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COMP 3104 - 15783

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Lab 09 - Docker Containerization & Nginx Kubernetes Cluster

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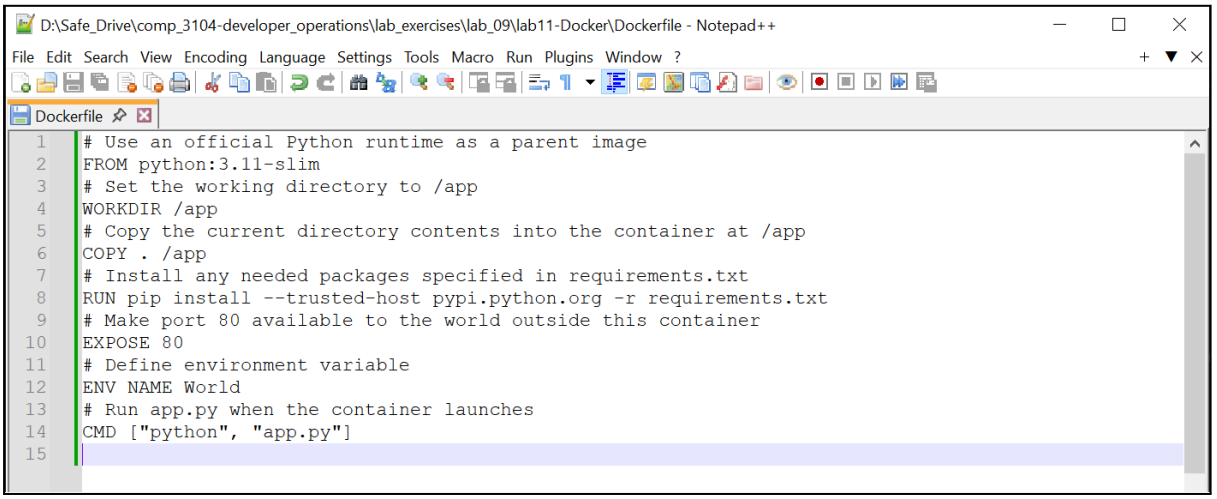
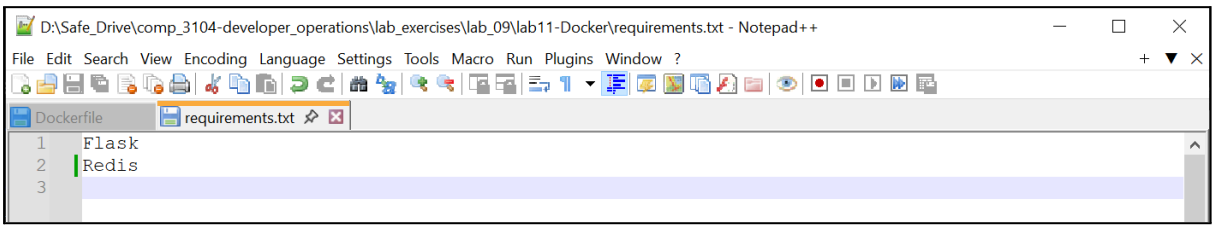
Container Setup





D:\Safe_Drive\comp_3104-developer_operations\lab_exercises\lab_09\lab11-Docker\app.py - Notepad++

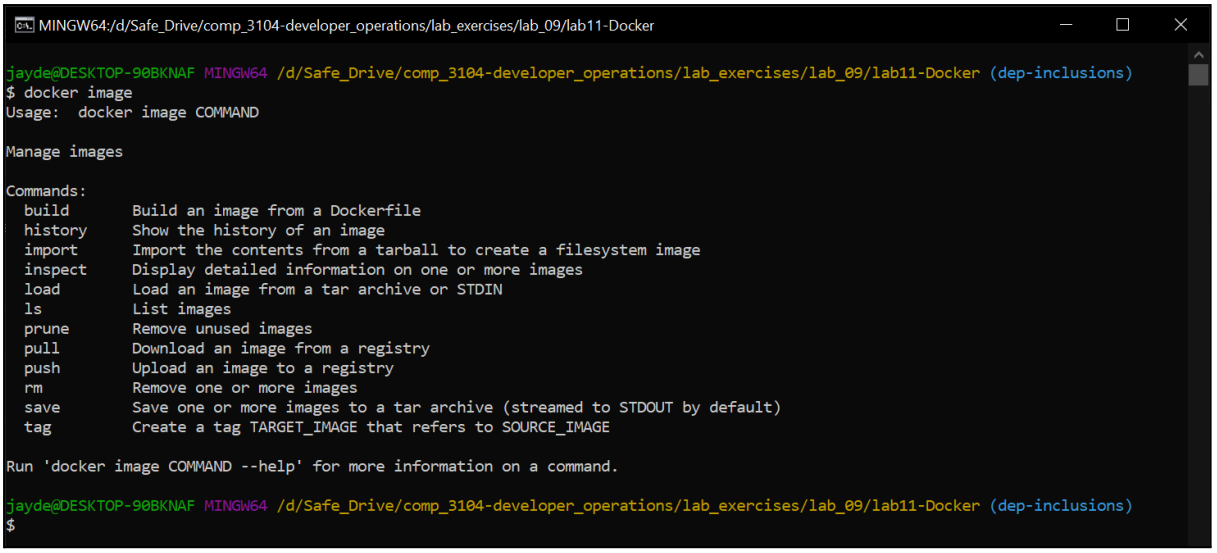
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

Dockerfile | requirements.txt | app.py

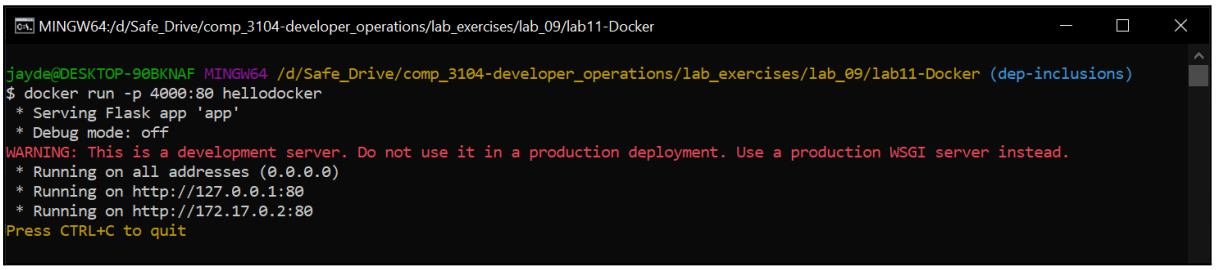
```python
from flask import Flask
from redis import Redis, RedisError
import os
import socket

# Connect to Redis
redis = Redis(host="redis", db=0, socket_connect_timeout=2, socket_timeout=2)

app = Flask(__name__)

@app.route("/")
def hello():
    try:
        visits = redis.incr("counter")
    except RedisError:
        visits = "<i>cannot connect to Redis, counter disabled</i>"
    html = "<h3>Hello {name}!</h3>" \
           "<b>Hostname:</b> {hostname}<br/>" \
           "<b>Visits:</b> {visits}"
    return html.format(name=os.getenv("NAME", "world"), hostname=socket.gethostname(), visits=visits)

if __name__ == "__main__":
    app.run(host='0.0.0.0', port=80)
```

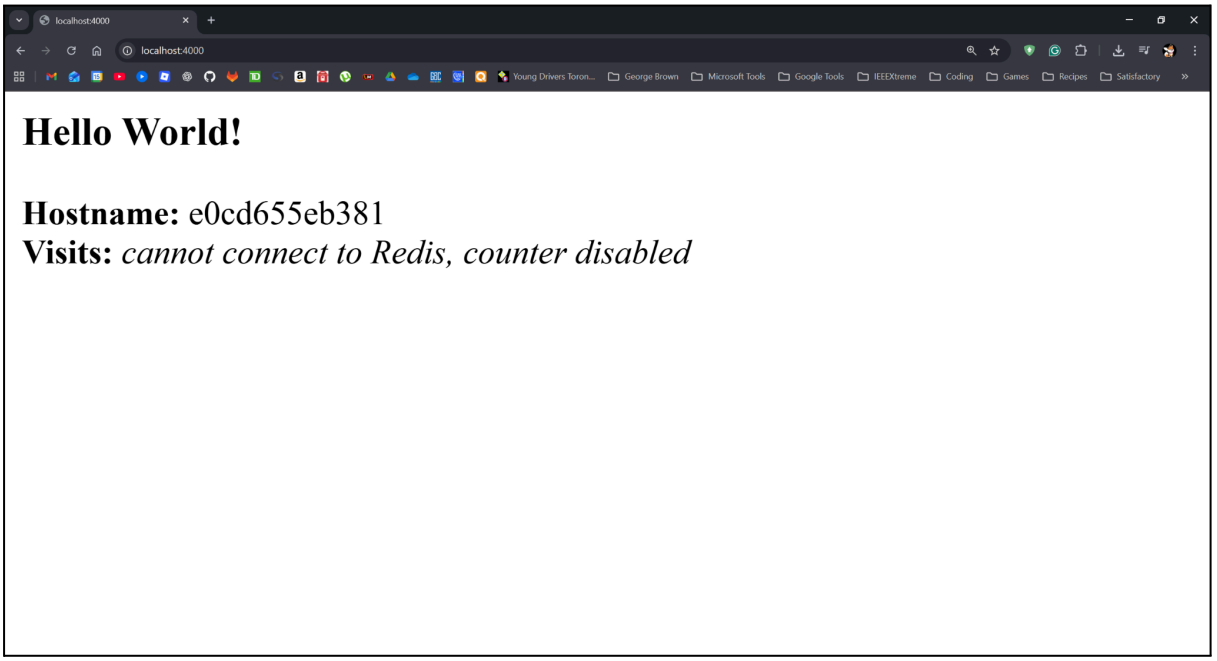
MINGW64:/d/Safe_Drive/comp_3104-developer_operations/lab_exercises/lab_09/lab11-Docker

```
jayde@DESKTOP-90BKNAF MINGW64 /d/Safe_Drive/comp_3104-developer_operations/lab_exercises/lab_09/lab11-Docker (dep-inclusions)
$ ls
app.py  Dockerfile  ReadMe.md  requirements.txt

jayde@DESKTOP-90BKNAF MINGW64 /d/Safe_Drive/comp_3104-developer_operations/lab_exercises/lab_09/lab11-Docker (dep-inclusions)
$ docker build --tag=hellodocker .
[+] Building 8.8s (9/10)                                                                    docker:desktop-linux
 => [internal] load build definition from Dockerfile                                                       0.0s
[+] Building 9.6s (10/10) FINISHED                                                          docker:desktop-linux
 => [internal] load build definition from Dockerfile                                                       0.0s
 => => transferring dockerfile: 547B                                                                       0.0s
 => [internal] load metadata for docker.io/library/python:3.11-slim                                        1.1s
 => [auth] library/python: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/python:3.11-slim@sha256:e4676722fba839e2e5cdb844a52262b43e90e56dbd55b7ad953ee3615ad7534f  2.8s
 => => resolve docker.io/library/python:3.11-slim@sha256:e4676722fba839e2e5cdb844a52262b43e90e56dbd55b7ad953ee3615ad7534f  0.0s
 => => sha256:f002d17b63fe84a7f8a66f20cfa63aec4f6cd2a44069f05b6296b0abfcf2a8e1 14.36MB / 14.36MB           2.1s
 => => sha256:65868b001a40155a1d3f5aa7f5a10ba02a7d55697301839dc047c9d549b670bc 248B / 248B                 0.2s
 => => sha256:1ee9c106547f05aa380c4cdec2837c546439943d73d965a3fc49f228dc8be993 1.29MB / 1.29MB             0.8s
 => => extracting sha256:1ee9c106547f05aa380c4cdec2837c546439943d73d965a3fc49f228dc8be993                   0.1s
 => => extracting sha256:f002d17b63fe84a7f8a66f20cfa63aec4f6cd2a44069f05b6296b0abfcf2a8e1                   0.6s
 => => extracting sha256:65868b001a40155a1d3f5aa7f5a10ba02a7d55697301839dc047c9d549b670bc                   0.0s
 => [internal] load build context                                                                          0.0s
 => => transferring context: 1.53kB                                                                        0.0s
 => [2/4] WORKDIR /app                                                                                     0.1s
 => [3/4] COPY . /app                                                                                      0.0s
 => [4/4] RUN pip install --trusted-host pypi.python.org -r requirements.txt                               4.0s
 => exporting to image                                                                                     1.3s
 => => exporting layers                                                                                    0.8s
 => => exporting manifest sha256:16c56cffa86dbc9f33d9a4048eb1ae7a12a95304257f5528b700e763c9014944          0.0s
 => => exporting config sha256:4010aa104f6b9fdc1eeefd009abf9974980bb4276555c5251f32a48654c423e0            0.0s
 => => exporting attestation manifest sha256:f376920dac61bdfb96e8fd3d319f0aa58e25b8fdd64a36bdef2a69132cd67fe5  0.0s
 => => exporting manifest list sha256:91cdf66dff1471146926146cd0b77b5431523077dfdf0f1b2603f8c321ec984f     0.0s
 => => naming to docker.io/library/hellodocker:latest                                                      0.0s
 => => unpacking to docker.io/library/hellodocker:latest                                                   0.4s

1 warning found (use docker --debug to expand):
- LegacyKeyValueFormat: "ENV key=value" should be used instead of legacy "ENV key value" format (line 12)

jayde@DESKTOP-90BKNAF MINGW64 /d/Safe_Drive/comp_3104-developer_operations/lab_exercises/lab_09/lab11-Docker (dep-inclusions)
$
```

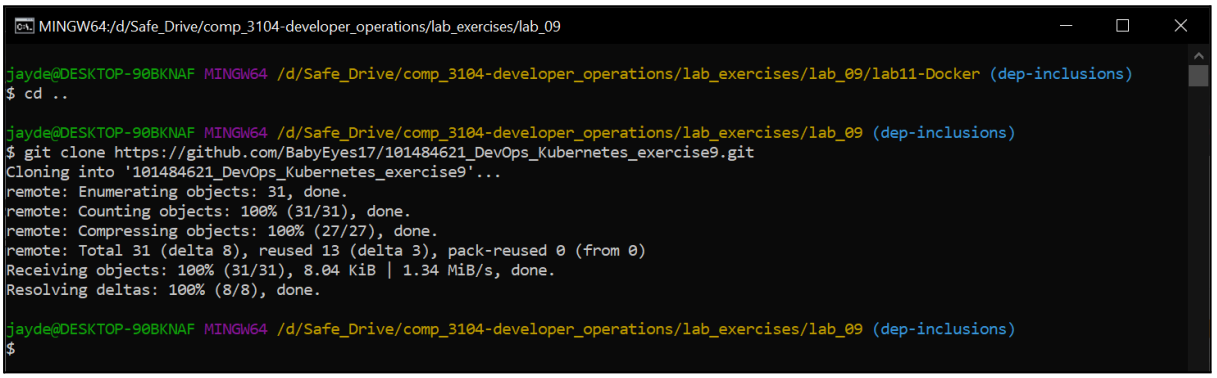


Running Docker Container & App

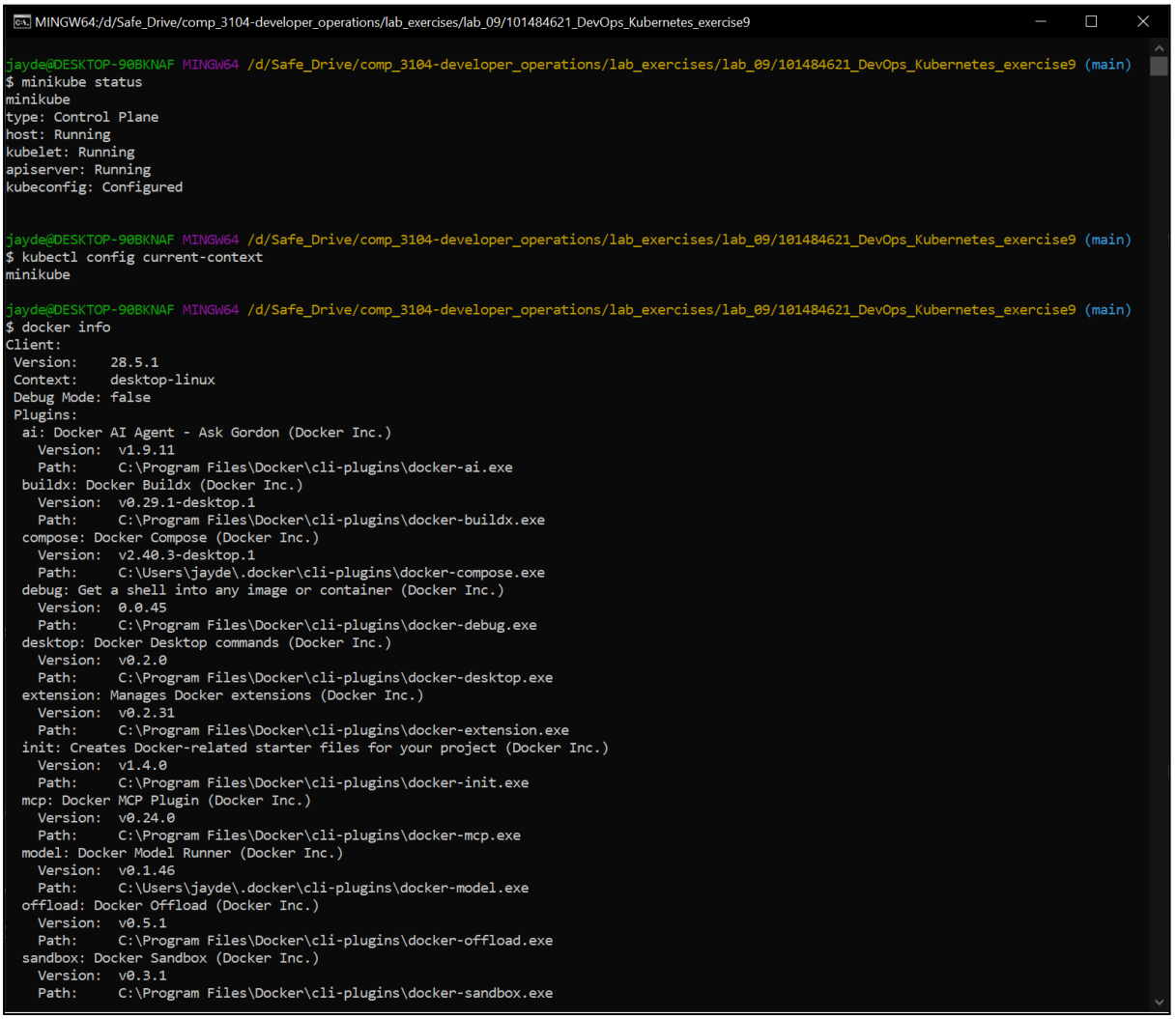




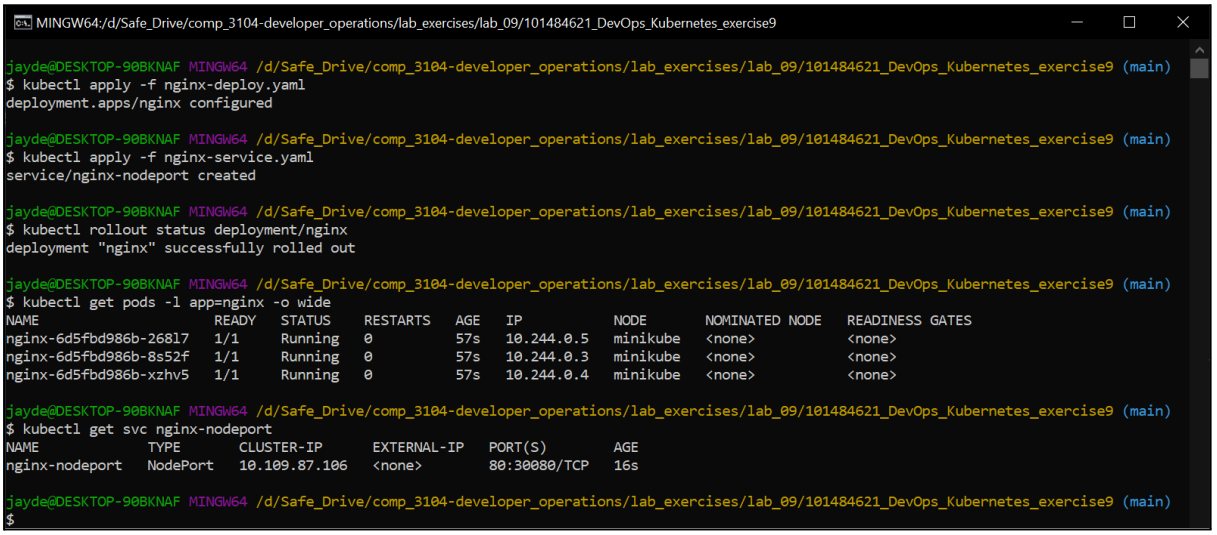
Forking GitHub Repository

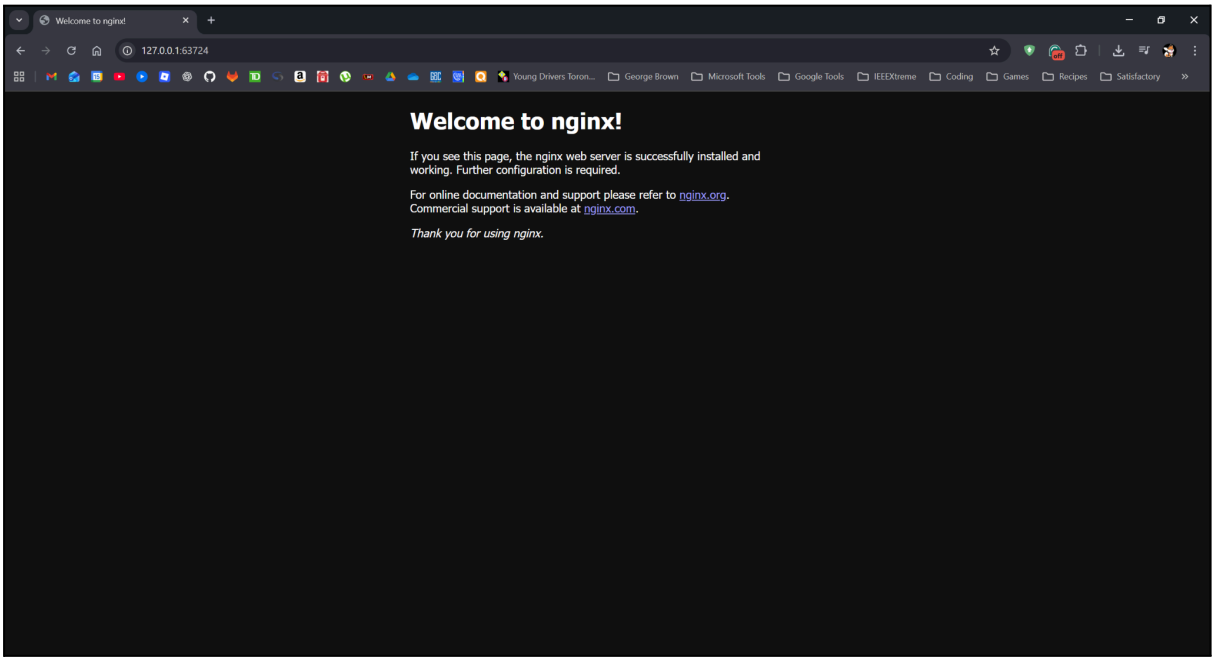


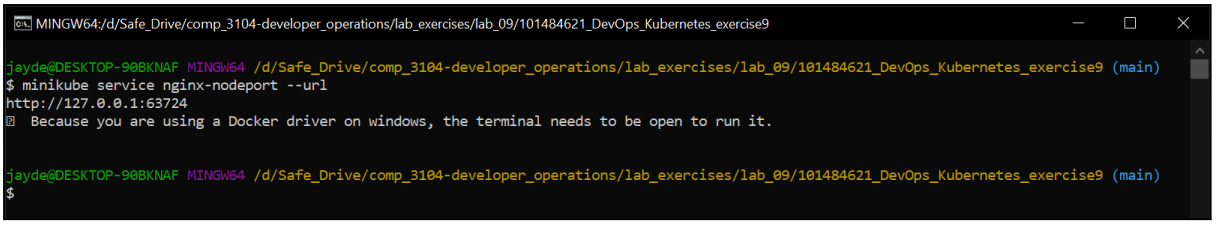
Minikube Setup & Status Check

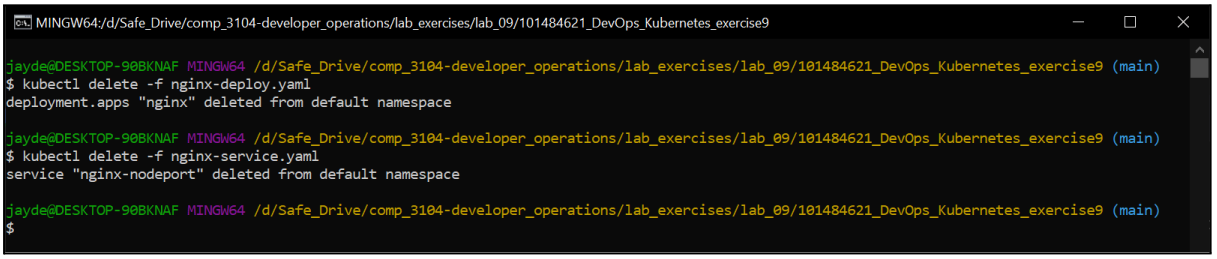


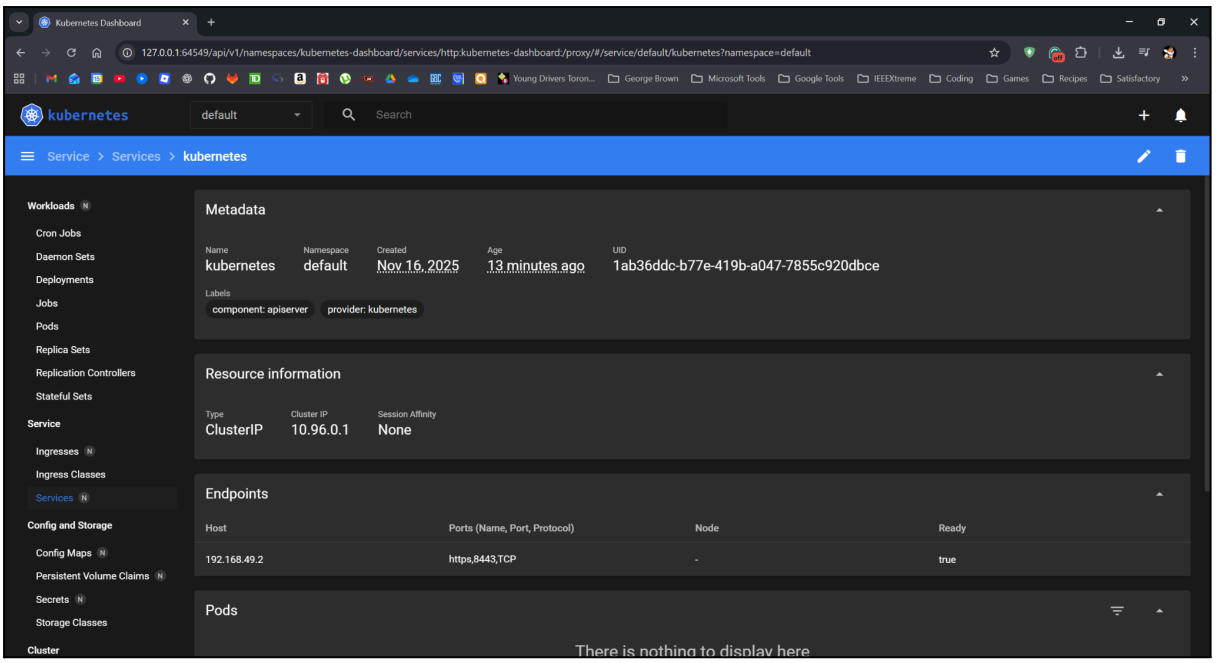
Deploying nginx Image Using Kubernetes










Kubernetes Dashboard
127.0.0.1:64549/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/#/service/default/kubernetes?namespace=default
kubernetes
default
Search
Service > Services > kubernetes
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
Replication Controllers
Stateful Sets
Service
Ingresses
Ingress Classes
Services
Config and Storage
Config Maps
Persistent Volume Claims
Secrets
Storage Classes
Cluster
Metadata
Name
kubernetes
Namespace
default
Created
Nov 16, 2025
Age
13 minutes ago
UID
1ab36ddc-b77e-419b-a047-7855c920dbce
Labels
component: apiserver
provider: kubernetes
Resource information
Type
ClusterIP
Cluster IP
10.96.0.1
Session Affinity
None
Endpoints
Host
Ports (Name, Port, Protocol)
Node
Ready
192.168.49.2
https,8443,TCP
-
true
Pods
There is nothing to display here