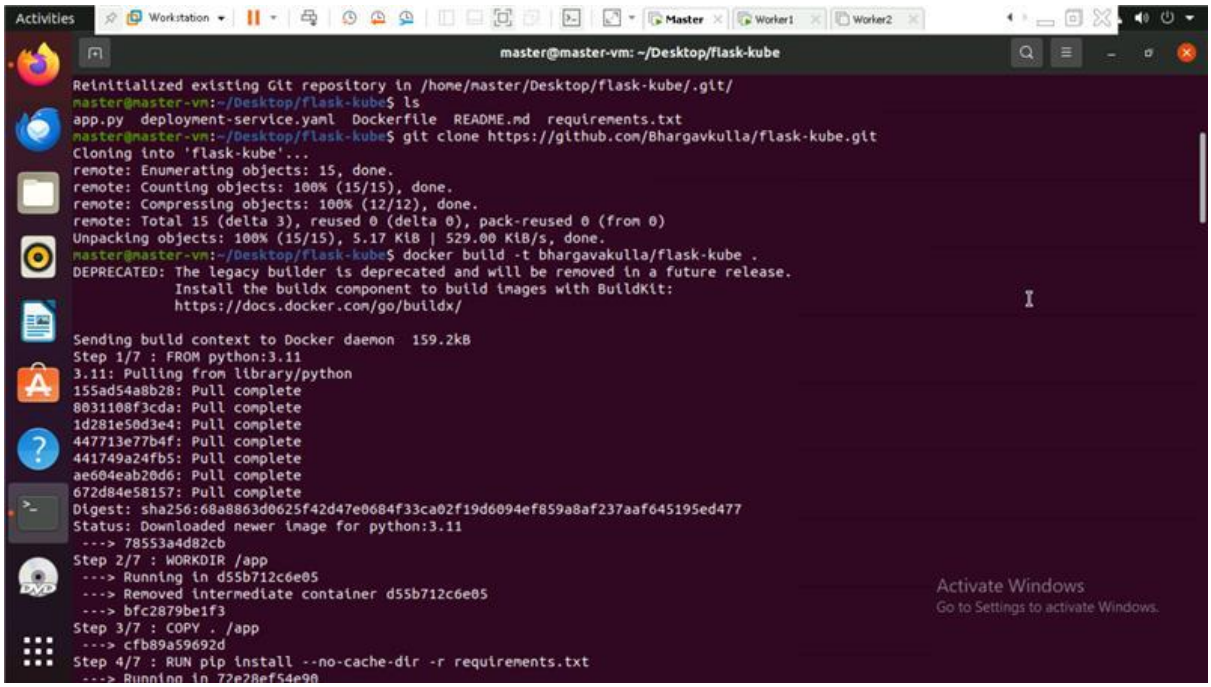
Kubernetes Project-1 Deploying a Flask Application on Kubernetes with Auto-Scaling & Load Testing

STEP-1. Building & Containerizing the Flask Application



STEP-2. Deploying Flask App on Kubernetes

```
Using default tag: latest
The push refers to repository [docker.io/bhargavakulla/flask-kube]
ed2d2de7e13d: Pushed
a4e99a22ba81: Pushed
ff84030030d9: Pushed
b723da6e1cf4: Mounted from library/python
7af6b2a8a1a8: Mounted from library/python
71030c5d3283: Mounted from library/python
4b017a36fd9c: Mounted from library/python
20a9b386e10e: Mounted from library/python
f8217d7865d2: Mounted from library/python
01c9a2a5f237: Mounted from library/python
latest: digest: sha256:c1654c6c11816344e2656ed12cde2f737465c81dc39ac3eb895a14bc0e52a8a8 size: 2422
master@master-vm:~/Desktop/flask-kube$ kubectl apply -f deployment-service.yaml
deployment.apps/flask-app created
service/flask-service created
```

STEP-3. Fixing Docker Hub Rate Limits (Authentication Issue)

```
master@master-vm:~/Desktop/flask-kube$ kubectl create secret docker-registry docker-secret \
>   --docker-server=https://index.docker.io/v1/ \
>   --docker-username=bhargavakulla \
>   --docker-password=Bharu@12345 \
>   --docker-email=bhargavaramcloud@gmail.com
secret/docker-secret created
```

STEP-4. Installing & Troubleshooting Metrics Server

```
master@master-vm:~/Desktop/flask-kube$ kubectl patch serviceaccount default -p '{"imagePullSecrets": [{"name": "docker-secret"}]}'
serviceaccount/default patched
master@master-vm:~/Desktop/flask-kube$ kubectl apply -f https://github.com/kubernetes-sigs/metrics-server/releases/latest/download/c
omponents.yaml
serviceaccount/metrics-server created
clusterrole.rbac.authorization.k8s.io/system:aggregated-metrics-reader created
clusterrole.rbac.authorization.k8s.io/system:metrics-server created
rolebinding.rbac.authorization.k8s.io/metrics-server-auth-reader created
clusterrolebinding.rbac.authorization.k8s.io/metrics-server:system:auth-delegator created
clusterrolebinding.rbac.authorization.k8s.io/system:metrics-server created
service/metrics-server created
deployment.apps/metrics-server created
apiservice.apiregistration.k8s.io/v1beta1.metrics.k8s.io created
master@master-vm:~/Desktop/flask-kube$
```

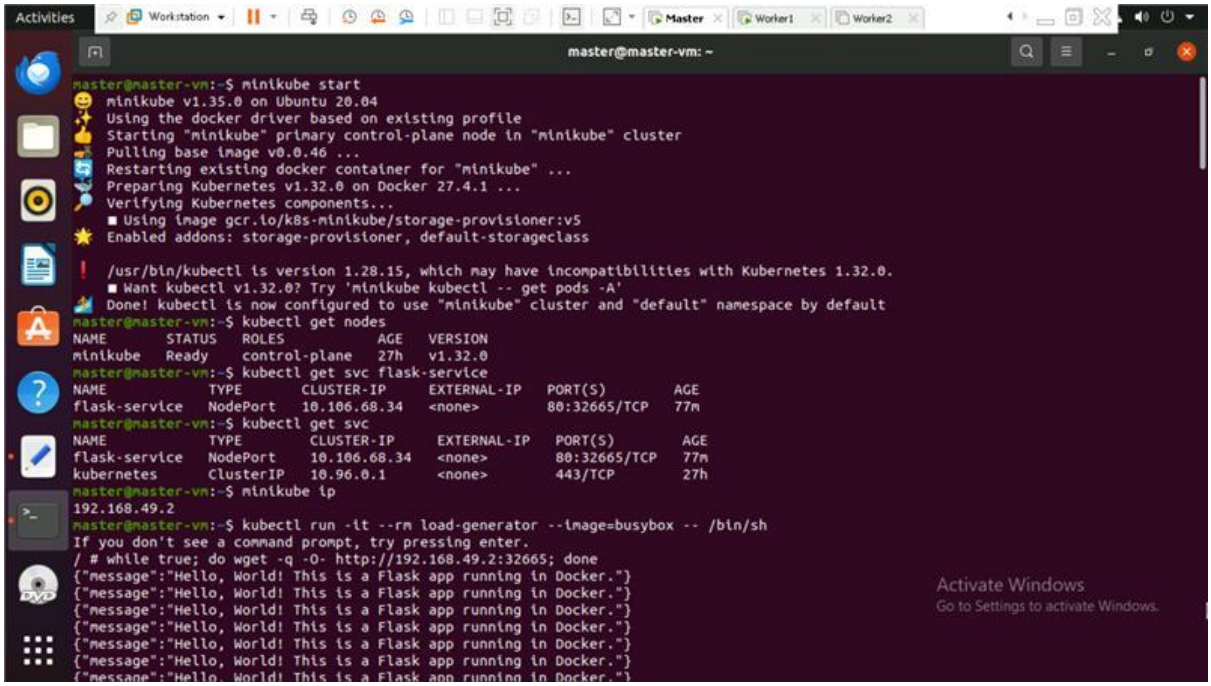

STEP-5. Enabling HPA (Horizontal Pod Autoscaler)

```
master@master-vm:~/Desktop/flask-kube$ kubectl autoscale deployment flask-app --cpu-percent=50 --min=3 --max=10
horizontalpodautoscaler.autoscaling/flask-app autoscaled
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME        REFERENCE              TARGETS            MINPODS   MAXPODS   REPLICAS   AGE
flask-app   Deployment/flask-app   cpu: <unknown>/50%   3         10        0          3s
master@master-vm:~/Desktop/flask-kube$ kubectl run -it --rm busybox --image=busybox -- /bin/sh
If you don't see a command prompt, try pressing enter.
/ #
/ # ls
bin    dev    etc    home   lib    lib64  proc   root   sys    tmp    usr    var
/ # pwd
/
/ # echo "hi bhargav"
hi bhargav
/ # exit
Session ended, resume using 'kubectl attach busybox -c busybox -i -t' command when the pod is running
pod "busybox" deleted
master@master-vm:~/Desktop/flask-kube$
```

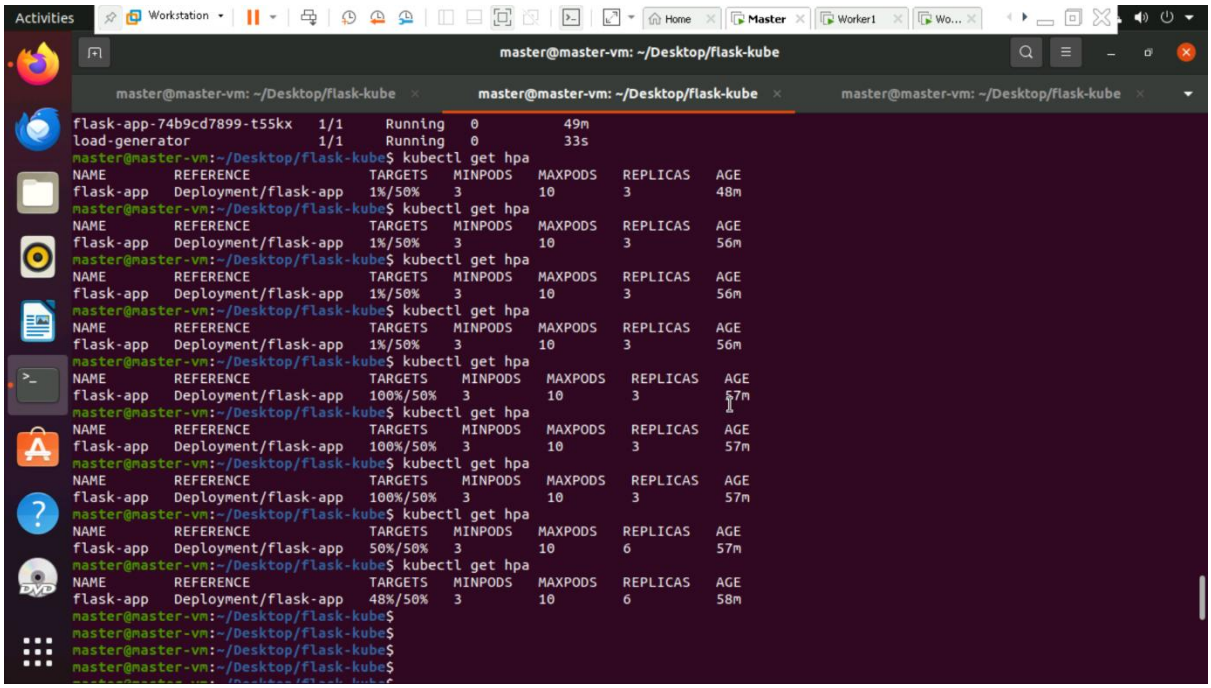
STEP-6. Load Testing & Debugging NodePort Issues

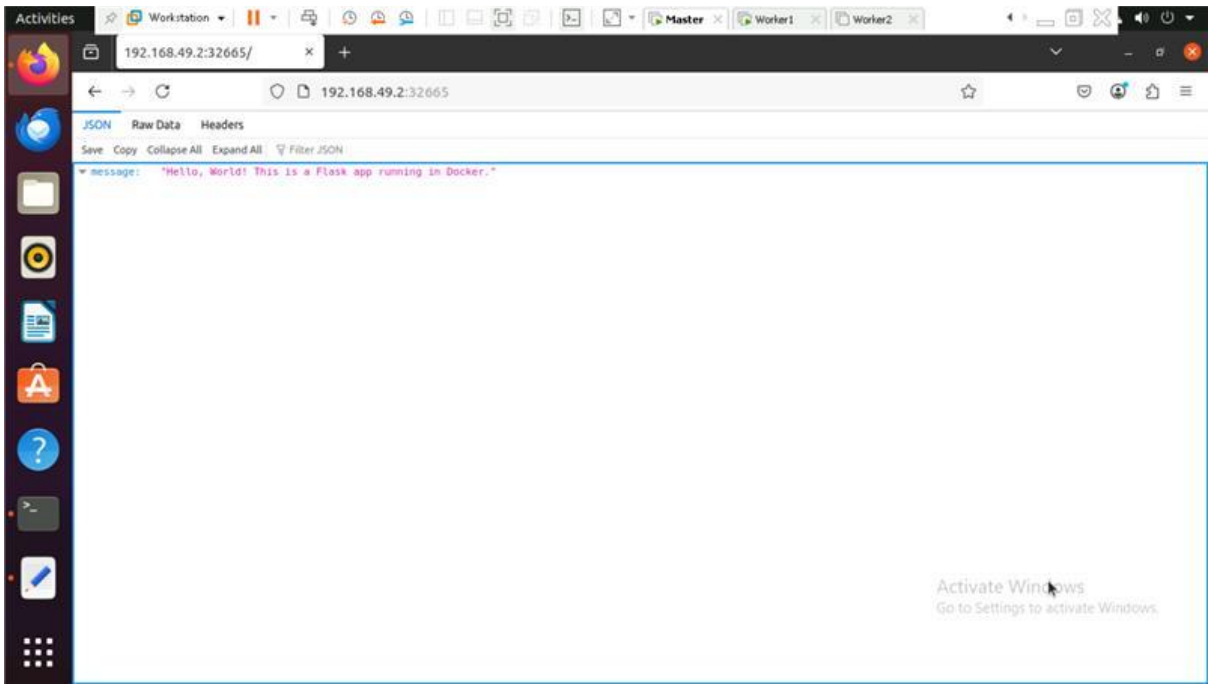
```
master@master-vm:~/Desktop/flask-kube$ wget -q -O- http://10.97.210.48:80
master@master-vm:~/Desktop/flask-kube$ kubectl get svc flask-service
NAME            TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)        AGE
flask-service   NodePort    10.106.68.34    <none>        80:32665/TCP   25m
```

STEP-7. Simulating Load for HPA



OUTPUT:


Activities
Workstation
master@master-vm: ~/Desktop/flask-kube
master@master-vm: ~/Desktop/flask-kube
master@master-vm: ~/Desktop/flask-kube
master@master-vm: ~/Desktop/flask-kube
flask-app-74b9cd7899-t55kx 1/1 Running 0 49m
load-generator 1/1 Running 0 33s
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 1%/50% 3 10 3 48m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 1%/50% 3 10 3 56m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 1%/50% 3 10 3 56m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 1%/50% 3 10 3 56m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 100%/50% 3 10 3 57m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 100%/50% 3 10 3 57m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 100%/50% 3 10 3 57m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 50%/50% 3 10 6 57m
master@master-vm:~/Desktop/flask-kube$ kubectl get hpa
NAME REFERENCE TARGETS MINPODS MAXPODS REPLICAS AGE
flask-app Deployment/flask-app 48%/50% 3 10 6 58m
master@master-vm:~/Desktop/flask-kube$
master@master-vm:~/Desktop/flask-kube$
master@master-vm:~/Desktop/flask-kube$
master@master-vm:~/Desktop/flask-kube$


Activities
Workstation
Master
Worker1
Worker2
192.168.49.2:32665/
192.168.49.2:32665
JSON
Raw Data
Headers
Save
Copy
Collapse All
Expand All
Filter JSON
message: "Hello, World! This is a Flask app running in Docker."
Activate Windows
Go to Settings to activate Windows.