GCP-final-task

1- preparing image for the project:

- clone Github repo to local machine

  `git clone` https://github.com/atefhares/DevOps-Challenge-Demo-Code.git

- create Dockerfile for this project

```
FROM python:3.7-alpine3.15
WORKDIR /app

#--------------install requirements ---------------#
RUN pip install redis
RUN pip install tornado

COPY . .


#----------- EXPORT ENV VARS --------#
ENV ENVIRONMENT=DEV
ENV HOST=localhost
ENV PORT=8000
ENV REDIS_HOST=redis
ENV REDIS_PORT=6379
ENV REDIS_DB=0

CMD [ "python3", "hello.py" ]
```

- create the image using Dockerfile

  `docker build . -t ahmedabdelsalam19/devops-challenge`

- tag the image

  `docker tag ahmedabdelsalam19/devops-challenge ahmedabdelsalam19/devops-challenge`

- push the image to Dockerhub [just for testing]

  `docker push ahmedabdelsalam19/devops-challenge`

- using helm charts to deploy

```
[ahmedabdelsalam@localhost GCP_TF_TASK]$ helm install python-gcp my-python-app/
NAME: python-gcp
LAST DEPLOYED: Tue Jul 26 06:08:25 2022
NAMESPACE: default
STATUS: deployed
REVISION: 1
```

- create deployment and service for application

- check pods and service

- good, all run successfully

```
[ahmedabdelsalam@localhost GCP_TF_TASK]$ kubectl get svc
NAME                TYPE        CLUSTER-IP        EXTERNAL-IP    PORT(S)            AGE
backend-service     ClusterIP   10.96.180.146     <none>         80/TCP             36d
kubernetes          ClusterIP   10.96.0.1         <none>         443/TCP            39d
myjenkins           ClusterIP   10.106.78.100     <none>         8080/TCP           12h
myjenkins-agent     ClusterIP   10.109.45.14      <none>         50000/TCP          12h
new-py-app-svc      NodePort    10.101.55.87      <none>         8000:31683/TCP     87s
new-redis-svc       ClusterIP   10.104.113.149    <none>         6379/TCP           88s
py-app-svc          NodePort    10.101.118.185    <none>         8000:31447/TCP     15h
redis               ClusterIP   10.107.24.110     <none>         6379/TCP           15h
web-app-service     NodePort    10.97.23.187      <none>         80:30082/TCP       36d
[ahmedabdelsalam@localhost GCP_TF_TASK]$ kubectl get po
NAME                                        READY    STATUS     RESTARTS         AGE
myjenkins-0                                 2/2      Running    2 (3h50m ago)    12h
new-python-application-65b46648cd-mzw2d     1/1      Running    0                106s
new-redis-dep-666d4dbfb4-k2qsh              1/1      Running    0                106s
python-application-7775f455f9-29h9r         1/1      Running    3 (9h ago)       15h
redis-dep-666d4dbfb4-mcww5                  1/1      Running    1 (3h50m ago)    15h
```

- generate url for app service using minikube

  `minikube service new-py-app-svc --url`

- open url to view results
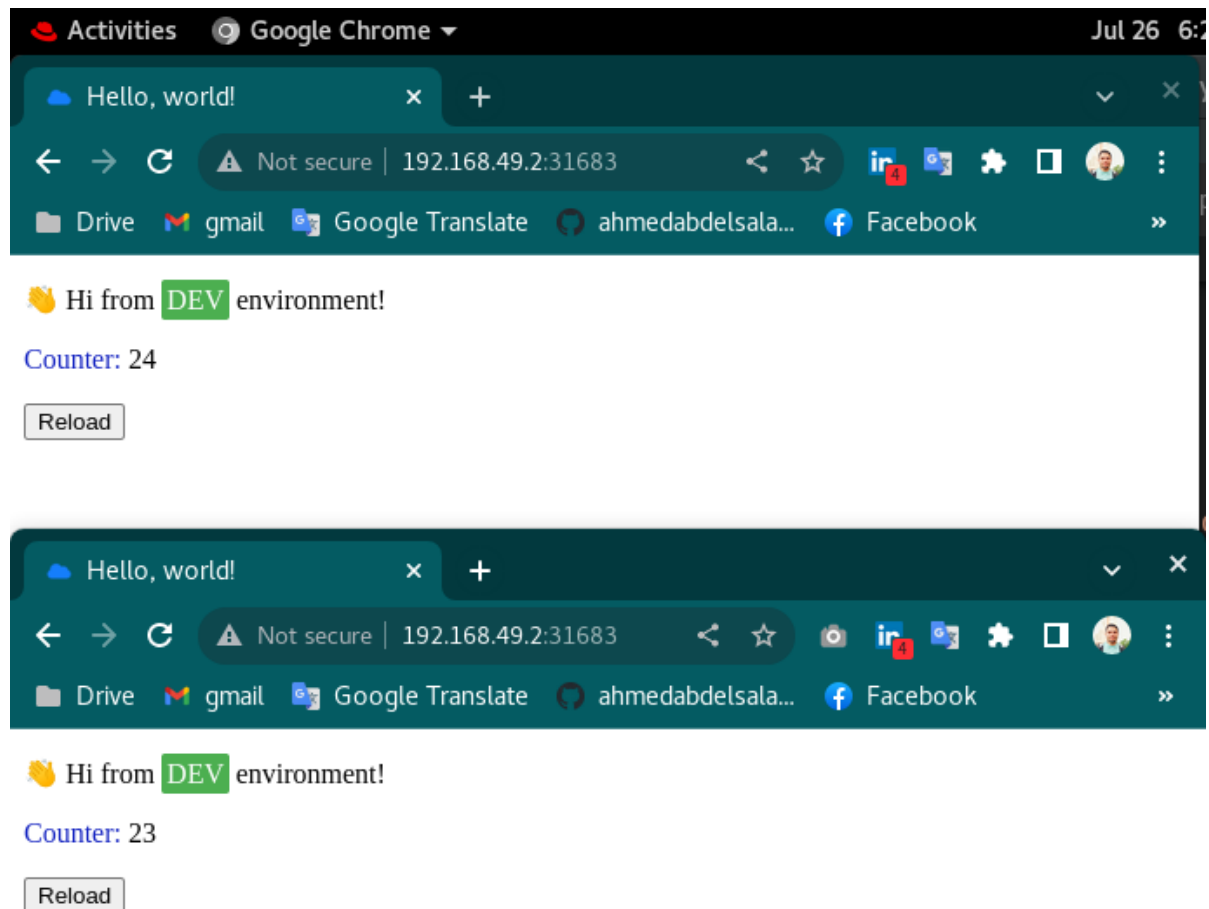
- we ensure that our image is running correctly

==

push our image to Artifacts Repository

- create artifact repo

- tag local image and push it to our repo

```
[ahmedabdelsalam@localhost ~]$ docker tag devops-challenge us-central1-docker.pkg.dev/abdelsalam-billing-account/gcp-task/task-image
[ahmedabdelsalam@localhost ~]$ docker push us-central1-docker.pkg.dev/abdelsalam-billing-account/gcp-task/task-image
Using default tag: latest
The push refers to repository [us-central1-docker.pkg.dev/abdelsalam-billing-account/gcp-task/task-image]
52e00613dfb7: Pushed
617ff5bd416e: Pushed
da3bcefc0f56: Pushed
74271740d39c: Pushed
b7d8c853a8e3: Pushed
e841fdac3d42: Pushed
7bc5226f5cd2: Pushed
cc6598558375: Pushed
ad543cd673bd: Pushed
latest: digest: sha256:34db17dc7929e6abc300b99525bf8eec70ed89757974f1011213aea10cb8a16b size: 2206
[ahmedabdelsalam@localhost ~]$
```

  - tag redis image and push it to our repo

```
[ahmedabdelsalam@localhost ~]$ docker tag redis us-central1-docker.pkg.dev/abdelsalam-billing-account/gcp-task/redis-image
[ahmedabdelsalam@localhost ~]$ docker push us-central1-docker.pkg.dev/abdelsalam-billing-account/gcp-task/redis-image
Using default tag: latest
The push refers to repository [us-central1-docker.pkg.dev/abdelsalam-billing-account/gcp-task/redis-image]
16230304f04e: Pushed
772d7920142a: Pushed
ac40c96f19dd: Pushed
fb7db7763439: Pushed
8b03e917ddc3: Pushed
43b3c4e3001c: Pushed
latest: digest: sha256:f39bd533478aa934b3376f85bf0771f37b6db30841bb043d0a5255db8987a496 size: 1573
[ahmedabdelsalam@localhost ~]$
```

- artifact repo

build infrastructure using Terraform

- authenticate terraform with gcp through service account

- create resources

```
terraform init
terraform plan
terraform apply
```

Google Cloud search bar: "Search Products, resources, docs (/)"

VPC networks   ➕ CREATE VPC NETWORK   ↻ REFRESH   🗨 HELP ASSISTANT

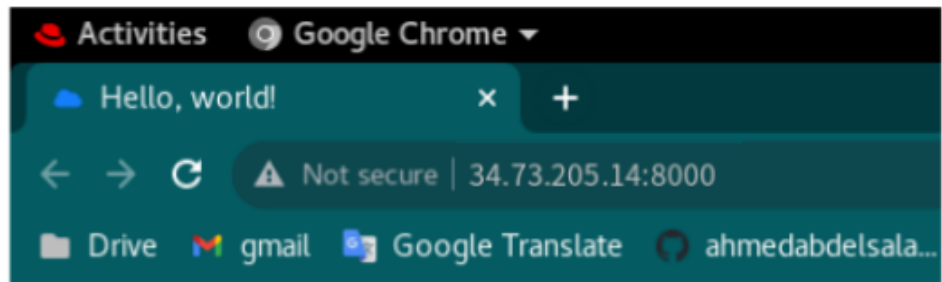| Name	Region	Subnets	MTU ❓	Mode	Internal IP ranges	External IP ranges	Secondary IPv4 ranges	Gateways	
▶ default		35	1460	Auto	None				
▼ vpc-network		2	1460	Custom	None				
	europe-west1	management-subnet			10.0.0.0/24	None	None	10.0.0.1	
	europe-west1	restricted-subnet			10.0.1.0/24	None	10.240.0.0/14, 10.2...	10.0.1.1	⌄

Deploy application

- **connect private vm [using ssh]**

```
[ahmedabdelsalam@localhost ~]$ gcloud compute ssh --zone "europe-west1-b" "private-vm"  --tunnel-through-iap --project "abdelsalam-bill
ing-account"
WARNING:

To increase the performance of the tunnel, consider installing NumPy. For instructions,
please see https://cloud.google.com/iap/docs/using-tcp-forwarding#increasing_the_tcp_upload_bandwidth

Warning: Permanently added 'compute.8491512971440096727' (ECDSA) to the list of known hosts.
[ahmedabdelsalam@private-vm ~]$
```

- **move kubernetes yaml files to vm using secure copy [scp]**

```
[ahmedabdelsalam@localhost ~]$ gcloud compute scp --recurse /home/ahmedabdelsalam/DevOps/GCP/GCP_TASK/kubernetes_files/ private-vm:kube
rnetes_files  --zone "europe-west1-b"   --tunnel-through-iap
WARNING:

To increase the performance of the tunnel, consider installing NumPy. For instructions,
please see https://cloud.google.com/iap/docs/using-tcp-forwarding#increasing_the_tcp_upload_bandwidth

app_deployment.yml                                                              100%  545     3.8KB/s   00:00
redis_service.yml                                                               100%  161     2.1KB/s   00:00
ingress.yml                                                                     100%  214     2.8KB/s   00:00
redis_deployment.yml                                                            100%  401     5.1KB/s   00:00
lb.yml                                                                          100%  185     2.4KB/s   00:00
[ahmedabdelsalam@localhost ~]$
```

- install kubectl [`sudo yum install kubectl`]
- install gcloud auth [`sudo yum install google-cloud-sdk-gke-gcloud-auth-plugin`]
- deploy kubernetes yml file using [`kubectl create -Rf kubernetes_files`]
- run the ingress ip at port 8000