472114dc1399ce 629B /
629B                                      0.6s
 => => extracting
sha256:619be1103602d98e1963557998c954c892b3872986c27365e9f651f5bc27cab8
0.2s
 => => sha256:a101c9a82b88a3fa561030af162d98a130ca3bc0501b2e70594410dd426f2c9b 393B /
393B                                      1.2s
 => => sha256:c7059f3102784cd05dc96fff74a52bce9fa50fea724ece08748507fa3455999b 956B /
956B                                      1.0s
```

```
 => => extracting
sha256:018b9065ed0dfedff48bbd11f6014960bb496e71c395f772bfad123ab33a1800
0.4s
 => => sha256:d6a456492aaa4c003389fec3da0939f31c505232fcf1925db314815a196c444f 1.21kB
/ 1.21kB                                  1.4s
 => => sha256:e1c681003a03fff277ecf90fccf526881bcc2e006c9e371b58f45680d54c1954 1.40kB
/ 1.40kB                                  1.4s
 => => sha256:a85ccd8c07bd7090e8a37ab878413b035a370e872367b145a0c0aaaaf60ccbdf
12.65MB / 12.65MB                                 2.9s
 => => extracting
sha256:c3ea3344e711fd7111dee02f17deebceb725ed1d0ee998f7fb472114dc1399ce
0.0s
 => => extracting
sha256:c7059f3102784cd05dc96fff74a52bce9fa50fea724ece08748507fa3455999b
0.0s
 => => extracting
sha256:a101c9a82b88a3fa561030af162d98a130ca3bc0501b2e70594410dd426f2c9b
0.0s
 => => extracting
sha256:d6a456492aaa4c003389fec3da0939f31c505232fcf1925db314815a196c444f
0.0s
 => => extracting
sha256:e1c681003a03fff277ecf90fccf526881bcc2e006c9e371b58f45680d54c1954
0.0s
 => => extracting
sha256:a85ccd8c07bd7090e8a37ab878413b035a370e872367b145a0c0aaaaf60ccbdf
0.7s
 => [internal] load build context
0.1s
 => => transferring context: 491B
0.0s
 => [2/3] COPY default.conf /etc/nginx/conf.d/
0.3s
 => [3/3] COPY index.html /usr/share/nginx/html/
0.1s
 => exporting to image
0.1s
 => => exporting layers
0.1s
 => => writing image
sha256:4ad9a9dadf9cbb6c37dd7a51b60d58c813f95655023992424d24767dea45ae30
0.0s
 => => naming to docker.io/asfiyask/cloudethix_master_nginx_asfiya:v1.0
0.0s
```

```
root@DESKTOP-8OOG2HF:local-repository# docker image push
asfiyask/cloudethix_master_nginx_asfiya:v1.0

The push refers to repository
[docker.io/asfiyask/cloudethix_master_nginx_asfiya]

b236441bb395: Pushed
b397c7fc2d49: Pushed
667a247707f0: Mounted from library/nginx
d8527026595f: Mounted from library/nginx
2593b08e5428: Mounted from library/nginx
9909978d630d: Mounted from library/nginx
c5140fc719dd: Mounted from library/nginx
3137f8f0c641: Mounted from asfiyask/nginx
718db50a47c0: Mounted from library/nginx
aedc3bda2944: Mounted from library/nginx
```

```
v1.0: digest: sha256:08804e31ee61176238fc2c94690c2d1dedad7d389a0d8d6ecc1f29afcb3021a4
size: 2403
```

```
root@DESKTOP-8OOG2HF:local-repository# git switch release
Switched to branch 'release'
root@DESKTOP-8OOG2HF:local-repository# git branch
  hotfix
  main
  master
* release
root@DESKTOP-8OOG2HF:local-repository# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:18 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:08 ../
-rwxrwxrwx 1 asfiya asfiya  95 Feb 21 12:17 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 286 Feb 21 12:01 default.conf*
-rwxrwxrwx 1 asfiya asfiya 125 Feb 21 12:18 index.html*

root@DESKTOP-8OOG2HF:local-repository# cat index.html
<html>
<body>
        <h1>Host: <!--#echo var="Cloudethix Master Branch Nginx" --></h1>
        Version: 1.1
</body>
</html>
root@DESKTOP-8OOG2HF:local-repository# vim index.html
root@DESKTOP-8OOG2HF:local-repository# cat index.html
<html>
<body>
        <h1>Host: <!--#echo var="Cloudethix Release Branch Nginx" --></h1>
        Version: 1.1
</body>
</html>
root@DESKTOP-8OOG2HF:local-repository# docker image build -t
asfiyask/cloudethix_release_nginx_asfiya:v1.1 .
[+] Building 1.8s (9/9) FINISHED
docker:default
 => [internal] load build definition from Dockerfile
0.0s
 => => transferring dockerfile: 132B
0.0s
 => [internal] load metadata for docker.io/library/nginx:alpine
1.5s
 => [auth] library/nginx:pull token for registry-1.docker.io
0.0s
 => [internal] load .dockerignore
0.0s
```

```
 => => transferring context: 2B
0.0s
 => [1/3] FROM
docker.io/library/nginx:alpine@sha256:6a2f8b28e45c4adea04ec207a251fd4a2df03ddc930f782
af51e315ebc76e9a9           0.0s
 => [internal] load build context
0.0s
 => => transferring context: 199B
0.0s
 => CACHED [2/3] COPY default.conf /etc/nginx/conf.d/
0.0s
 => [3/3] COPY index.html /usr/share/nginx/html/
0.1s
 => exporting to image
0.1s
 => => exporting layers
0.0s
 => => writing image
sha256:5097c6e1faa1a75ae34e1b6f6869d3ca8c8b70a26067b7bc15c72e6b4f9e4a97
0.0s
 => => naming to docker.io/asfiyask/cloudethix_release_nginx_asfiya:v1.1
0.0s
root@DESKTOP-8OOG2HF:local-repository# docker image push
asfiyask/cloudethix_release_nginx_asfiya:v1.1

The push refers to repository
[docker.io/asfiyask/cloudethix_release_nginx_asfiya]

64a0eb9b9a77: Pushed
b397c7fc2d49: Mounted from asfiyask/cloudethix_master_nginx_asfiya
667a247707f0: Mounted from asfiyask/cloudethix_master_nginx_asfiya
d8527026595f: Mounted from asfiyask/cloudethix_master_nginx_asfiya
2593b08e5428: Mounted from asfiyask/cloudethix_master_nginx_asfiya
9909978d630d: Mounted from asfiyask/cloudethix_master_nginx_asfiya
c5140fc719dd: Mounted from asfiyask/cloudethix_master_nginx_asfiya
3137f8f0c641: Mounted from asfiyask/cloudethix_master_nginx_asfiya
718db50a47c0: Mounted from asfiyask/cloudethix_master_nginx_asfiya
aedc3bda2944: Mounted from asfiyask/cloudethix_master_nginx_asfiya
v1.1: digest: sha256:d3e38768d592b6f995e275a1592a9edc99cab6f8e828e9bd481506af9382ac43
size: 2403


root@DESKTOP-8OOG2HF:local-repository# git switch main


Switched to branch 'main'

root@DESKTOP-8OOG2HF:local-repository#

root@DESKTOP-8OOG2HF:local-repository# git branch

  hotfix

* main

  master

  release

root@DESKTOP-8OOG2HF:local-repository# mkdir  kube
```

```
root@DESKTOP-8OOG2HF:local-repository# cd kube/
root@DESKTOP-8OOG2HF:kube# touch master_pod.yaml
```

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: master-nginx
  labels:
    app: master-nginx
spec:
  containers:
  - name: master-nginx-container
    image:  asfiyask/cloudethix_master_nginx_asfiya:v2
    ports:
    - containerPort: 80
```

```
root@DESKTOP-8OOG2HF:kube# touch  release_pod.yaml
```

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: release-nginx
  labels:
    app: release-nginx
spec:
  containers:
  - name: release-nginx-container
    image: asfiyask/cloudethix_release_nginx_asfiya:v2
    ports:
    - containerPort: 80
```

```
root@DESKTOP-8OOG2HF:local-repository# mkdir clusterIP
root@DESKTOP-8OOG2HF:local-repository# cd clusterIP/
root@DESKTOP-8OOG2HF:clusterIP# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:46 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:45 ../
-rwxrwxrwx 1 asfiya asfiya 225 Feb 21 12:43 cluster_ip-service.yaml*
```

```yaml
# NODE2 SERVICE.YAML
apiVersion: v1
kind: Service
metadata:
  name: cloudethix-clusterip
spec:
```

```
  ports:
    - port: 80
      protocol: TCP
      targetPort: 80
  selector:
    app: release-nginx
  type: ClusterIP
```

```
Apply complete! Resources: 15 added, 0 changed, 0 destroyed.

Outputs:

cluster_nodes = [
  {
    "name" = "master"
    "private_ip" = "172.31.33.64"
    "public_ip" = "65.0.165.194"
    "subnet_id" = "subnet-07fa90d35a2e2f0d5"
  },
  {
    "name" = "worker-0"
    "private_ip" = "172.31.46.92"
    "public_ip" = "65.0.168.192"
    "subnet_id" = "subnet-07fa90d35a2e2f0d5"
  },
  {
    "name" = "worker-1"
    "private_ip" = "172.31.40.201"
    "public_ip" = "13.234.77.46"
    "subnet_id" = "subnet-07fa90d35a2e2f0d5"
  },
]
vpc_id = "vpc-08cc066fb89d9b742"
```

```
root@DESKTOP-8OOG2HF:k8sCluster_kubeadm_terraform# realpath assured-bull.conf

/mnt/c/Users/DELL/OneDrive/Desktop/CLOUDETHIX/KUBERNETES/k8sCluster_kubeadm_terraform/assured-bull.conf

root@DESKTOP-8OOG2HF:k8sCluster_kubeadm_terraform# export KUBECONFIG=/mnt/c/Users/DELL/OneDrive/Desktop/CLOUDETHIX/KUBERNETES/k8sCluster_kubeadm_terraform/assured-bull.conf

root@DESKTOP-8OOG2HF:clusterIP# kgn

NAME       STATUS   ROLES           AGE    VERSION

master     Ready    control-plane   110s   v1.28.2

worker-0   Ready    <none>          97s    v1.28.2

worker-1   Ready    <none>          97s    v1.28.2

root@DESKTOP-8OOG2HF:k8sCluster_kubeadm_terraform# kubectl apply -f calico.yaml


root@DESKTOP-8OOG2HF:kube# k apply -f .

pod/master-nginx created
```

```
pod/release-nginx created

root@DESKTOP-8OOG2HF:kube# cd ../clusterIP/

root@DESKTOP-8OOG2HF:clusterIP# k apply -f .

service/cloudethix-clusterip created

root@DESKTOP-8OOG2HF:clusterIP# cd -

/mnt/c/Users/DELL/OneDrive/Desktop/CLOUDETHIX/KUBERNETES/KUBERNETES-ASSIGNMENTS/K8S-Questions-Assignment/Question_01/docker-sample-nginx/local-repository/kube

root@DESKTOP-8OOG2HF:kube# ll

total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 12:46 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 13:47 ../
-rwxrwxrwx 1 asfiya asfiya 241 Feb 21 13:52 master_pod.yaml*
-rwxrwxrwx 1 asfiya asfiya 244 Feb 21 13:49 release_pod.yaml*

root@DESKTOP-8OOG2HF:kube# kgp

NAME             READY   STATUS    RESTARTS   AGE

master-nginx     1/1     Running   0          19s

release-nginx    1/1     Running   0          19s

root@DESKTOP-8OOG2HF:kube# k exec -it master-nginx -- /bin/sh

/ # curl localhost
<html>
<body>
        <h1>Host: master-nginx</h1>
        Version: 1.1
        Cloudethix Master Branch Nginx
</body>
</html>
/ #
root@DESKTOP-8OOG2HF:kube# kgs

NAME                     TYPE        CLUSTER-IP       EXTERNAL-IP
PORT(S)   AGE

cloudethix-clusterip   ClusterIP   10.101.120.181   <none>
80/TCP    2m


root@DESKTOP-8OOG2HF:kube# k exec -it release-nginx -- /bin/sh

/ # curl localhost
<html>

<body>

        <h1>Host: release-nginx</h1>

        Version: 1.1
```

```
        Cloudethix release Branch Nginx

</body>

</html>
```

```
root@DESKTOP-8OOG2HF:kube# k exec -it master-nginx -- /bin/sh
/ # curl cloudethix-clusterip
<html>

<body>

        <h1>Host: release-nginx</h1>

        Version: 1.1

        Cloudethix release Branch Nginx

</body>


</html>
root@DESKTOP-8OOG2HF:docker-sample-nginx# git remote -v
root@DESKTOP-8OOG2HF:docker-sample-nginx# git remote add origin
git@github.com:ASFIASHAIKH/cloudethix-k8s-asfiya.git


root@DESKTOP-8OOG2HF:docker-sample-nginx# git remote -v
origin  git@github.com:ASFIASHAIKH/cloudethix-k8s-asfiya.git (fetch)
origin  git@github.com:ASFIASHAIKH/cloudethix-k8s-asfiya.git (push)


root@DESKTOP-8OOG2HF:docker-sample-nginx# git add  local-repository
root@DESKTOP-8OOG2HF:docker-sample-nginx# git commit -m "Add
Assignment_05 Question-1 File"
[master 5513230] Add Assignment_05 Question-1 File
 6 files changed, 67 insertions(+)
 create mode 100644 local-repository/Dockerfile
 create mode 100644 local-repository/clusterIP/cluster_ip-service.yaml
 create mode 100644 local-repository/default.conf
 create mode 100644 local-repository/index.html
 create mode 100644 local-repository/kube/master_pod.yaml
 create mode 100644 local-repository/kube/release_pod.yaml
root@DESKTOP-8OOG2HF:docker-sample-nginx# git branch
  hotfix
  main
* master
```

Release

```
root@DESKTOP-8OOG2HF:docker-sample-nginx# git push --all
Enumerating objects: 31, done.
Counting objects: 100% (31/31), done.
Delta compression using up to 4 threads
Compressing objects: 100% (24/24), done.
Writing objects: 100% (31/31), 4.07 KiB | 47.00 KiB/s, done.
Total 31 (delta 8), reused 21 (delta 7), pack-reused 0
remote: Resolving deltas: 100% (8/8), done.
remote:
remote: Heads up! The branch 'main' that you pushed to was renamed to 'Remote-Main-
Branch'.
remote:
To github.com:ASFIASHAIKH/cloudethix-k8s-asfiya.git
 * [new branch]      hotfix -> hotfix
 * [new branch]      main -> main
 * [new branch]      master -> master
 * [new branch]      release -> release
```

==========

Que 2 →

- In the main branch of your local repository create a directory

kube/NodePort.

- Create below files from below url. Please make sure you will create

NodePort service with port 30008 instead of loadbalancer.

https://kubernetes.io/docs/tasks/access-application-cluster/connec

ting-frontend-backend/.

backend-deployment.yaml

backend-service.yaml

frontend-deployment.yaml

frontend-NodePort-service.yaml

- Once files are created , create all the resources in your k8s cluster.

- Access all public ips with port 30008 in the browser and then check the

result.

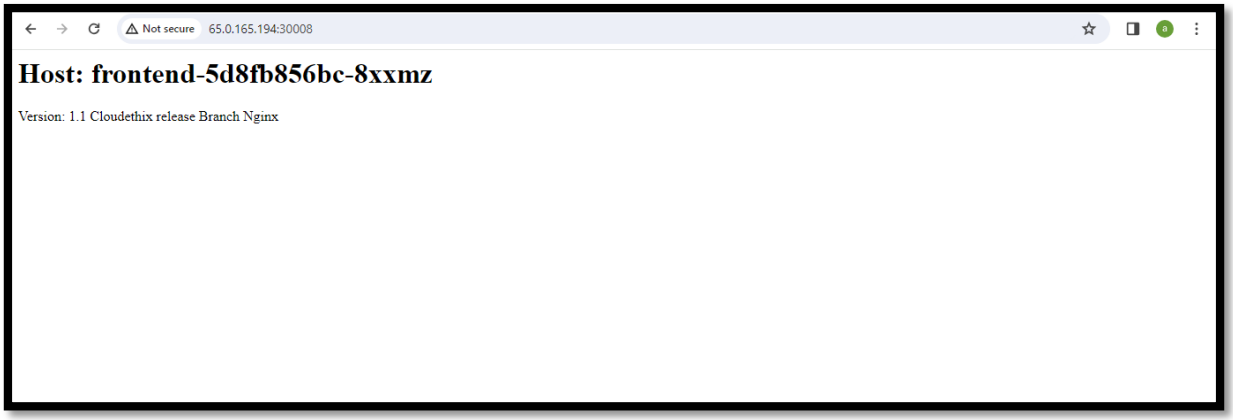
- Finally, push all the latest code to the remote repository.

==========

➢ SOLUTION

```
root@DESKTOP-8OOG2HF:docker-sample-nginx# git branch
  hotfix
  main
* master
  release
root@DESKTOP-8OOG2HF:docker-sample-nginx# git switch main
Switched to branch 'main'
root@DESKTOP-8OOG2HF:docker-sample-nginx# git branch
  hotfix
* main
  master
  release


root@DESKTOP-8OOG2HF:kube-NodePort# touch backend-service.yaml
root@DESKTOP-8OOG2HF:kube-NodePort# touch frontend-deployment.yaml
root@DESKTOP-8OOG2HF:kube-NodePort# touch frontend-NodePort-
service.yaml
root@DESKTOP-8OOG2HF:kube-NodePort# ll
total 4
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 14:56 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 14:43 ../
-rwxrwxrwx 1 asfiya asfiya 488 Feb 21 15:02 backend-deployment.yaml*
-rwxrwxrwx 1 asfiya asfiya 187 Feb 21 14:58 backend-service.yaml*
-rwxrwxrwx 1 asfiya asfiya 228 Feb 21 15:01 frontend-NodePort-service.yaml*
-rwxrwxrwx 1 asfiya asfiya 538 Feb 21 15:02 frontend-deployment.yaml*


root@DESKTOP-8OOG2HF:kube-NodePort# kgp
NAME                        READY   STATUS    RESTARTS   AGE
backend-68bdd7b78f-ch954    1/1     Running   0          12s
backend-68bdd7b78f-kd67p    1/1     Running   0          12s
backend-68bdd7b78f-thkfw    1/1     Running   0          12s
frontend-5d8fb856bc-8xxmz   1/1     Running   0          12s


root@DESKTOP-8OOG2HF:kube-NodePort# kgs
NAME                    TYPE        CLUSTER-IP       EXTERNAL-IP
PORT(S)        AGE
```

```
frontend                NodePort    10.108.168.23    <none>
80:30008/TCP    5m17s

hello                   ClusterIP   10.108.182.109   <none>
80/TCP          5m17s

kubernetes              ClusterIP   10.96.0.1        <none>
443/TCP         129m
```



==========

Que 3 →

- Create any 2 pods and assign them to different worker nodes with nodeName property.

==========

➢ SOLUTION

```yaml
# pod-01
apiVersion: v1
kind: Pod
metadata:
  name: pod1
spec:
  nodeName: worker-0
  containers:
  - name: pod1-container
    image: asfiyask/nginx:v4

---
# pod-02
apiVersion: v1
kind: Pod
metadata:
  name: pod2
```

```
spec:
  nodeName: worker-1
  containers:
  - name: pod2-container
    image: asfiyask/nginx:v5
```

```
root@DESKTOP-8OOG2HF:pod-configs# kgp
NAME                          READY   STATUS    RESTARTS   AGE
pod1                          1/1     Running   0          10s
pod2                          1/1     Running   0          10s

root@DESKTOP-8OOG2HF:pod-configs# kubectl get pods -o wide
NAME   READY   STATUS  RESTARTS AGE     IP           NODE   NOMINATED NODE
READINESS GATES
pod1   1/1     Running   0      2m22s        10.108.43.18    worker-0  <none>
<none>
pod2   1/1     Running   0      2m22s         10.111.158.76   worker-1 <none>
<none>
```

==========

Que 4 → ● Label both worker nodes such as worker-0 node as cloudethix-k8s-00 & worker-1 node as cloudethix-k8s-01

● Once nodes are labeled, create pod00.yaml file and schedule the pod on worker-0 node with nodeSelector property. Also create one more file named pod01.yaml & schedule the pod on worker-1 node.

==========

➢ SOLUTION

```
root@DESKTOP-8OOG2HF:local-repository# cd Label-Nodes/
root@DESKTOP-8OOG2HF:Label-Nodes# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 16:29 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 16:50 ../
-rwxrwxrwx 1 asfiya asfiya 205 Feb 21 16:48 label-nodes.yaml*
```

```yaml
# Label pod worker-0
apiVersion: v1
kind: Node
metadata:
  name: worker-0
  labels:
    cloudethix-k8s-00: "true"

---
# Label pod worker-1
apiVersion: v1
kind: Node
metadata:
  name: worker-1
  labels:
    cloudethix-k8s-01: "true"
```

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: pod-00
spec:
  containers:
  - name: container-00
    image: asfiyask/nginx:v1
  nodeSelector:
    cloudethix-k8s-00: "true"
```

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: pod-01
spec:
  containers:
  - name: container-01
    image: asfiyask/nginx:v2
  nodeSelector:
    cloudethix-k8s-01: "true"
```

```
root@DESKTOP-8OOG2HF:Label-Nodes# k apply -f .
node/worker-0 unchanged
node/worker-1 unchanged
```

```
pod/pod-00 created
pod/pod-01 created
root@DESKTOP-8OOG2HF:Label-Nodes# kgp
NAME                              READY   STATUS    RESTARTS   AGE
pod-00                            1/1     Running   0          14s
pod-01                            1/1     Running   0          14s
```

```
root@DESKTOP-8OOG2HF:Label-Nodes# kubectl describe pod pod-01
```

```
Volumes:
  kube-api-access-r49q2:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
    ConfigMapName:           kube-root-ca.crt
    ConfigMapOptional:       <nil>
    DownwardAPI:             true
QoS Class:                   BestEffort
Node-Selectors:              cloudethix-k8s-01=true
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type    Reason     Age    From               Message
  ----    ------     ----   ----               -------
  Normal  Scheduled  5m49s  default-scheduler  Successfully assigned default/pod-01 to worker-1
  Normal  Pulling    5m48s  kubelet            Pulling image "asfiyask/nginx:v2"
  Normal  Pulled     5m43s  kubelet            Successfully pulled image "asfiyask/nginx:v2" in 4.939s (4.939s including waiting)
  Normal  Created    5m43s  kubelet            Created container container-01
  Normal  Started    5m43s  kubelet            Started container container-01
```

```
root@DESKTOP-8OOG2HF:Label-Nodes# kubectl describe pod pod-00
```

```
Volumes:
  kube-api-access-mbnb5:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
    ConfigMapName:           kube-root-ca.crt
    ConfigMapOptional:       <nil>
    DownwardAPI:             true
QoS Class:                   BestEffort
Node-Selectors:              cloudethix-k8s-00=true
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type    Reason     Age    From               Message
  ----    ------     ----   ----               -------
  Normal  Scheduled  9m33s  default-scheduler  Successfully assigned default/pod-00 to worker-0
  Normal  Pulling    9m32s  kubelet            Pulling image "asfiyask/nginx:v1"
  Normal  Pulled     9m27s  kubelet            Successfully pulled image "asfiyask/nginx:v1" in 4.962s (4.962s including waiting)
  Normal  Created    9m27s  kubelet            Created container container-00
  Normal  Started    9m27s  kubelet            Started container container-00
```

==========

Que 5 →

- Clone the below repo locally & create DaemonSet from directory DaemonSet101. https://github.com/collabnix/kubelabs

==========

SOLUTION

```
root@DESKTOP-8OOG2HF:DaemonSet# ll
total 0
```

```
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 17:22 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 17:19 ../
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 17:26 kubelabs/

root@DESKTOP-8OOG2HF:DaemonSet101#
root@DESKTOP-8OOG2HF:DaemonSet101# ll
total 8
drwxrwxrwx 1 asfiya asfiya  512 Feb 21 17:26 ./
drwxrwxrwx 1 asfiya asfiya  512 Feb 21 17:26 ../
-rwxrwxrwx 1 asfiya asfiya 7040 Feb 21 17:26 README.md*
-rwxrwxrwx 1 asfiya asfiya  394 Feb 21 17:26 daemonset.yml*

root@DESKTOP-8OOG2HF:DaemonSet101# kubectl apply -f daemonset.yml
daemonset.apps/prometheus-daemonset created

root@DESKTOP-8OOG2HF:DaemonSet101# kubectl get daemonsets/prometheus-
daemonset

NAME                   DESIRED   CURRENT   READY   UP-TO-DATE
AVAILABLE   NODE SELECTOR   AGE
prometheus-daemonset   2         2         2       2            2
<none>          23s

root@DESKTOP-8OOG2HF:DaemonSet101# kubectl describe
daemonset/prometheus-daemonset
Name:           prometheus-daemonset
Selector:       name=prometheus-exporter,tier=monitoring
Node-Selector:  <none>
Labels:         <none>
Annotations:    deprecated.daemonset.template.generation: 1
Desired Number of Nodes Scheduled: 2
Current Number of Nodes Scheduled: 2
Number of Nodes Scheduled with Up-to-date Pods: 2
```

```
Number of Nodes Scheduled with Available Pods: 2
Number of Nodes Misscheduled: 0
Pods Status:  2 Running / 0 Waiting / 0 Succeeded / 0 Failed
Pod Template:
  Labels:  name=prometheus-exporter
           tier=monitoring
  Containers:
   prometheus:
    Image:        prom/node-exporter
    Port:         80/TCP
    Host Port:    0/TCP
    Environment:  <none>
    Mounts:       <none>
  Volumes:        <none>
Events:
  Type    Reason            Age   From                  Message
  ----    ------            ----  ----                  -------
  Normal  SuccessfulCreate  38s   daemonset-controller  Created pod:
prometheus-daemonset-2pn26
  Normal  SuccessfulCreate  38s   daemonset-controller  Created pod:
prometheus-daemonset-thskb


root@DESKTOP-8OOG2HF:DaemonSet101# kgn
NAME       STATUS   ROLES           AGE     VERSION
master     Ready    control-plane   5h25m   v1.28.2
worker-0   Ready    <none>          96m     v1.28.2
worker-1   Ready    <none>          96m     v1.28.2
```

==========

Que 6 → ● Create a static pod with name cloudethix-static in your k8s cluster. Refer below link.
https://kubernetes.io/docs/tasks/configure-pod-container/static-po d/

==========

SOLUTION

```
root@DESKTOP-8OOG2HF:local-repository# mkdir Static-Pod

root@DESKTOP-8OOG2HF:local-repository# cd Static-Pod/


root@DESKTOP-8OOG2HF:Static-Pod# ll

total 0

drwxrwxrwx 1 asfiya asfiya 512 Feb 21 18:30 ./

drwxrwxrwx 1 asfiya asfiya 512 Feb 21 18:30 ../


root@DESKTOP-8OOG2HF:manifests# ssh -i ~/.ssh/id_rsa
ubuntu@65.0.168.192

The authenticity of host '65.0.168.192 (65.0.168.192)' can't be
established.

ED25519 key fingerprint is
SHA256:aOSwPVQgJAjxq7E5Ut/F3rQ8O3I/sTb+sqeQOPF61B4.

This key is not known by any other names

Are you sure you want to continue connecting
(yes/no/[fingerprint])? yes

Warning: Permanently added '65.0.168.192' (ED25519) to the list
of known hosts.

Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-1103-aws x86_64)


 * Documentation:  https://help.ubuntu.com

 * Management:     https://landscape.canonical.com

 * Support:        https://ubuntu.com/advantage


  System information as of Wed Feb 21 13:23:07 UTC 2024


  System load:  0.0               Users logged in:        0

  Usage of /:   51.8% of 7.57GB   IP address for eth0:
172.31.46.92
```

```
  Memory usage: 26%               IP address for docker0:
172.17.0.1
  Swap usage:   0%                IP address for tunl0:
10.108.43.21
  Processes:    146


ubuntu@ip-172-31-46-92:~$ ps -ef | grep kubel
root      5679     1  0 07:29 ?        00:03:20 /usr/bin/kubelet
--bootstrap-kubeconfig=/etc/kubernetes/bootstrap-kubelet.conf --
kubeconfig=/etc/kubernetes/kubelet.conf --
config=/var/lib/kubelet/config.yaml --container-runtime-
endpoint=unix:///var/run/containerd/containerd.sock --hostname-
override=worker-0 --pod-infra-container-
image=registry.k8s.io/pause:3.9


ubuntu@ip-172-31-46-92:/etc/kubernetes/manifests$ sudo su


root@ip-172-31-46-92:/etc/kubernetes/manifests# vim static-
web.yaml


root@ip-172-31-46-92:/etc/kubernetes/manifests# cat static-
web.yaml
apiVersion: v1
kind: Pod
metadata:
  name: static-web
  labels:
    role: myrole
spec:
  containers:
    - name: web
      image: nginx
      ports:
        - name: web
```

```
          containerPort: 80
          protocol: TCP
root@ip-172-31-46-92:/etc/kubernetes/manifests# exit
ubuntu@ip-172-31-46-92:/etc/kubernetes/manifests$ logout
Connection to 65.0.168.192 closed.

root@DESKTOP-8OOG2HF:manifests# kgp
NAME                          READY   STATUS    RESTARTS   AGE
static-web-worker-0           1/1     Running   0          57s
```

==========

Que 7 →

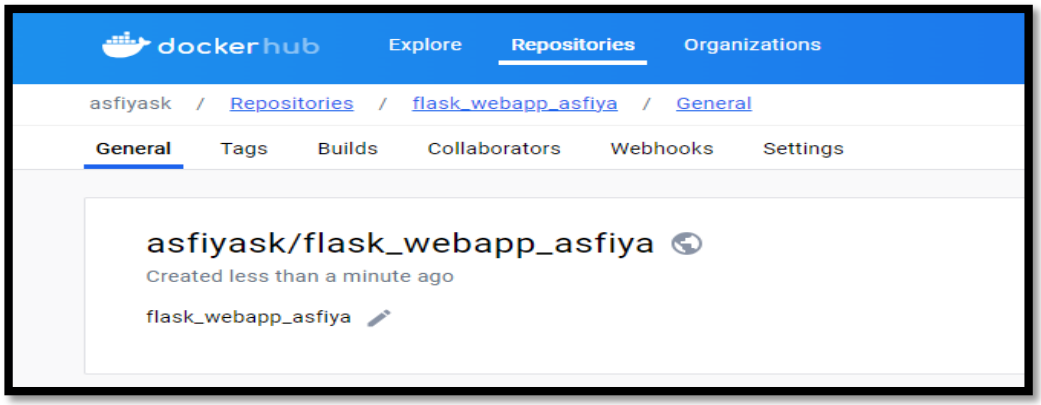
- Install Kubectx & kubens in your k8s cluster
  - ✓ INSTALL KUBECTX-KUBENS

```
sudo apt-get update
sudo snap install kubectl --classic
chmod +x kubectx kubens
sudo mv kubectx kubens /usr/local/bin
snap list
kubectx --help
kubens --help
```

==========

Que 8 →

- Create 1 Public Docker Hub registry named flask_webapp_yourname.



● Clone below repository on your system.
https://github.com/mmumshad/simple-webapp-docker.git

```
root@DESKTOP-8OOG2HF:simple-webapp-docker# git branch
* master
```

● Initialize a local repository & copy the code from above repo to your local repository in your working branch.

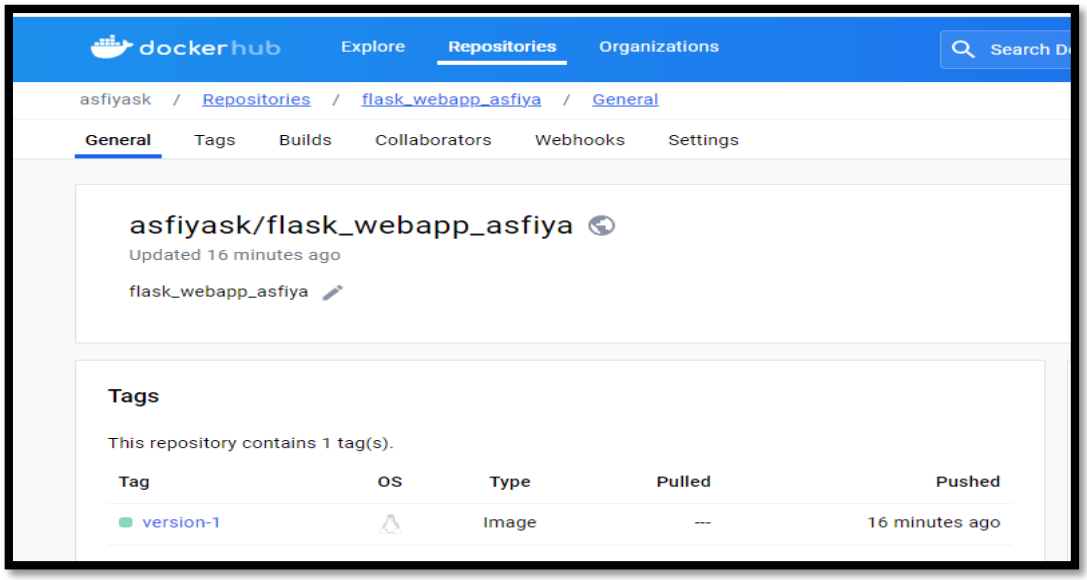
```
root@DESKTOP-8OOG2HF:simple-webapp-docker# mkdir my_scripts
root@DESKTOP-8OOG2HF:simple-webapp-docker# cd my_scripts/
root@DESKTOP-8OOG2HF:my_scripts# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 21:47 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 21:47 ../

root@DESKTOP-8OOG2HF:my_scripts# cp -pr ../Dockerfile .
root@DESKTOP-8OOG2HF:my_scripts# cp -pr ../app.py .
root@DESKTOP-8OOG2HF:my_scripts# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 21:47 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 21 21:47 ../
-rwxrwxrwx 1 asfiya asfiya 194 Feb 21 21:40 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 229 Feb 21 21:40 app.py*
```

● Once code is copied to the local repository, build the docker image & add meaningful tags with version 1 and push to Docker Hub registry.

```
root@DESKTOP-8OOG2HF:my_scripts# docker image build -t
asfiyask/flask_webapp_asfiya:version-1 .


[+] Building 99.5s (10/10) FINISHED
docker:default

 => [internal] load build definition from Dockerfile
0.1s

 => => transferring dockerfile: 233B
0.0s

 => [internal] load metadata for docker.io/library/ubuntu:20.04
3.2s

 => [auth] library/ubuntu:pull token for registry-1.docker.io
0.0s

 => [internal] load .dockerignore
0.0s

 => => transferring context: 2B
0.0s

 => [1/4] FROM
docker.io/library/ubuntu:20.04@sha256:bb1c41682308d7040f74d103022816d41c50d7b
0c89e9d706a74b4e548636e54           7.6s

 => => resolve
docker.io/library/ubuntu:20.04@sha256:bb1c41682308d7040f74d103022816d41c50d7b
0c89e9d706a74b4e548636e54           0.0s

 => =>
sha256:bb1c41682308d7040f74d103022816d41c50d7b0c89e9d706a74b4e548636e54
1.13kB / 1.13kB                                    0.0s

 => =>
sha256:a4fab1802f08df089c4b2e0a1c8f1a06f573bd1775687d07fef4076d3a2e4900 424B
/ 424B                                          0.0s

 => =>
sha256:18ca3f4297e795532c0d053ba443d392d5d316ee83ddee0de27f1e742a7db273
2.30kB / 2.30kB                                    0.0s

 => =>
sha256:8ee0874247356ecb5ea92128219660506b139dcb6cc45dcab84d98b3c6485061
27.51MB / 27.51MB                                  4.7s
```

```
 => => extracting
sha256:8ee0874247356ecb5ea92128219660506b139dcb6cc45dcab84d98b3c6485061
2.5s

 => [internal] load build context
0.1s

 => => transferring context: 264B
0.0s

 => [2/4] RUN apt-get update && apt-get install -y python3 python3-pip
79.9s

 => [3/4] RUN pip install flask
5.1s

 => [4/4] COPY app.py /opt/
0.1s

 => exporting to image
3.5s

 => => exporting layers
3.5s

 => => writing image
sha256:7aa75cdfd0e6a5402c2bc4d01b5db99023b6d27f2d87eee0058667379db1dce6
0.0s

 => => naming to docker.io/asfiyask/flask_webapp_asfiya:version-1
0.0s
```

```
root@DESKTOP-8OOG2HF:my_scripts# docker image push
asfiyask/flask_webapp_asfiya:version-1

The push refers to repository
[docker.io/asfiyask/flask_webapp_asfiya]

1e8c18d52fdf: Pushed

6153008a8793: Pushed

4af3dea163d8: Pushed

28da0445c449: Mounted from library/ubuntu

version-1: digest:
sha256:e3aa54a2c1137486ea51949890fd52232d52924bf677f05f6a7e6aca8
688589e size: 1160
```



- Once Images are pushed to Docker hub registries, create a directory named kube. Inside the kube directory create deployement.yaml file with 3 replication , labels app: flask-webapp , containerPort: 8080 and add the image that you have pushed in Docker Hub registry.

root@DESKTOP-8OOG2HF:my_scripts# cd kube/

root@DESKTOP-8OOG2HF:kube# touch deployement.yaml

```yaml
# flask-webapp-deployment yaml file
apiVersion: apps/v1
kind: Deployment
metadata:
  name: flask-webapp-deployment
  labels:
    app: flask-webapp
spec:
  replicas: 3
  selector:
    matchLabels:
      app: flask-webapp
  template:
    metadata:
      labels:
        app: flask-webapp
    spec:
      containers:
        - name: nginx
          image: asfiyask/flask_webapp_asfiya:version-1
          ports:
            - containerPort: 8080
```

root@DESKTOP-8OOG2HF:kube# touch service.yaml

```yaml
apiVersion: v1
kind: Service
metadata:
  name: flask-webapp-service
spec:
  selector:
    app: flask-webapp
  ports:
    - protocol: TCP
      port: 8080
      targetPort: 8080
      nodePort: 30011
  type: NodePort
```

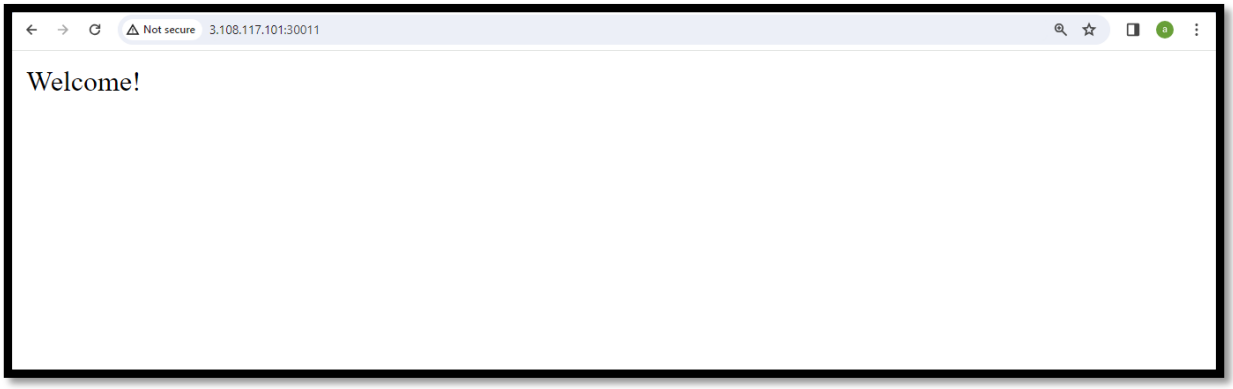
- Once a service is created try accessing the web page in the browser as below. (30011 is nodeport mentioned in service.yaml). Meanwhile open app.py from your code to understand paths & output.

http://master_ip:30011/

http://master_ip:30011/how are you

root@DESKTOP-8OOG2HF:kube# cd ../../../../../../../../../k8sCluster_kubeadm_terraform/

root@DESKTOP-8OOG2HF:k8sCluster_kubeadm_terraform# terraform apply -auto-approve



● Now , update the app.py from your code and add below route above if __name__ == "__main__" line @app.route('/Who are you') def cloudethix(): return 'Yes, I am cloudethix, and You !!!'

```
root@DESKTOP-8OOG2HF:my_scripts# cat app.py
import os
from flask import Flask

app = Flask(__name__)

@app.route("/")
def main():
    return "Welcome!"

@app.route('/how are you')
def hello():
    return 'I am good, how about you?'

@app.route('/Who are you')
def cloudethix():
    return 'Yes, I am cloudethix, and You !!!'

if __name__ == "__main__":
    app.run()
```

- Once the file is updated , rebuild the docker image & add meaningful tags with version 2 and push to Docker Hub registry.

- Now we have the latest docker image in repo, It's time to roll out a new image. Roll out the new Image with all three ways one by one.

1. With kubectl set command
2. With kubectl edit deployment
3. With deployment.yaml file modification

```
root@DESKTOP-8OOG2HF:kube# k set image deployment flask-webapp-deployment flask-webapp-cont=asfiyask/flask_webapp_asfiya:version-1 --record
deployment.apps/flask-webapp-deployment image updated
root@DESKTOP-8OOG2HF:kube# k edit deployment flask-webapp-deployment
deployment.apps/flask-webapp-deployment edited
root@DESKTOP-8OOG2HF:kube# k apply -f .
deployment.apps/flask-webapp-deployment configured
```

```yaml
# flask-webapp-deployment yaml file
apiVersion: apps/v1
kind: Deployment
metadata:
  name: flask-webapp-deployment
  labels:
    app: flask-webapp
spec:
  replicas: 3
  selector:
    matchLabels:
      app: flask-webapp
  template:
    metadata:
      labels:
        app: flask-webapp
    spec:
      containers:
        - name:  flask-webapp-cont
          image: asfiyask/flask_webapp_asfiya:version2
```

```
        ports:
          - containerPort: 8080
```

```
root@DESKTOP-8OOG2HF:kube# kgp
NAME                                     READY   STATUS    RESTARTS
AGE
flask-webapp-deployment-78cbfb7d68-fkwtf   1/1     Running   0
4m51s
flask-webapp-deployment-78cbfb7d68-nqc4n   1/1     Running   0
4m48s
flask-webapp-deployment-78cbfb7d68-q4vvx   1/1     Running   0
4m50s
```

- Run the # kubectl rollout command to check status and history.

```
root@DESKTOP-8OOG2HF:kube# kubectl rollout status deployment flask-
webapp-deployment
deployment "flask-webapp-deployment" successfully rolled out
root@DESKTOP-8OOG2HF:kube# kubectl rollout history deployment flask-
webapp-deployment
deployment.apps/flask-webapp-deployment
REVISION  CHANGE-CAUSE
3         kubectl set image deployment flask-webapp-deployment flask-
webapp-cont=asfiyask/flask_webapp_asfiya:version-1 --record=true
4         kubectl set image deployment flask-webapp-deployment flask-
webapp-cont=asfiyask/flask_webapp_asfiya:version-1 --record=true
```

- Note:- Once above step 1 is done , run # kubectl rollout undo deployment command to rollback the change and then try a second way of rollout.

```
root@DESKTOP-8OOG2HF:kube# kubectl rollout undo deployment flask-
webapp-deployment --to-revision=4
deployment.apps/flask-webapp-deployment rolled back
```

```
root@DESKTOP-8OOG2HF:kube# kubectl rollout history deployment flask-
webapp-deployment
```

deployment.apps/flask-webapp-deployment

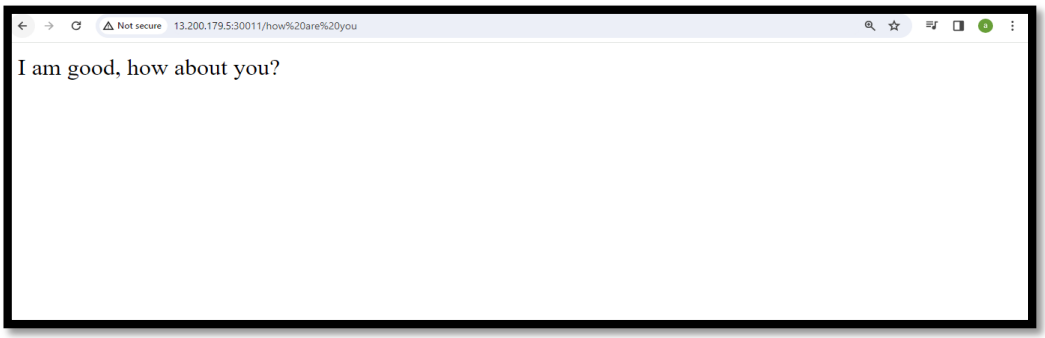
REVISION CHANGE-CAUSE

5 kubectl set image deployment flask-webapp-deployment flask-webapp-cont=asfiyask/flask_webapp_asfiya:version-1 --record=true

6 kubectl set image deployment flask-webapp-deployment flask-webapp-cont=asfiyask/flask_webapp_asfiya:version-1 --record=true

---

- In the browser run all three routes & notice the changes.
http://master_ip:30011/ http://master_ip:30011/how are you
http://master_ip:30011/Who are you

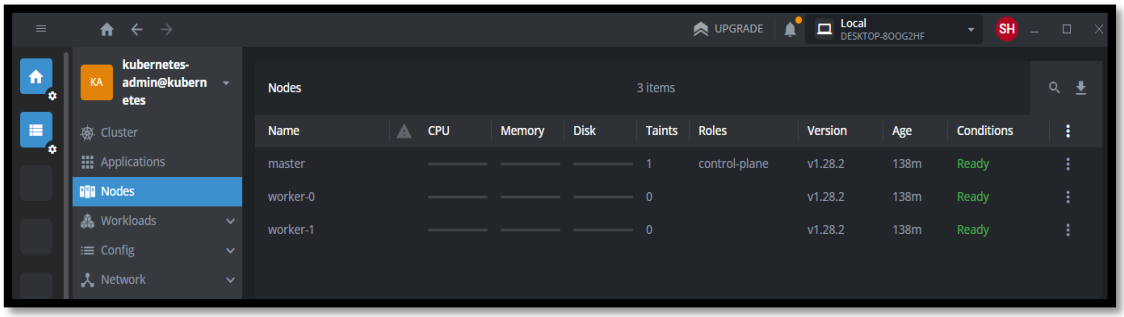


Que 9 →

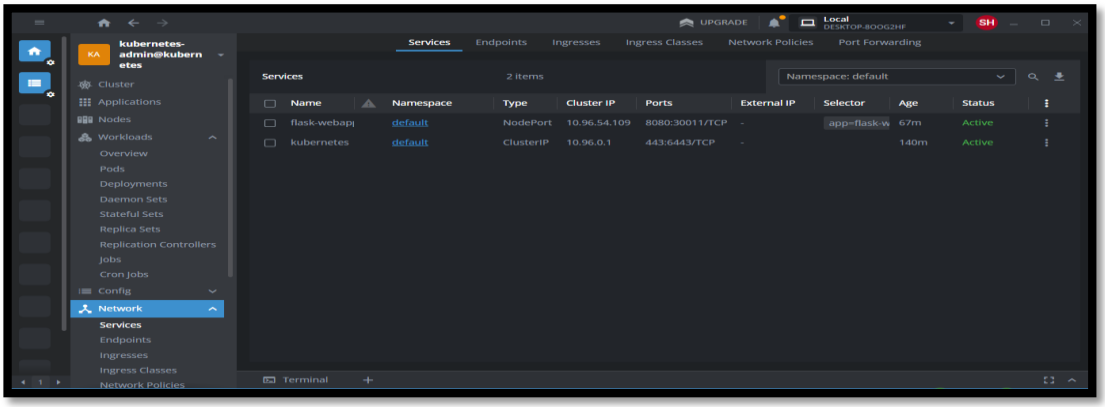
- Download and install Lens & access your k8s cluster from Lens.

- Create nginx Pod and Nodeport service. Check the Pod logs from Lens.
- Check the service from lens. Also login to the pod shell using the lens.
- Take snaps and delete the resources that you have just created.

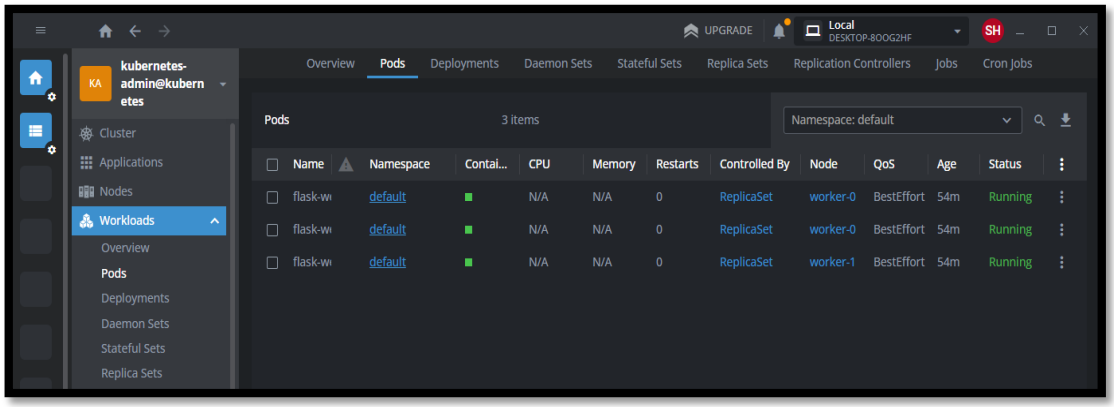
NODES



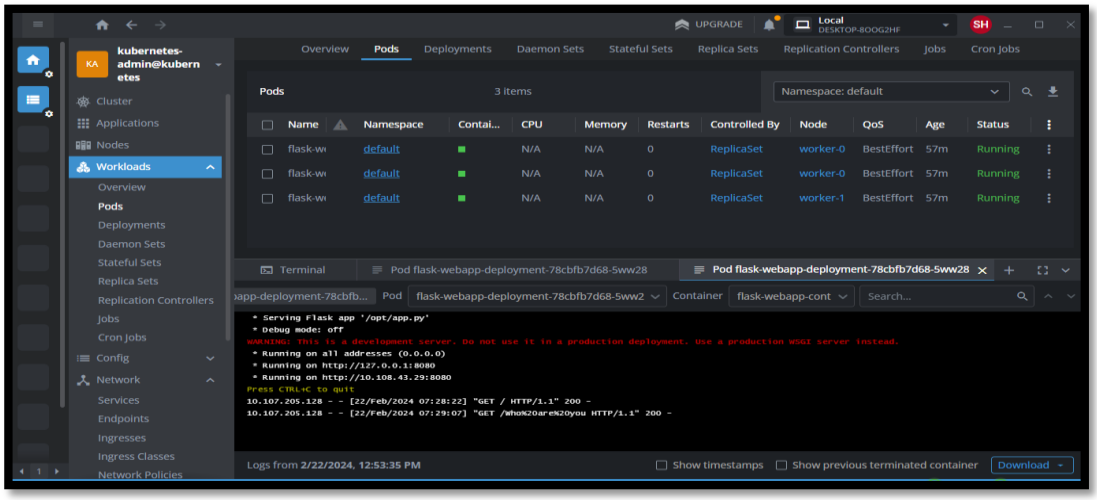
SERVICES



PODS



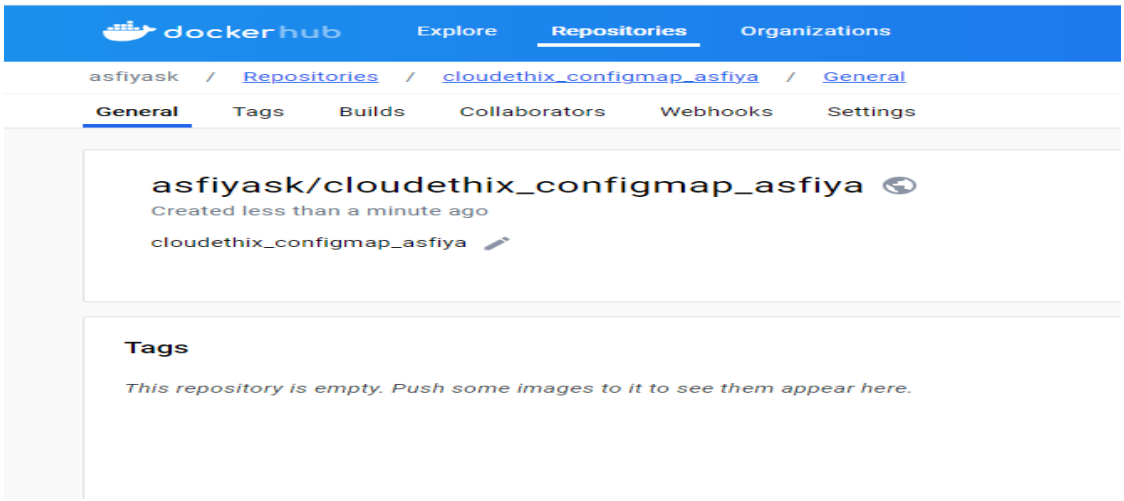
POD LOGS



==========

Que 10 →

- Create 1 Public Docker Hub registry named cloudethix_configmap_yourname.



- Clone below repository on your system.
https://github.com/zembutsu/docker-sample-nginx.git

```
root@DESKTOP-8OOG2HF:configmap-volume# git clone
git@github.com:zembutsu/docker-sample-nginx.git
Cloning into 'docker-sample-nginx'...
remote: Enumerating objects: 22, done.
remote: Counting objects: 100% (12/12), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 22 (delta 7), reused 6 (delta 6), pack-reused 10
Receiving objects: 100% (22/22), done.
Resolving deltas: 100% (7/7), done.

root@DESKTOP-8OOG2HF:configmap-volume# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 14:01 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 14:00 ../
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 14:01 docker-sample-nginx/
root@DESKTOP-8OOG2HF:configmap-volume# cd docker-sample-nginx/
root@DESKTOP-8OOG2HF:docker-sample-nginx# ll
total 4
drwxrwxrwx 1 asfiya asfiya  512 Feb 22 14:01 ./
drwxrwxrwx 1 asfiya asfiya  512 Feb 22 14:01 ../
drwxrwxrwx 1 asfiya asfiya  512 Feb 22 14:01 .git/
-rwxrwxrwx 1 asfiya asfiya   95 Feb 22 14:01 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 1084 Feb 22 14:01 LICENSE*
-rwxrwxrwx 1 asfiya asfiya   73 Feb 22 14:01 README.md*
-rwxrwxrwx 1 asfiya asfiya  286 Feb 22 14:01 default.conf*
-rwxrwxrwx 1 asfiya asfiya  103 Feb 22 14:01 index.html*
```

- Initialize a local repository & copy the code from above repo to your local repository in the working branch.

- Once code is copied , build a docker image from docker file and add meaningful tags and push to docker hub repository.

root@DESKTOP-8OOG2HF:docker-sample-nginx# docker image push asfiyask/cloudethix_configmap_asfiya:v1

The push refers to repository [docker.io/asfiyask/cloudethix_configmap_asfiya]

788ad69e55bb: Pushed

b397c7fc2d49: Mounted from asfiyask/cloudethix_release_nginx_asfiya

667a247707f0: Mounted from asfiyask/cloudethix_release_nginx_asfiya

d8527026595f: Mounted from asfiyask/cloudethix_release_nginx_asfiya

2593b08e5428: Mounted from asfiyask/cloudethix_release_nginx_asfiya

9909978d630d: Mounted from asfiyask/cloudethix_release_nginx_asfiya

c5140fc719dd: Mounted from asfiyask/cloudethix_release_nginx_asfiya

3137f8f0c641: Mounted from asfiyask/cloudethix_release_nginx_asfiya

718db50a47c0: Mounted from asfiyask/cloudethix_release_nginx_asfiya

aedc3bda2944: Mounted from asfiyask/cloudethix_release_nginx_asfiya

v1: digest: sha256:b49f72a7a19241426cd108efada55296d9bc1e14c8232a8573a15ead9f9b1b5f size: 2403

- Once Images are pushed to Docker hub registries, create a directory named kube. Inside the kube directory create deployement.yaml file with 3 replication , labels app: frontend-webapp , containerPort: 80 and add the image that you have pushed in Docker Hub registry.

root@DESKTOP-8OOG2HF:docker-sample-nginx# mkdir kube

root@DESKTOP-8OOG2HF:docker-sample-nginx# cd kube/

root@DESKTOP-8OOG2HF:kube# touch deployement.yaml

```yaml
# flask-webapp-deployment yaml file
apiVersion: apps/v1
kind: Deployment
metadata:
  name: frontend-webapp-deployment
  labels:
    app: frontend-webapp
spec:
  replicas: 3
  selector:
    matchLabels:
      app: frontend-webapp
  template:
    metadata:
      labels:
        app: frontend-webapp
    spec:
      containers:
        - name:  frontend-webapp-cont
          image: asfiyask/cloudethix_configmap_asfiya:v1
          ports:
            - containerPort: 80
```

- Create one service.yaml file with type nodeport & select frontend-webapp pod with port 80 & targetPort 80 with any nodePort between range 30000-32768.

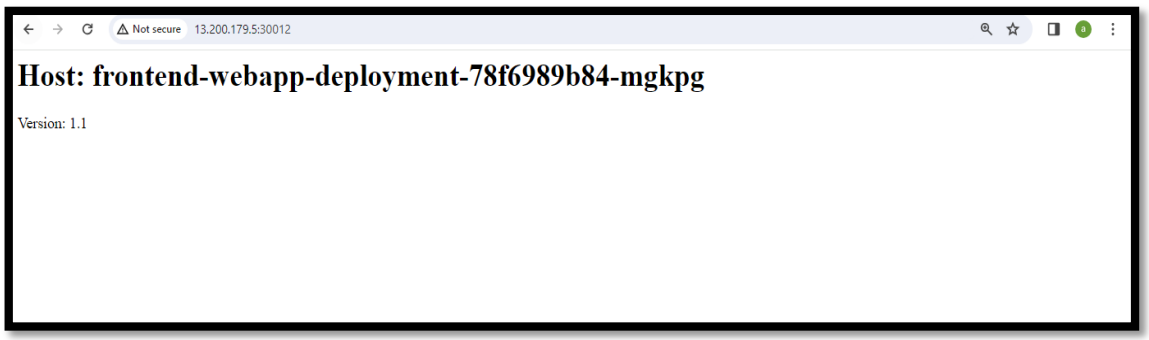
root@DESKTOP-8OOG2HF:kube# touch service.yaml

```yaml
apiVersion: v1
kind: Service
metadata:
  name: frontend-webapp-service
spec:
  selector:
    app: frontend-webapp

  ports:
    - protocol: TCP
      port: 80
      targetPort: 80
```

```
    nodePort: 30012
  type: NodePort
```

```
root@DESKTOP-8OOG2HF:kube# k apply -f .
deployment.apps/frontend-webapp-deployment created
service/frontend-webapp-service unchanged

root@DESKTOP-8OOG2HF:kube# kgp
NAME                                        READY   STATUS
RESTARTS   AGE
frontend-webapp-deployment-78f6989b84-h8lgw   1/1     Running
0          10s
frontend-webapp-deployment-78f6989b84-mgkpg   1/1     Running
0          10s
frontend-webapp-deployment-78f6989b84-p67br   1/1     Running
0          10s

root@DESKTOP-8OOG2HF:kube# kgs
NAME                       TYPE        CLUSTER-IP     EXTERNAL-IP
PORT(S)          AGE
frontend-webapp-service    NodePort    10.100.69.39   <none>
80:30012/TCP     41s
kubernetes                 ClusterIP   10.96.0.1      <none>
443/TCP          3h4m
```

- Once the service is created try accessing the web page in the browser as below. Notice the changes & take the snap.



● Now create a configmap.yaml file with below data & delete the deployment

that you have created.

<html>

<body>

<h1> I am Cloudethix Team, Are you ?!! </h1>

Version: 1.1

</body>

</html>

```
root@DESKTOP-8OOG2HF:kube# k delete -f .
deployment.apps "frontend-webapp-deployment" deleted
service "frontend-webapp-service" deleted

root@DESKTOP-8OOG2HF:kube# kgp
NAME                                        READY   STATUS
RESTARTS   AGE
flask-webapp-deployment-78cbfb7d68-5ww28    1/1     Running   0
106m
flask-webapp-deployment-78cbfb7d68-mlzkk    1/1     Running   0
106m
flask-webapp-deployment-78cbfb7d68-z5pt4    1/1     Running   0
106m
root@DESKTOP-8OOG2HF:kube# touch  configmap.yaml
```

```yaml
apiVersion: v1
kind: ConfigMap
metadata:
  name: my-configmap
data:
  index.html: |
    <html>
    <body>
    <h1> I am Cloudethix Team, Are you ?!! </h1>
    Version: 1.1
    </body>
```

```
    </html>
```

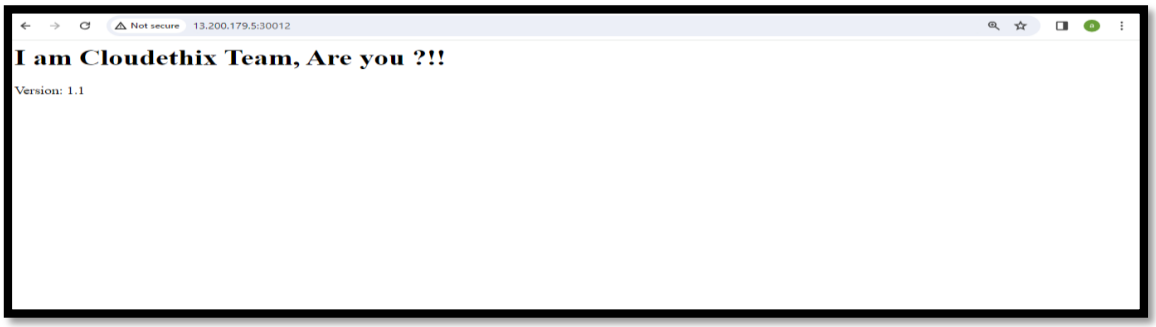
- Then update the same deployment.yaml file and mount configmap as volume on container using volumeMounts with mountPath /usr/share/nginx/html/

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: frontend-webapp-deployment
  labels:
    app: frontend-webapp
spec:
  replicas: 3
  selector:
    matchLabels:
      app: frontend-webapp
  template:
    metadata:
      labels:
        app: frontend-webapp
    spec:
      containers:
      - name: frontend-webapp-cont
        image: asfiyask/cloudethix_configmap_asfiya:v1
        ports:
        - containerPort: 80
        volumeMounts:
        - name: config-volume
          mountPath: /usr/share/nginx/html
      volumes:
      - name: config-volume
        configMap:
          name: my-configmap
```

- Now it's time to create configmap & deployment. Once created , try to access the webpage in the browser & confirm that the index page is the same as we have in configmap.

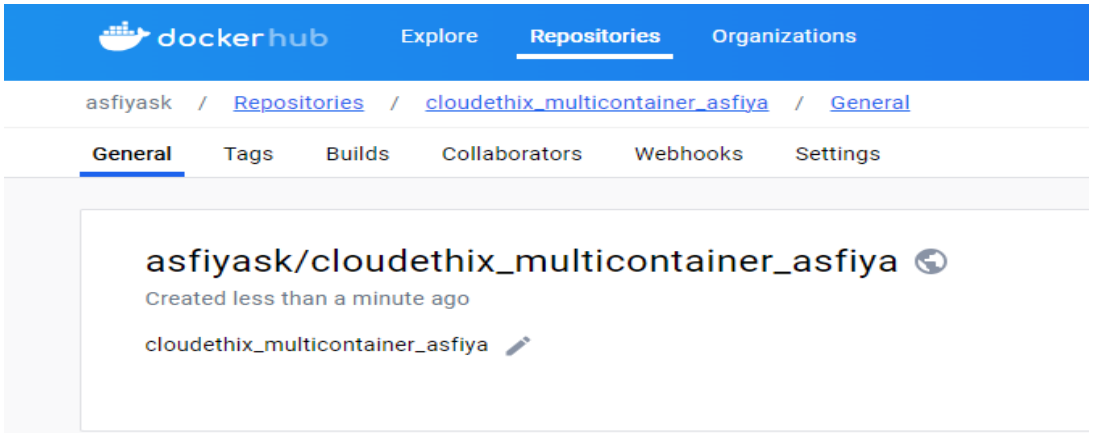
```
root@DESKTOP-8OOG2HF:kube# k apply -f .
configmap/my-configmap created
deployment.apps/frontend-webapp-deployment created
```

```
service/frontend-webapp-service created


root@DESKTOP-8OOG2HF:kube# kgp
NAME                                          READY   STATUS
RESTARTS   AGE
frontend-webapp-deployment-6b8bd8b577-5bhgv   1/1     Running   0
2s
frontend-webapp-deployment-6b8bd8b577-jvmxq   1/1     Running   0
2s
frontend-webapp-deployment-6b8bd8b577-sblmn   1/1     Running   0
2s


root@DESKTOP-8OOG2HF:kube# kgs
NAME                       TYPE        CLUSTER-IP      EXTERNAL-IP
PORT(S)          AGE
frontend-webapp-service    NodePort    10.106.20.243   <none>
80:30012/TCP     12s
```



Que 11 →

- Create 1 Public Docker Hub registry named cloudethix_multicontainer_yourname.



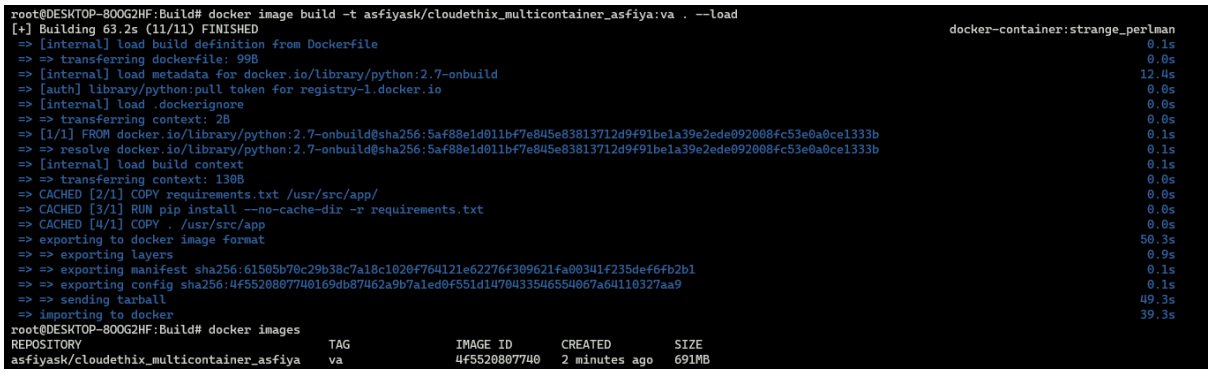
- Clone below repository on your system.
https://github.com/janakiramm/Kubernetes-multi-container-pod.git

```
root@DESKTOP-8OOG2HF:my_scripts# mkdir multicontainer
root@DESKTOP-8OOG2HF:my_scripts# cd multicontainer/

root@DESKTOP-8OOG2HF:multicontainer# git clone
git@github.com:janakiramm/Kubernetes-multi-container-pod.git
Cloning into 'Kubernetes-multi-container-pod'...
remote: Enumerating objects: 51, done.
remote: Total 51 (delta 0), reused 0 (delta 0), pack-reused 51
Receiving objects: 100% (51/51), 88.14 KiB | 308.00 KiB/s, done.
Resolving deltas: 100% (21/21), done.

root@DESKTOP-8OOG2HF:multicontainer# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 15:03 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 15:02 ../
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 15:03 Kubernetes-multi-
container-pod/
root@DESKTOP-8OOG2HF:multicontainer# cd Kubernetes-multi-container-
pod/

root@DESKTOP-8OOG2HF:multicontainer# cd Kubernetes-multi-container-
pod/
```

```
root@DESKTOP-8OOG2HF:Kubernetes-multi-container-pod# ll
total 120
drwxrwxrwx 1 asfiya asfiya    512 Feb 22 15:03 ./
drwxrwxrwx 1 asfiya asfiya    512 Feb 22 15:03 ../
drwxrwxrwx 1 asfiya asfiya    512 Feb 22 15:03 .git/
-rwxrwxrwx 1 asfiya asfiya      9 Feb 22 15:03 .gitignore*
drwxrwxrwx 1 asfiya asfiya    512 Feb 22 15:03 Build/
drwxrwxrwx 1 asfiya asfiya    512 Feb 22 15:03 Deploy/
-rwxrwxrwx 1 asfiya asfiya   2550 Feb 22 15:03 README.md*
-rwxrwxrwx 1 asfiya asfiya 116003 Feb 22 15:03 multi-container-
pod.png*
```

- Once code is copied , go to the Build directory and build docker image from docker file and add meaningful tags and push to docker hub repository.

```
root@DESKTOP-8OOG2HF:Kubernetes-multi-container-pod# cd Build/
root@DESKTOP-8OOG2HF:Build# ll
total 4
drwxrwxrwx 1 asfiya asfiya  512 Feb 22 15:03 ./
drwxrwxrwx 1 asfiya asfiya  512 Feb 22 15:03 ../
-rwxrwxrwx 1 asfiya asfiya   62 Feb 22 15:03 Dockerfile*
-rwxrwxrwx 1 asfiya asfiya 1607 Feb 22 15:03 app.py*
-rwxrwxrwx 1 asfiya asfiya  242 Feb 22 15:03 docker-compose.yml*
-rwxrwxrwx 1 asfiya asfiya   24 Feb 22 15:03 requirements.txt*
```



```
root@DESKTOP-8OOG2HF:Build# docker image push
asfiyask/cloudethix_multicontainer_asfiya:va

The push refers to repository
[docker.io/asfiyask/cloudethix_multicontainer_asfiya]

8f18896fd729: Pushed

b5fc42bbcb37: Pushed

d0fb1324b33b: Pushed

3e397f5b8357: Pushed

e257add70b4b: Pushed

ce7e990ce056: Pushed

633d23790c1d: Pushed

d071a18d9802: Pushed

8451f9fe0016: Pushed

858cd8541f7e: Pushed

a42d312a03bb: Pushed

dd1eb1fd7e08: Pushed

va: digest:
sha256:1f90ebab5e9f5c41f018558c801f88eae6aa150c83653467e4e04ab62103d5a
5 size: 2844
```

- Now go to the deploy directory and notice the files.
- Here, web-pod-1.yml file will create the pod with two containers (Multi container). Take a note of lables , name of containers and ports. Also, please make sure you will update the python container image that you have pushed to your docker registry.

```yaml
apiVersion: "v1"
kind: Pod
metadata:
  name: web1
  labels:
    name: web
    app: demo
spec:
  containers:
    - name: redis
      image: redis
      ports:
        - containerPort: 6379
```

```
          name: redis
          protocol: TCP
    - name: python
      image: asfiyask/cloudethix_multicontainer_asfiya:va
      env:
        - name: "REDIS_HOST"
          value: "localhost"
      ports:
        - containerPort: 5000
          name: http
          protocol: TCP
```

- Now, open web-svc.yml file and notice service Type , selectors & targetPort. Apply the fil

```
#web-svc.yaml
apiVersion: v1
kind: Service
metadata:
  name: web
  labels:
    name: web
    app: demo
spec:
  selector:
    name: web
  type: NodePort
  ports:
   - port: 80
     name: http
     targetPort: 5000
     protocol: TCP
```

- Now open db-pod.yml & notice the lables , name , Image, containerPort and apply the file.

```
apiVersion: "v1"
kind: Pod
metadata:
  name: mysql
  labels:
    name: mysql
    app: demo
spec:
  containers:
    - name: mysql
      image: mysql:5.7.25
      ports:
```

```
        - containerPort: 3306
          protocol: TCP
      env:
        -
          name: "MYSQL_ROOT_PASSWORD"
          value: "password"
```

● Now open the db-svc.yml file and notice service Type , selectors & targetPort. Apply the file.

```
apiVersion: v1
kind: Service
metadata:
  name: mysql
  labels:
    name: mysql
    app: demo
spec:
  ports:
  - port: 3306
    name: mysql
    targetPort: 3306
  selector:
    name: mysql
    app: demo
```

● Now , from the command line run below urls & notice the changes. # curl http://$NODE_IP:$NODE_PORT/init Initialize the database with sample schema

root@DESKTOP-8OOG2HF:Deploy# curl http://13.200.179.5:31424/init

DB Init doneroot@DESKTOP-8OOG

● Now it's time to Insert some sample data. Make sure you will use correct $NODE_IP:$NODE_PORT

curl -i -H "Content-Type: application/json" -X POST -d '{"uid": "1",

"user":"John Doe"}' http://$NODE_IP:$NODE_PORT/users/add

curl -i -H "Content-Type: application/json" -X POST -d '{"uid": "2",

```
"user":"Jane Doe"}' http://$NODE_IP:$NODE_PORT/users/add


'{# curl -i -H "Content-Type: application/json" -X POST -d
'{"uid": "3",
"user":"Bill Colls"}' http://$NODE_IP:$NODE_PORT/users/add


# curl -i -H "Content-Type: application/json" -X POST -d
'{"uid": "4",
"user":"Mike Taylor"}' http://$NODE_IP:$NODE_PORT/users/add


@DESKTOP-8OOGcurl -i -H "Content-Type: application/json" -X POST -d
'{"uid": "1",{"uid": "1",
"user":"John Doe"}' http://13.200.179.5:31424/users/add
HTTP/1.0 200 OK
Content-Type: application/json
Content-Length: 5
Server: Werkzeug/1.0.1 Python/2.7.15
Date: Thu, 22 Feb 2024 11:29:12 GMT


root@DESKTOP-8OOG2HF:Deploy# curl -i -H "Content-Type:
application/json" -X POST -d '{"uid": "2",
"user":"Jane Doe"}' http://13.200.179.5:31424/users/add
HTTP/1.0 200 OK
Content-Type: application/json
Content-Length: 5
Server: Werkzeug/1.0.1 Python/2.7.15
Date: Thu, 22 Feb 2024 11:40:35 GMT


root@DESKTOP-8OOG2HF:Deploy# curl -i -H "Content-Type:
application/json" -X POST -d '{"uid": "3",
"user":"Bill Colls"}' http://13.200.179.5:31424/users/add
HTTP/1.0 200 OK
Content-Type: application/json
```

Content-Length: 5

Server: Werkzeug/1.0.1 Python/2.7.15

Date: Thu, 22 Feb 2024 11:41:27 GMT

root@DESKTOP-8OOG2HF:Deploy# curl -i -H "Content-Type: application/json" -X POST -d '{"uid": "4",

"user":"Mike Taylor"}' http://13.200.179.5:31424/users/add

HTTP/1.0 200 OK

Content-Type: application/json

Content-Length: 5

Server: Werkzeug/1.0.1 Python/2.7.15

Date: Thu, 22 Feb 2024 11:34:46 GMT

- The second time you access the data, it appends '(c)' indicating that it is pulled from the Redis cache.

root@DESKTOP-8OOG2HF:Deploy# curl http://13.200.179.5:31424/users/1

John Doe

- Also, try to access mysql shell i.e db pod & run select * from the users table. check app.py for DB related information.

```
root@DESKTOP-8OOG2HF:Deploy# systemctl status mysql
● mysql.service - MySQL Community Server
     Loaded: loaded (/lib/systemd/system/mysql.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2024-02-22 17:32:30 IST; 7s ago
    Process: 391761 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0/SUCCESS)
   Main PID: 391780 (mysqld)
     Status: "Server is operational"
      Tasks: 38 (limit: 4639)
     Memory: 365.5M
     CGroup: /system.slice/mysql.service
             └─391780 /usr/sbin/mysqld
```

root@DESKTOP-8OOG2HF:Deploy# mysql -u root -p

Enter password:

Welcome to the MySQL monitor. Commands end with ; or \g.

Your MySQL connection id is 8

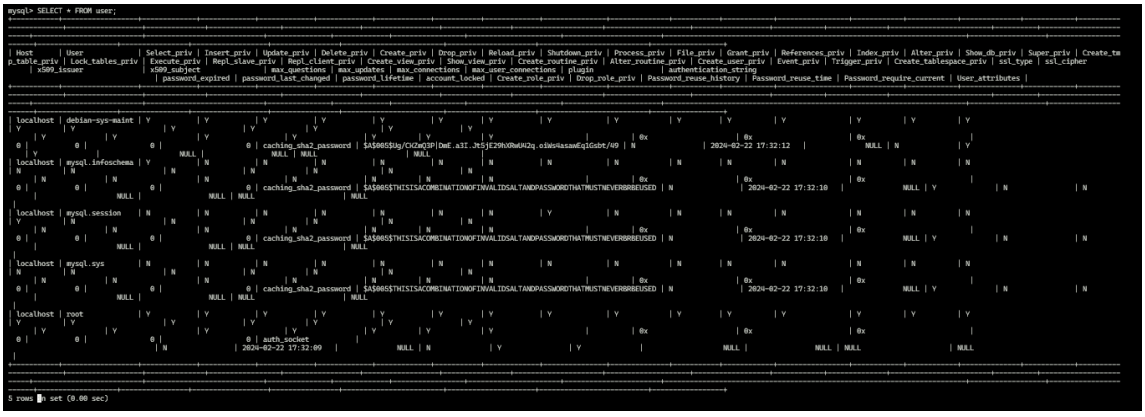
Server version: 8.0.36-0ubuntu0.22.04.1 (Ubuntu)

```
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input
statement.

root@DESKTOP-8OOG2HF:Deploy# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 9
Server version: 8.0.36-0ubuntu0.22.04.1 (Ubuntu)

Copyright (c) 2000, 2024, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input
statement.

mysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
4 rows in set (0.01 sec)
```

```
mysql> USE mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SHOW TABLES;
+-----------------------------------------------------+
| Tables_in_mysql                                     |
+-----------------------------------------------------+
| columns_priv                                        |
| component                                           |
| db                                                  |
| default_roles                                       |
| engine_cost                                         |
| func                                                |
| general_log                                         |
| global_grants                                       |
| gtid_executed                                       |
| help_category                                       |
| help_keyword                                        |
| help_relation                                       |
| help_topic                                          |
| innodb_index_stats                                  |
| innodb_table_stats                                  |
| password_history                                    |
| plugin                                              |
| procs_priv                                          |
| proxies_priv                                        |
| replication_asynchronous_connection_failover        |
| replication_asynchronous_connection_failover_managed |
| replication_group_configuration_version             |
| replication_group_member_actions                    |
```

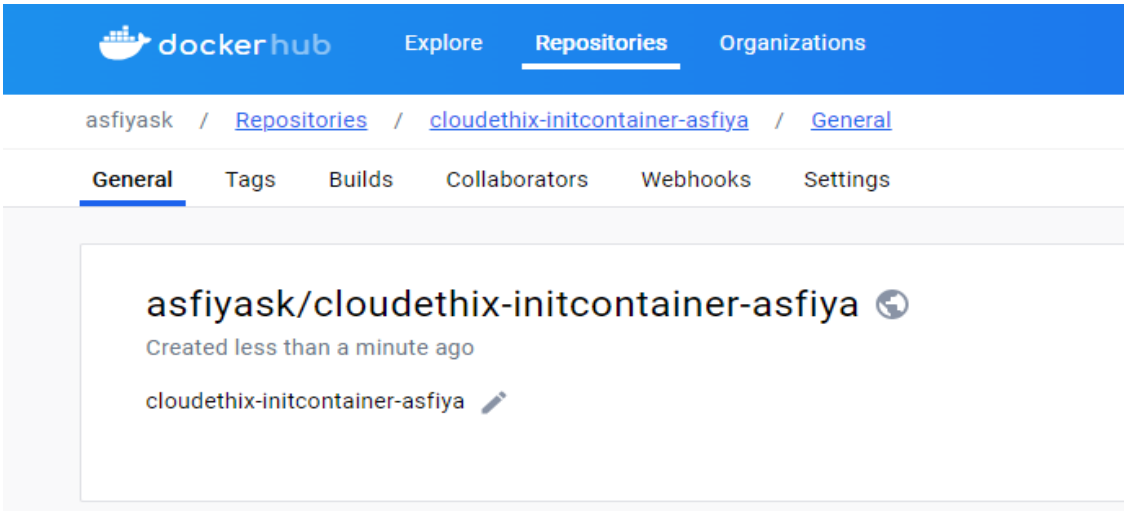
```
| role_edges                                                 |
| server_cost                                                |
| servers                                                    |
| slave_master_info                                          |
| slave_relay_log_info                                       |
| slave_worker_info                                          |
| slow_log                                                   |
| tables_priv                                                |
| time_zone                                                  |
| time_zone_leap_second                                      |
| time_zone_name                                             |
| time_zone_transition                                       |
| time_zone_transition_type                                  |
| user                                                       |
+------------------------------------------------------------+
37 rows in set (0.01 sec)
```

```
mysql> SELECT * FROM user;
```



Que 12 →

- Create 1 Public Docker Hub registry named cloudethix_Initcontainer_yourname.



- Clone below repository on your system.
https://github.com/janakiramm/simpleapp.git

```
root@DESKTOP-8OOG2HF:my_scripts# mkdir Initcontainer
root@DESKTOP-8OOG2HF:my_scripts# cd Initcontainer/


root@DESKTOP-8OOG2HF:Initcontainer# git clone
git@github.com:janakiramm/simpleapp.git
Cloning into 'simpleapp'...
remote: Enumerating objects: 47, done.
remote: Total 47 (delta 0), reused 0 (delta 0), pack-reused 47
Receiving objects: 100% (47/47), 8.20 KiB | 147.00 KiB/s, done.
Resolving deltas: 100% (9/9), done.
root@DESKTOP-8OOG2HF:Initcontainer# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:52 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:50 ../
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:52 simpleapp/
root@DESKTOP-8OOG2HF:Initcontainer# cd simpleapp/
root@DESKTOP-8OOG2HF:simpleapp# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:52 ./
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:52 ../
```

```
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:52 .git/
-rwxrwxrwx 1 asfiya asfiya  85 Feb 22 17:52 Dockerfile*
drwxrwxrwx 1 asfiya asfiya 512 Feb 22 17:52 html/
-rwxrwxrwx 1 asfiya asfiya  69 Feb 22 17:52 wrapper.sh*
```

- Once code is copied , go to the Build directory and build docker image from docker file and add meaningful tags and push to docker hub repository.


```
REPOSITORY                                    TAG
IMAGE ID       CREATED          SIZE

asfiyask/cloudethix-initcontainer-asfiya      vI
aae376c8baa0   21 seconds ago   187MB
```

```
root@DESKTOP-8OOG2HF:simpleapp# docker image push asfiyask/cloudethix-initcontainer-asfiya:vI

The push refers to repository [docker.io/asfiyask/cloudethix-initcontainer-asfiya]

e51c056ac20f: Pushed

300802a9a414: Pushed

61a7fb4dabcd: Mounted from asfiyask/nginx

bcc6856722b7: Mounted from asfiyask/nginx

188d128a188c: Mounted from asfiyask/nginx

7d52a4114c36: Mounted from asfiyask/nginx

3137f8f0c641: Mounted from asfiyask/cloudethix_configmap_asfiya

84619992a45b: Mounted from asfiyask/nginx

ceb365432eec: Mounted from asfiyask/nginx
```

```
vI: digest:
sha256:e6d0ad824e66110b1f72afd8d494d2edd3a5dda9377530b60809503eb499d4d
1 size: 2192
```

- Once Images are pushed to Docker hub registries, create a directory named kube. Inside the kube directory create deployement.yaml file with 3 replication , label app: simpleapp-webapp , containerPort: 80 and add the image that you have pushed in Docker Hub registry.

```
root@DESKTOP-8OOG2HF:simpleapp# mkdir kube
```

```
root@DESKTOP-8OOG2HF:simpleapp# cd kube/
```

```
root@DESKTOP-8OOG2HF:kube# touch deployement.yaml
```

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: simpleapp-webapp-deployment
  labels:
    app: simpleapp-webapp
spec:
  replicas: 3
  selector:
    matchLabels:
      app: simpleapp-webapp
  template:
    metadata:
      labels:
        app: simpleapp-webapp
    spec:
      containers:
      - name: simpleapp-webapp-cont
        image: asfiyask/cloudethix-initcontainer-asfiya:vI
        ports:
        - containerPort: 80
```

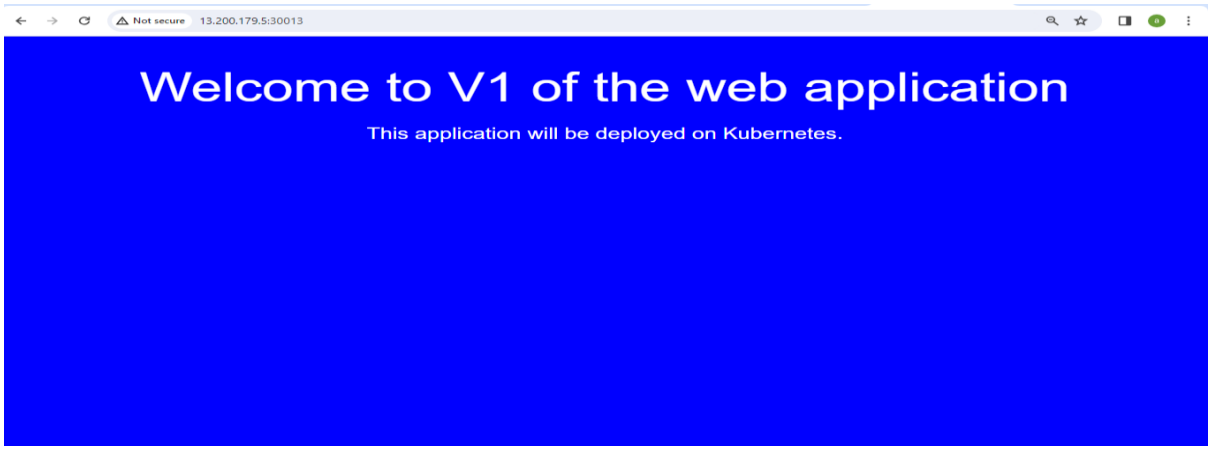
- Create one service.yaml file with type nodeport & select simpleapp-webapp pod with port 80 & targetPort 80 with any nodePort between range 30000-32768.

```yaml
apiVersion: v1
kind: Service
metadata:
  name: simpleapp-webapp-service
spec:
  selector:
    app: simpleapp-webapp
```

```
  ports:
    - protocol: TCP
      port: 80
      targetPort: 80
      nodePort: 30013
  type: NodePort
```

```
root@DESKTOP-8OOG2HF:kube# k apply -f .

root@DESKTOP-8OOG2HF:kube# kgp

NAME                                              READY   STATUS
RESTARTS   AGE

simpleapp-webapp-deployment-84d879f6bc-d7hfd   1/1     Running   0
41s

simpleapp-webapp-deployment-84d879f6bc-nwjw4   1/1     Running   0
41s

simpleapp-webapp-deployment-84d879f6bc-rhk2j   1/1     Running   0
41s


root@DESKTOP-8OOG2HF:kube# kgs

NAME                        TYPE        CLUSTER-IP       EXTERNAL-IP
PORT(S)          AGE

simpleapp-webapp-service    NodePort    10.109.247.99    <none>
80:30013/TCP     70s
```

- Open the webpage in the browser and notice the changes and capture the snap.



- Then delete the deployment that you have just created.

root@DESKTOP-8OOG2HF:kube# k delete -f .

deployment.apps "simpleapp-webapp-deployment" deleted

service "simpleapp-webapp-service" deleted

- Update the deployment.yaml file and add volumeMounts with mountPath

/usr/share/nginx/html from emptyDir: {} volume.

- Once above changes are added, add initContainers block with below

parameters. Also add volumeMounts for Init Container with mountPath

"/work-dir" from emptyDir: {} volume.

initContainers:

- name: install

image: busybox:1.28

command:

- wget

- "-O"

- "/work-dir/index.html"

- http://info.cern.ch

volumeMounts:

- name: workdir

mountPath: "/work-dir"

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: simpleapp-webapp
spec:
  selector:
    matchLabels:
      app: simpleapp-webapp
  template:
    metadata:
      labels:
```

```
        app: simpleapp-webapp
    spec:
      initContainers:
      - name: install
        image: busybox:1.28
        command:
        - wget
        - "-O"
        - "/work-dir/index.html"
        - http://info.cern.ch
        volumeMounts:
        - name: workdir
          mountPath: "/work-dir"
      containers:
      - name: simpleapp-webapp
        image: asfiyask/cloudethix-initcontainer-asfiya:initt
        ports:
        - containerPort: 80
        volumeMounts:
        - name: html-volume
          mountPath: /usr/share/nginx/html
        - name: workdir
          mountPath: /work-dir
      volumes:
      - name: html-volume
        emptyDir: {}
      - name: workdir
        emptyDir: {}
```

- Add volumes with emptyDir: {} in deployment.yaml file.

```
apiVersion: v1

kind: Service
metadata:
  name: simpleapp-webapp-service
spec:
  selector:
    app: simpleapp-webapp
  ports:
    - protocol: TCP
      port: 80
      targetPort: 80
      nodePort: 30016
  type: NodePort
```

WRAPPER.SH FILE OUTPUT

```
#!/bin/bash

echo "Nginx is running..."
cp -r /work-dir/index.html /usr/share/nginx/html/
exec nginx -g "daemon off;"
```

- Once the deployment.yaml file is ready, create the deployment & access the page in the browser and notice the changes.

Ss

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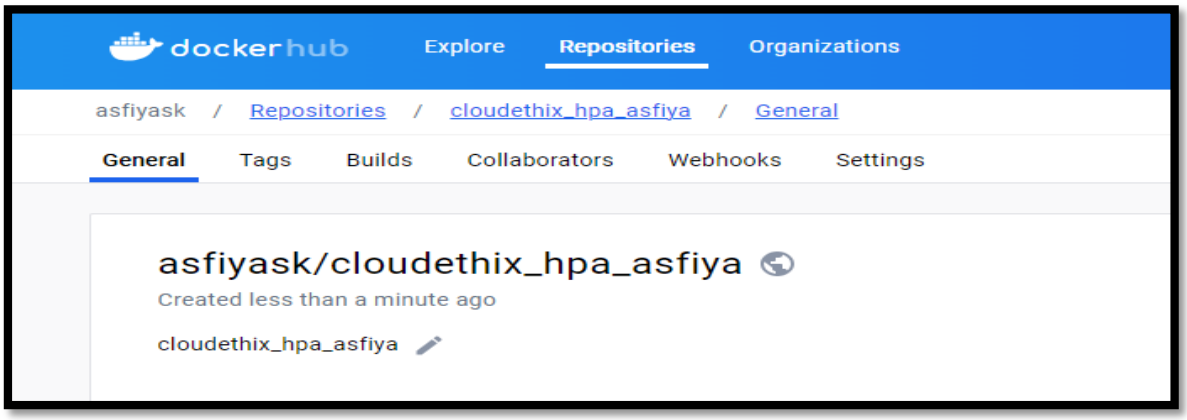
Que 13 →

- Create 1 Public Docker Hub registry named cloudethix_hpa_yourname.



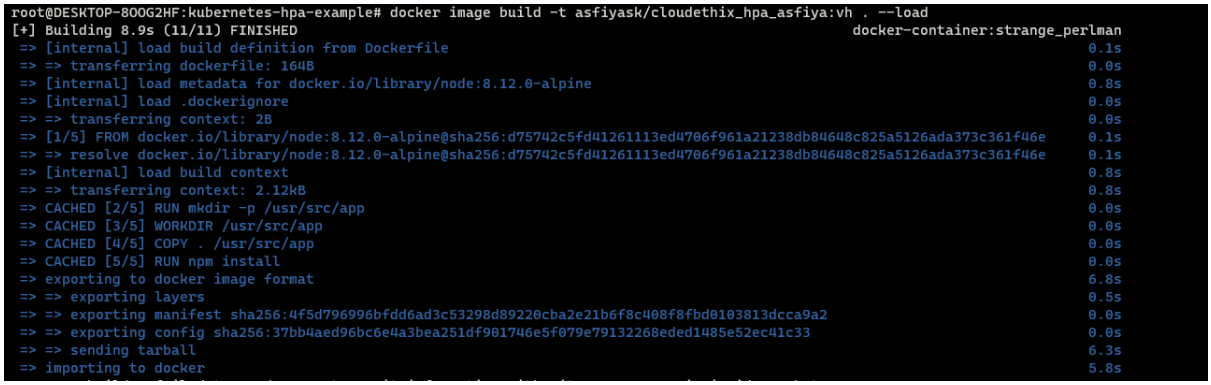
- Clone below repository on your system.
https://github.com/vivekamin/kubernetes-hpa-example.git

root@DESKTOP-8OOG2HF:my_scripts# mkdir hpa

root@DESKTOP-8OOG2HF:my_scripts# cd hpa/

```
root@DESKTOP-8OOG2HF:hpa# git clone
git@github.com:vivekamin/kubernetes-hpa-example.git

Cloning into 'kubernetes-hpa-example'...

remote: Enumerating objects: 26, done.

remote: Total 26 (delta 0), reused 0 (delta 0), pack-reused 26

Receiving objects: 100% (26/26), done.

Resolving deltas: 100% (9/9), done.


root@DESKTOP-8OOG2HF:hpa# ll

total 0

drwxrwxrwx 1 asfiya asfiya 512 Feb 22 18:48 ./

drwxrwxrwx 1 asfiya asfiya 512 Feb 22 18:47 ../

drwxrwxrwx 1 asfiya asfiya 512 Feb 22 18:48 kubernetes-hpa-example/


root@DESKTOP-8OOG2HF:hpa# cd kubernetes-hpa-example/


root@DESKTOP-8OOG2HF:kubernetes-hpa-example# ll

total 4

drwxrwxrwx 1 asfiya asfiya  512 Feb 22 18:48 ./

drwxrwxrwx 1 asfiya asfiya  512 Feb 22 18:48 ../

drwxrwxrwx 1 asfiya asfiya  512 Feb 22 18:48 .git/

-rwxrwxrwx 1 asfiya asfiya  127 Feb 22 18:48 Dockerfile*

-rwxrwxrwx 1 asfiya asfiya 2788 Feb 22 18:48 README.md*

drwxrwxrwx 1 asfiya asfiya  512 Feb 22 18:48 k8s/

-rwxrwxrwx 1 asfiya asfiya  272 Feb 22 18:48 package.json*

drwxrwxrwx 1 asfiya asfiya  512 Feb 22 18:48 src/
```

- Once code is copied , build a docker image from the docker file and add meaningful tags and push to the docker hub repository.




```
root@DESKTOP-8OOG2HF:kubernetes-hpa-example# docker image ls

REPOSITORY                                  TAG                 IMAGE
ID       CREATED          SIZE

asfiyask/cloudethix_hpa_asfiya              vh
37bb4aed96bc   50 seconds ago   65.7MB

root@DESKTOP-8OOG2HF:kubernetes-hpa-example# docker image push
asfiyask/cloudethix_hpa_asfiya:vh

The push refers to repository
[docker.io/asfiyask/cloudethix_hpa_asfiya]

b8e9c0a07126: Pushed

77abe5d8f1bf: Pushed

5f70bf18a086: Mounted from asfiyask/kubernetes-haproxy-nodejs-service

f4d297a2cf06: Pushed

8b59e4cead98: Pushed

7aa09d2ca0a3: Pushed

df64d3292fd6: Pushed

vh: digest:
sha256:3d06d57b00748f65426eeb58f6b08ca5e724559bc3fc3bca22c4ed9e8a75fe4
0 size: 1780

------------------------------------------------------------------
```

- Once the image is pushed, go to k8s directory and update deployment.yaml file with image name from your repo. And then create it.

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: node-example
spec:
  replicas: 1
  selector:
```

```
    matchLabels:
      app: node-example
  template:
    metadata:
      labels:
        app: node-example
    spec:
      containers:
      - name: node-example
        image: asfiyask/cloudethix_hpa_asfiya:vh
        imagePullPolicy: Always
        ports:
        - containerPort: 3000
        resources:
          limits:
            cpu: "0.5"
          requests:
            cpu: "0.25"
```

- Open service.yml and change the type to nodePort and apply the same.

```
apiVersion: v1
kind: Service
metadata:
  name: node-example
  labels:
    app: node-example
spec:
  selector:
    app: node-example
  ports:
  - port: 80
    protocol: TCP
    targetPort: 3000
    nodePort: 30111
  type: NodePort
```

- Open the HPA.yaml file, notice it and then apply the same.

```
root@DESKTOP-8OOG2HF:k8s# k apply -f .
deployment.apps/node-example created
horizontalpodautoscaler.autoscaling/node-example created
service/node-example created
```

```
root@DESKTOP-8OOG2HF:k8s# kgp
NAME                            READY   STATUS    RESTARTS   AGE
node-example-688488b678-vk54q   1/1     Running   0          26s


root@DESKTOP-8OOG2HF:k8s# kgs
NAME           TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)
AGE
node-example   NodePort    10.96.90.172   <none>        3000:30111/TCP
28s
```

- Open the browser, and access the webpage

- Now it's time to test the HPA working with the below command.

```
# kubectl run -i --tty load-generator --rm --image=busybox
--restart=Never -- /bin/sh -c "while sleep 0.01; do wget -q -
Ohttp://NODE_PORT_SERVICE_NAME; done"


root@DESKTOP-8OOG2HF:k8s# kubectl run -i --tty load-generator --rm --
image=busybox --restart=Never -- /bin/sh -c "while sleep 0.01; do wget
-q -O- http://node-example:80; done"
If you don't see a command prompt, try pressing enter.
Hello World!!
Hello World!!
Hello World!!
Hello World!!
```

```
Hello World!!

Hello World!!
```

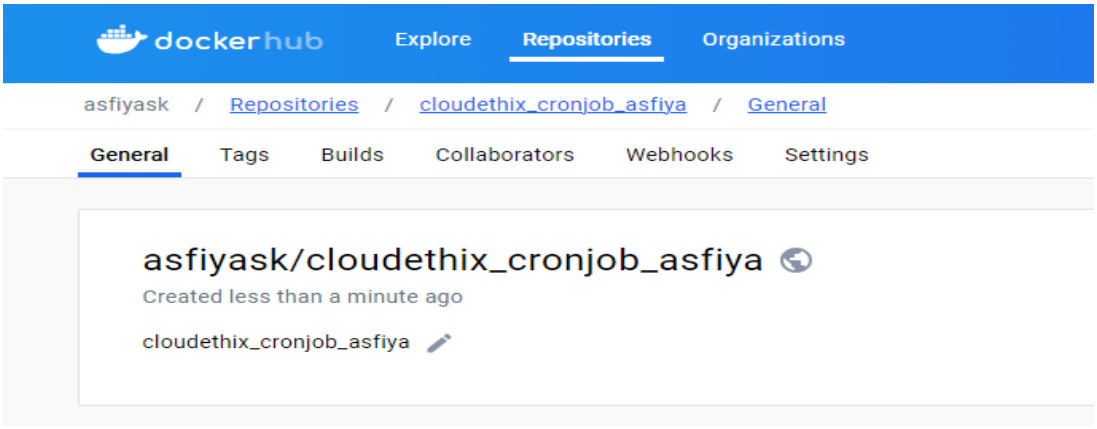
- Check the HPA from kubectl command and also check if the deployment is scaling up.

```
root@DESKTOP-8OOG2HF:k8s# kubectl get hpa
NAME           REFERENCE                  TARGETS         MINPODS   MAXPODS   REPLICAS   AGE
node-example   Deployment/node-example   <unknown>/1%   1         4         0          27m

root@DESKTOP-8OOG2HF:k8s# kubectl get deployments
NAME           READY   UP-TO-DATE   AVAILABLE   AGE
node-example   1/1     1            1           27m
```

==========

Que 14 →

- Create 1 Public Docker Hub registry named cloudethix_cronjob_yourname.




```
root@DESKTOP-8OOG2HF:my_scripts# mkdir Cronjob
root@DESKTOP-8OOG2HF:my_scripts# cd Cronjob/
root@DESKTOP-8OOG2HF:Cronjob# ll
total 0
drwxrwxrwx 1 asfiya asfiya 512 Feb 23 11:22 ./
```

drwxrwxrwx 1 asfiya asfiya 512 Feb 23 11:22 ../

root@DESKTOP-8OOG2HF:Cronjob# touch helloworld.py

```
# Hellowold.py
#!/usr/local/bin/python3
import datetime
x = datetime.datetime.now()
print("Welcome to the Cloudethix World")
print("Today is")
print(x)
```

root@DESKTOP-8OOG2HF:Cronjob# touch Dockerfile

```
# Dockerfile
FROM python:3.7-alpine
#add user group and ass user to that group
RUN addgroup -S appgroup && adduser -S appuser -G appgroup
#creates work dir
WORKDIR /app
#copy python script to the container folder app
COPY helloworld.py /app/helloworld.py
RUN chmod +x /app/helloworld.py
#user is appuser
USER appuser
ENTRYPOINT ["python", "/app/helloworld.py"]
```

root@DESKTOP-8OOG2HF:Cronjob# touch pythoncronjob.yml

```
root@DESKTOP-8OOG2HF:Cronjob# docker image build -t asfiyask/cloudethix_cronjob_asfiya:v1 . --load
[+] Building 7.7s (11/11) FINISHED                                                    docker-container:strange_perlman
 => [internal] load build definition from Dockerfile                                                          0.1s
 => => transferring dockerfile: 396B                                                                          0.0s
 => [internal] load metadata for docker.io/library/python:3.7-alpine                                          0.8s
 => [internal] load .dockerignore                                                                             0.1s
 => => transferring context: 2B                                                                               0.0s
 => [1/5] FROM docker.io/library/python:3.7-alpine@sha256:f3d31c8677d03f0b3c724446077f229a6ce9d3ac430f5c08cd7dff00292048c3    0.1s
 => => resolve docker.io/library/python:3.7-alpine@sha256:f3d31c8677d03f0b3c724446077f229a6ce9d3ac430f5c08cd7dff00292048c3    0.1s
 => [internal] load build context                                                                             0.1s
 => => transferring context: 32B                                                                              0.0s
 => CACHED [2/5] RUN addgroup -S appgroup && adduser -S appuser -G appgroup                                   0.0s
 => CACHED [3/5] WORKDIR /app                                                                                 0.0s
 => CACHED [4/5] COPY helloworld.py /app/helloworld.py                                                        0.0s
 => CACHED [5/5] RUN chmod +x /app/helloworld.py                                                              0.0s
 => exporting to docker image format                                                                          6.3s
 => => exporting layers                                                                                       1.0s
 => => exporting manifest sha256:505a04fa1a343d5e11d18679eedd04d459ce8b289e24971300b99e7dec62c58f             0.1s
 => => exporting config sha256:3fe0da619649e9e8081214d735ae060b69da97da301cbf5c1ed4787742f4520a               0.0s
 => => sending tarball                                                                                        5.2s
 => importing to docker                                                                                       4.4s
```

root@DESKTOP-8OOG2HF:Cronjob# docker image push asfiyask/cloudethix_cronjob_asfiya:v1

The push refers to repository [docker.io/asfiyask/cloudethix_cronjob_asfiya]

5f70bf18a086: Mounted from asfiyask/cloudethix_hpa_asfiya

68ff62071c60: Pushed

```
4daa97c307e6: Pushed

cc3791a4c448: Pushed

ae2ed3079163: Pushed

aa3a591fc84e: Pushed

7f29b11ef9dd: Pushed

a1c2f058ec5f: Pushed

cc2447e1835a: Pushed

v1: digest:
sha256:c50a6a105b39ef3d5df62558f3f4e44b034416ce26f478cc93c8500f8902fce
d size: 2195
```

- Now update the pythoncronjob.yml file to change the image name that you have just pushed to docker hub registry.

```yaml
# Python Cronjob Yaml
apiVersion: batch/v1
kind: CronJob
metadata:
  name: python-helloworld
spec:
  schedule: "*/1 * * * *"
  jobTemplate:
    spec:
      template:
        spec:
          containers:
          - name: python-helloworld
            image: asfiyask/cloudethix_cronjob_asfiya:v1
            command: ["/app/helloworld.py"]
          restartPolicy: OnFailure
```

- Now create a cron job using pythoncronjob.yml file. Check with kubectl command if the cron job is created.

```
root@DESKTOP-8OOG2HF:Cronjob# k apply -f pythoncronjob.yml

cronjob.batch/python-helloworld created

root@DESKTOP-8OOG2HF:Cronjob# kgp

No resources found in default namespace.
```

```
root@DESKTOP-8OOG2HF:Cronjob# kubectl get cronjob
NAME                SCHEDULE      SUSPEND   ACTIVE   LAST SCHEDULE
AGE
python-helloworld   */1 * * * *   False     1        46s
72s
```

- Then check the pod logs which are created by the job and capture the output.

```
root@DESKTOP-8OOG2HF:14_Cronjob# kgp
NAME                                 READY   STATUS      RESTARTS   AGE
python-helloworld-28478206-5bzfv     0/1     Completed   0          22s


root@DESKTOP-8OOG2HF:14_Cronjob# k logs python-helloworld-28478206-
5bzfv
Welcome to the Cloudethix World
Today is
2024-02-23 12:46:07.011640


root@DESKTOP-8OOG2HF:14_Cronjob# k get cronjob
NAME                SCHEDULE      SUSPEND   ACTIVE   LAST SCHEDULE
AGE
python-helloworld   */1 * * * *   False     0        59s
98s
```

```yaml
apiVersion: batch/v1
kind: CronJob
metadata:
  name: python-helloworld
spec:
  schedule: "*/1 * * * *"
  jobTemplate:
    spec:
      template:
        spec:
          containers:
          - name: python-helloworld
            image: asfiyask/cronjob_asfiya:v1
            command: ["/app/helloworld.py"]
          restartPolicy: OnFailure
```