

MSK

Lab 2

Docker Compose and Minikube

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Docker compose

1. Create a directory for the project and add the app.py file with the given program code.

```
zoobie@zoobieCOMP: ~/masters/mopuk... x zoobie@zoobieCOMP: ~/masters/mopuk... x
1 import time
2
3 import redis
4 from flask import Flask
5
6 app = Flask(__name__)
7 cache = redis.Redis(host='redis', port=6379)
8
9 def get_hit_count():
10     retries = 5
11     while True:
12         try:
13             return cache.incr('hits')
14         except redis.exceptions.ConnectionError as exc:
15             if retries == 0:
16                 raise exc
17             retries -= 1
18             time.sleep(0.5)
19
20 @app.route('/')
21 def hello():
22     count = get_hit_count()
23     return 'Hello World! I have been seen {} times.\n'.format(count)
-- INSERT -- 1,1 All
```

2. Create requirements.txt

```
zoobie@zoobieCOMP: ~/masters/mopuk... x zoobie@zoobieCOMP: ~/masters/mopuk... x
1 flask
2 redis
```

3. Create Dockerfile that will be used to build docker image:

```
zoobie@zoobieCOMP: ~/masters/mopuk... x zoobie@zoobieCOMP: ~/masters/mopuk... x
1 FROM python:3.7-alpine
2 WORKDIR /code
3 ENV FLASK_APP=app.py
4 ENV FLASK_RUN_HOST=0.0.0.0
5 RUN apk add --no-cache gcc musl-dev linux-headers
6 COPY requirements.txt requirements.txt
7 RUN pip install -r requirements.txt
8 EXPOSE 5000
9 COPY . .
10 CMD ["flask", "run"]
```

4. Define web and redis services in docker-compose.yml file:

```
zoobie@zoobieCOMP: ~/masters/mopuk... x zoobie@zoobieCOMP: ~/masters/mopuk... x
1 version: "3.3"
2 services:
3   web:
4     build: .
5     ports:
6       - "5000:5000"
7   redis:
8     image: "redis:alpine"
```

5. Build and run with docker-compose up:

```
(base) zoobie@zoobieCOMP:~/masters/nopuk/lab/compose$ docker-compose up --build
Building web
Step 1/10 : FROM python:3.7-alpine
--> 72e4ef8abf8e
Step 2/10 : WORKDIR /code
--> Using cache
--> f1a46e164b2b
Step 3/10 : ENV FLASK_APP=app.py
--> Using cache
--> 9d2a396805cf
Step 4/10 : ENV FLASK_RUN_HOST=0.0.0
--> Using cache
--> 7601defba689
Step 5/10 : RUN apk add --no-cache gcc musl-dev linux-headers
--> Using cache
--> 10c4d7765c10
Step 6/10 : COPY requirements.txt requirements.txt
--> Using cache
--> d5f8a40b2993
Step 7/10 : RUN pip install -r requirements.txt
--> Using cache
--> 70385d2976a2
Step 8/10 : EXPOSE 5000
--> Using cache
--> 08975f503c32
Step 9/10 : COPY . .
--> 80c9b1124217
Step 10/10 : CMD ["flask","run"]
--> Running in f0af903d6553
Removing intermediate container f0af903d6553
--> fac80c83ed1a

Successfully built fac80c83ed1a
Successfully tagged compose_web:latest
Recreating compose_web_1 ...
Starting compose_redis_1 ...
Recreating compose_web_1
Recreating compose_web_1 ... done
Attaching to compose_redis_1, compose_web_1
```

The results can be observed at localhost:5000 and the counter starts at 1 and successfully increments on page reload:



Hello Minikube

1. Verify minikube and kubectl installation:

```
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/L
ab-2/Ismoil_Atajanov/minikube$ minikube version
minikube version: v1.13.1
commit: 1fd1f67f338cbab4b3e5a6e4c71c551f522ca138-dirty

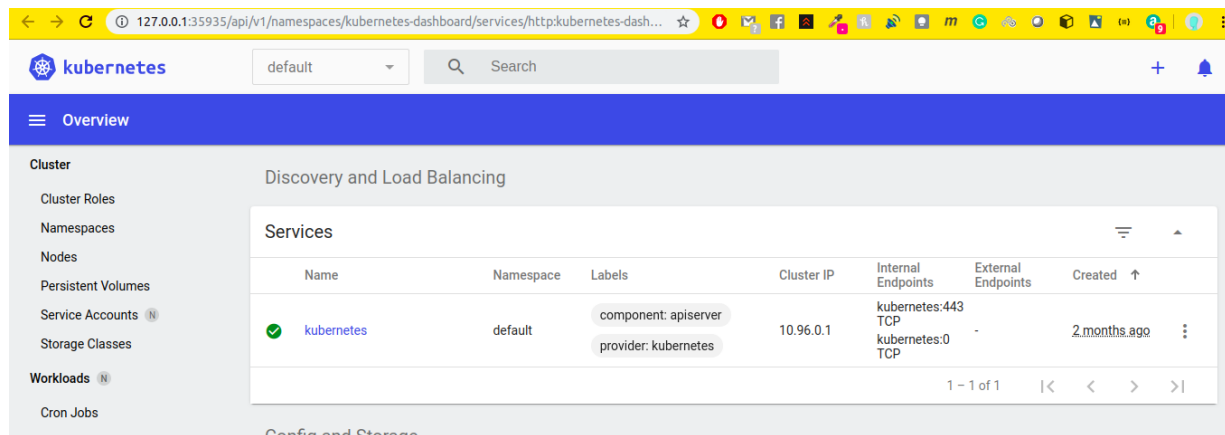
ab-2/Ismoil_Atajanov/minikube$ sudo snap install kubectl --classic
[sudo] password for zoobie:
kubectl 1.20.1 from Canonical✓ installed
```

2. Run minikube with minikube start

```
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/Lab-2/Ismoil_Atajanov/minikube$ minikube start
🐹 minikube v1.13.1 on Ubuntu 18.04
🔔 minikube 1.16.0 is available! Download it: https://github.com/kubernetes/minikube/releases/tag/v1.16.0
💡 To disable this notice, run: 'minikube config set WantUpdateNotification false'

🌟 Using the docker driver based on existing profile
🏠 Starting control plane node minikube in cluster minikube
🔧 Restarting existing docker container for "minikube" ...
🔧 Preparing Kubernetes v1.19.2 on Docker 19.03.8 ...
🔧 Verifying Kubernetes components...
🌟 Enabled addons: default-storageclass, storage-provisioner
🏠 Done! kubectl is now configured to use "minikube" by default
```

3. Open the Kubernetes dashboard in a browser:



4. Create Deployment using Kubectl create command:

```
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/Lab-2/Ismoil_Atajanov/minikube$ kubectl create deployment hello-node --image=k8s.gcr.io/echoserver:1.4
deployment.apps/hello-node created
```

5. Verify the new deployment exists:

```
/minikube$ kubectl get deployments
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
hello-node    1/1     1             1           49s
```

6. View the pods:

```
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/minikube$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
hello-node-7567d9fdc9-8mqgx         1/1     Running   0           98s
```

7. View cluster events

```
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/Lab-2/Ismoil_Atajanov
/minikube$ kubectl get events
LAST SEEN   TYPE      REASON      OBJECT                                MESSAGE
2m26s       Normal    Scheduled    pod/hello-node-7567d9fdc9-8mqgx      Successfully
assigned default/hello-node-7567d9fdc9-8mqgx to minikube
2m24s       Normal    Pulling      pod/hello-node-7567d9fdc9-8mqgx      Pulling imag
e "k8s.gcr.io/echoserver:1.4"
2m10s       Normal    Pulled       pod/hello-node-7567d9fdc9-8mqgx      Successfully
pulled image "k8s.gcr.io/echoserver:1.4" in 13.35033209s
2m5s        Normal    Created      pod/hello-node-7567d9fdc9-8mqgx      Created cont
ainer echoserver
2m4s        Normal    Started      pod/hello-node-7567d9fdc9-8mqgx      Started cont
ainer echoserver
2m26s       Normal    SuccessfulCreate    replicaset/hello-node-7567d9fdc9    Created pod:
hello-node-7567d9fdc9-8mqgx
2m26s       Normal    ScalingReplicaSet    deployment/hello-node                Scaled up re
plica set hello-node-7567d9fdc9 to 1
18m        Normal    Starting     node/minikube                        Starting kub
elet.
18m        Normal    NodeHasSufficientMemory    node/minikube                        Node minikub
e status is now: NodeHasSufficientMemory
18m        Normal    NodeHasNoDiskPressure    node/minikube                        Node minikub
```

8. View kubectl configuration

```
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/Lab-2/Ismoil_Atajanov
/minikube$ kubectl config view
apiVersion: v1
clusters:
- cluster:
  certificate-authority: /home/zoobie/.minikube/ca.crt
  server: https://172.17.0.2:8443
  name: minikube
contexts:
- context:
  cluster: minikube
  user: minikube
  name: minikube
current-context: minikube
kind: Config
preferences: {}
users:
- name: minikube
  user:
    client-certificate: /home/zoobie/.minikube/profiles/minikube/client.crt
    client-key: /home/zoobie/.minikube/profiles/minikube/client.key
```

Create service:

9. Expose the Pod to the public internet using command - `kubectl expose deployment hello-node --type=LoadBalancer --port=8080`
10. View newly created service:

```
/minikube$ kubectl get services
NAME          TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
hello-node    LoadBalancer  10.110.179.113  <pending>        8080:30619/TCP   116s
kubernetes    ClusterIP      10.96.0.1       <none>           443/TCP          82d
```

11. Run minikube service hello-node

← → ↻ ⓘ Not secure | 172.17.0.2:30619

```

CLIENT VALUES:
client_address=172.18.0.1
command=GET
real_path=/
query=nil
request_version=1.1
request_uri=http://172.17.0.2:8080/

SERVER VALUES:
server_version=nginx: 1.10.0 - lua: 10001

HEADERS RECEIVED:
accept=text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3
accept-encoding=gzip, deflate
accept-language=en-US,en;q=0.9,az;q=0.8
connection=keep-alive
host=172.17.0.2:30619
upgrade-insecure-requests=1
user-agent=Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36
BODY:
-no body in request-

```

12. View existing addons list:

```

zoobie@zoobieCOMP: ~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/Lab-2/Ismoil_Atajanov-
File Edit View Search Terminal Tabs Help
zoobie@zoobieCOMP: ~/mast... x zoobie@zoobieCOMP: ~/mast... x zoobie@zoobieCOMP: ~/mast... x
Opening in existing browser session.
^C
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/minikube$ minikube addons list

```

ADDON NAME	PROFILE	STATUS
ambassador	minikube	disabled
csi-hostpath-driver	minikube	disabled
dashboard	minikube	enabled ✓
default-storageclass	minikube	enabled ✓
efk	minikube	disabled
freshpod	minikube	disabled
gcp-auth	minikube	disabled
gvisor	minikube	disabled
helm-tiller	minikube	disabled
ingress	minikube	disabled
ingress-dns	minikube	disabled
istio	minikube	disabled
istio-provisioner	minikube	disabled
kubevirt	minikube	disabled
logviewer	minikube	disabled
metallb	minikube	disabled
metrics-server	minikube	disabled
nvidia-driver-installer	minikube	disabled
nvidia-gpu-device-plugin	minikube	disabled
olm	minikube	disabled
pod-security-policy	minikube	disabled

13. Enable metrics-server addon:

```

/minikube$ minikube addons enable metrics-server
🌟 The 'metrics-server' addon is enabled
(base) zoobie@zoobieCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/minikube$

```

14. View Pod and service that were created:

```
(base) zooble@zoobleCOMP:~/masters/mopuk/AEII_2020_MSK_-Ismoil_Atajanov-/Lab-2/Ismoil_Atajanov
/minikube$ kubectl get pod,svc -n kube-system
```

NAME	READY	STATUS	RESTARTS	AGE
pod/coredns-f9fd979d6-5rsfh	1/1	Running	2	82d
pod/etcd-minikube	1/1	Running	1	65d
pod/kube-apiserver-minikube	1/1	Running	1	65d
pod/kube-controller-manager-minikube	1/1	Running	2	82d
pod/kube-proxy-n69fw	1/1	Running	2	82d
pod/kube-scheduler-minikube	1/1	Running	2	82d
pod/metrics-server-d9b576748-t28tc	1/1	Running	0	2m3s
pod/storage-provisioner	1/1	Running	5	82d

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
service/kube-dns	ClusterIP	10.96.0.10	<none>	53/UDP,53/TCP,9153/TCP	82d
service/metrics-server	ClusterIP	10.98.56.135	<none>	443/TCP	2m4s

15. Disable addon using – minikube addon disable metrics-server

16. Clean up :

```
kubectl delete service hello-node
```

```
kubectl delete deployment hello-node
```