TU856/3
INTRODUCTION TO DEVOPS

LAB 7 - KUBERNETES

26/03/2025

PAULINA CZARNOTA C21365726

1. DOCKER, MINIKUBE, AND KUBECTL VERSIONS

This confirms successful installation and compatibility of *Docker*, *Minikube*, and *kubectl*, which are required for running the Kubernetes cluster locally.

```
C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>docker version
Client:
 Version:           28.0.1
 API version:       1.48
 Go version:        go1.23.6
 Git commit:        068a01e
 Built:             Wed Feb 26 10:41:52 2025
 OS/Arch:           windows/amd64
 Context:           desktop-linux

Server: Docker Desktop 4.39.0 (184744)
 Engine:
  Version:          28.0.1
  API version:      1.48 (minimum version 1.24)
  Go version:       go1.23.6
  Git commit:       bbd0a17
  Built:            Wed Feb 26 10:41:16 2025
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.7.25
  GitCommit:        bcc810d6b9066471b0b6fa75f557a15a1cbf31bb
 runc:
  Version:          1.2.4
  GitCommit:        v1.2.4-0-g6c52b3f
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0

C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>minikube version
minikube version: v1.35.0
commit: dd5d320e41b5451cdf3c01891bc4e13d189586ed-dirty

C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>kubectl version --client
Client Version: v1.32.2
Kustomize Version: v5.5.0
```

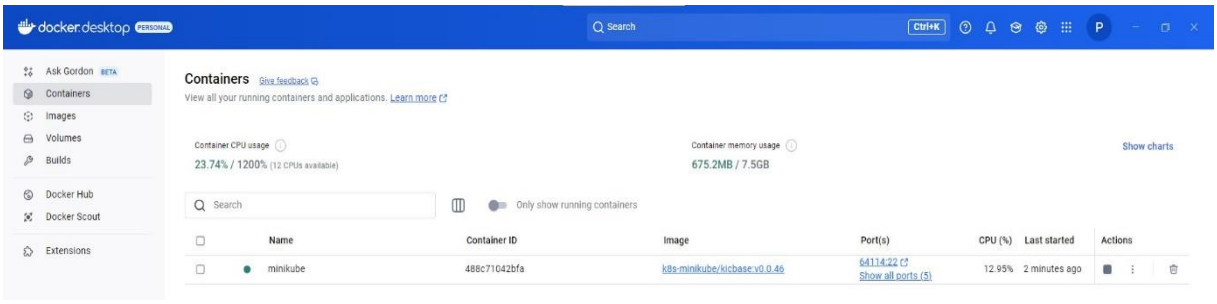
2. MINIKUBE CLEANUP AND CLUSTER SETUP

Deleted any existing *Minikube* setup, increased memory allocation, and created a fresh *Minikube* cluster using *Docker* driver and Kubernetes version 1.27.0.

```
C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>minikube delete --all
* Usuwanie "minikube" - docker...
* Removing C:\Users\35389\.minikube\machines\minikube ...
* Removed all traces of the "minikube" cluster.
* Successfully deleted all profiles

C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>minikube config set memory 6000
! These changes will take effect upon a minikube delete and then a minikube start

C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>minikube start --driver=docker --kubernetes-version=v1.27.0
* minikube v1.35.0 na Microsoft Windows 10 Home 10.0.19045.5608 Build 19045.5608
* Using the docker driver based on user configuration
* Using Docker Desktop driver with root privileges
* Starting "minikube" primary control-plane node in "minikube" cluster
* Pulling base image v0.0.46 ...
* Creating docker container (CPUs=2, Memory=6000MB) ...
! Failing to connect to https://registry.k8s.io/ from both inside the minikube container and host machine
* To pull new external images, you may need to configure a proxy: https://minikube.sigs.k8s.io/docs/reference/networking/proxy/
* Przygotowywanie Kubernetesa v1.27.0 na Docker 27.4.1...
  - Generating certificates and keys ...
  - Uruchamianie płaszczyzny kontrolnej ...
  - Konfigurowanie zasad RBAC ...
* Configuring bridge CNI (Container Networking Interface) ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: storage-provisioner, default-storageclass

! C:\Program Files\Docker\Docker\resources\bin\kubectl.exe jest w wersji 1.32.2, co może być niekompatybilne z Kubernetesem w wersji 1.27.0.
  - Want kubectl v1.27.0? Try 'minikube kubectl -- get pods -A'
* Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

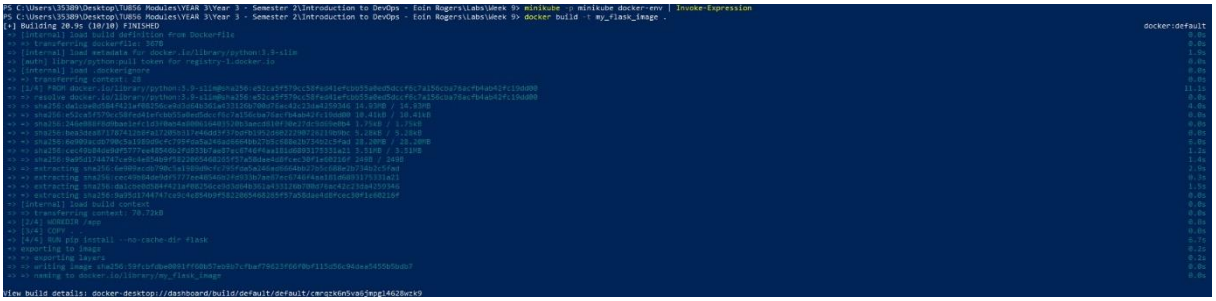
3. MINIKUBE CONTAINER RUNNING IN DOCKER DESKTOP

Verified that *Minikube* is running inside *Docker* with the correct container *(kicbase)*, confirming Kubernetes is active.



4. BUILDING DOCKER IMAGE FOR FLASK APP

Built the Flask app *Docker* image *(my_flask_image)* inside the *Minikube Docker* environment to make it usable for deployment in the cluster.



5. DEPLOYING FLASK APP TO KUBERNETES

Deployed the *Docker* image as a Kubernetes *Deployment* using *flaskapp.yml*. Verified successful *Pod* creation and status as running.

```
C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>kubectl create -f flaskapp.yml
deployment.apps/flaskapp-deployment created

C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>kubectl get pods
NAME                                 READY   STATUS    RESTARTS   AGE
flaskapp-deployment-7654cddfb8-7bhtn   1/1     Running   0          6s
```

6. CREATING AND VERIFYING THE SERVICE

Created a *LoadBalancer Service (flaskapp-service)* from *service.yml* to expose the Flask *Pod* externally. Initially shows *<pending>* external IP.

```
C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>kubectl create -f service.yml
service/flaskapp-service created

C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>kubectl get svc
NAME              TYPE           CLUSTER-IP     EXTERNAL-IP   PORT(S)          AGE
flaskapp-service   LoadBalancer   10.110.61.41   <pending>     5000:30575/TCP   5s
kubernetes        ClusterIP      10.96.0.1      <none>        443/TCP          7m16s
```

7. STARTING MINIKUBE TUNNEL

Started a tunnel to assign an external IP *(e.g., 127.0.0.1)* to the *LoadBalancer Service* so it can be accessed from the host machine.

```
C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9>minikube tunnel
* Tunnel successfully started

* NOTE: Please do not close this terminal as this process must stay alive for the tunnel to be accessible ...

* Starting tunnel for service flaskapp-service.
```

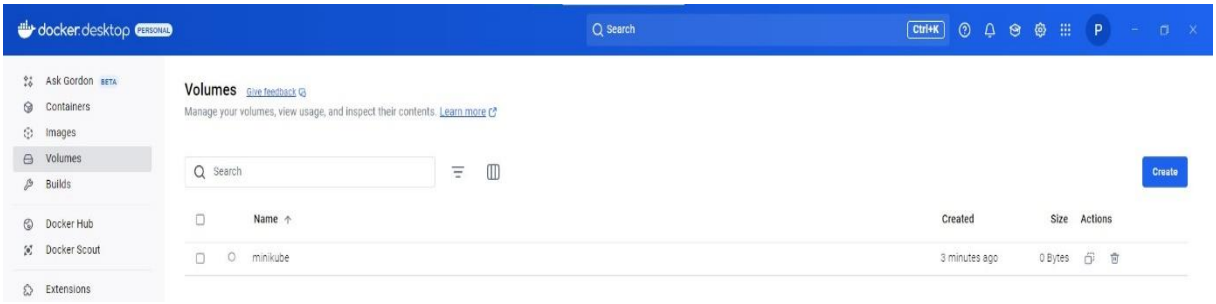
8. TESTING THE FLASK APP ENDPOINT

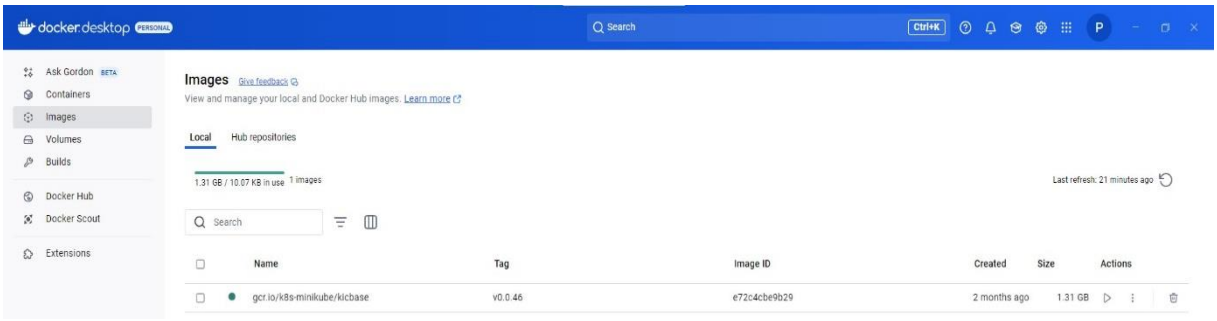
Used *curl* to verify that the Flask app is accessible at *http://127.0.0.1:5000*, and also confirmed in the web browser that the Service is working correctly.

```
PS C:\Users\35389\Desktop\TU856 Modules\YEAR 3\Year 3 - Semester 2\Introduction to DevOps - Eoin Rogers\Labs\Week 9> curl http://127.0.0.1:5000


StatusCode        : 200
StatusDescription : OK
Content           : Hello from Kubernetes Lab 7!
RawContent        : HTTP/1.1 200 OK
                    Connection: close
                    Content-Length: 28
                    Content-Type: text/html; charset=utf-8
                    Date: Wed, 26 Mar 2025 20:43:28 GMT
                    Server: Werkzeug/3.1.3 Python/3.9.21

                    Hello from Kubernetes Lab 7...
Forms             : {}
Headers           : {[Connection, close], [Content-Length, 28], [Content-Type, text/html; charset=utf-8], [Date, Wed, 26 Mar 2025 20:43:28 GMT]...}
Images            : {}
InputFields       : {}
Links             : {}
ParsedHtml        : mshtml.HTMLDocumentClass
RawContentLength  : 28
```

9. DOCKER DESKTOP VERIFICATION

Showed the *Minikube* volume for Kubernetes persistence, and verified the *kicbase* image used to run the *Minikube* container.




docker desktop
PERSONAL
Search
Ctrl+K
P
Ask Gordon BETA
Containers
Images
Volumes
Builds
Docker Hub
Docker Scout
Extensions
Images
Give feedback
View and manage your local and Docker Hub images. Learn more
Local
Hub repositories
1.31 GB / 10.07 kB in use
1 images
Last refresh: 21 minutes ago
Search
Name
Tag
Image ID
Created
Size
Actions
gcr.io/k8s-minikube/kicbase
v0.0.46
e72c4cbe9b29
2 months ago
1.31 GB