# School of Computer Science

## UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

# Containers & Docker Security

## Lab File (2022-2026)

## 5th Semester

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# EXPERIMENT 3

**AIM: Working with Docker Volumes**

**Objective:**

- Learn how to create and manage Docker volumes.
- Understand how Docker volumes can be used to persist data across container restarts.
- Practice mounting Docker volumes to containers.

**Prerequisites:**

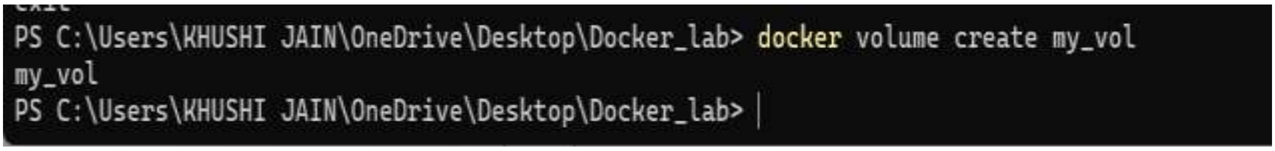
- Docker installed on your system.
- Basic understanding of Docker commands and container concepts.

### Step 1: Create a Docker Volume

Create a new Docker volume:

```
docker volume create my_data_volume
```

This command creates a Docker volume named my_data_volume.

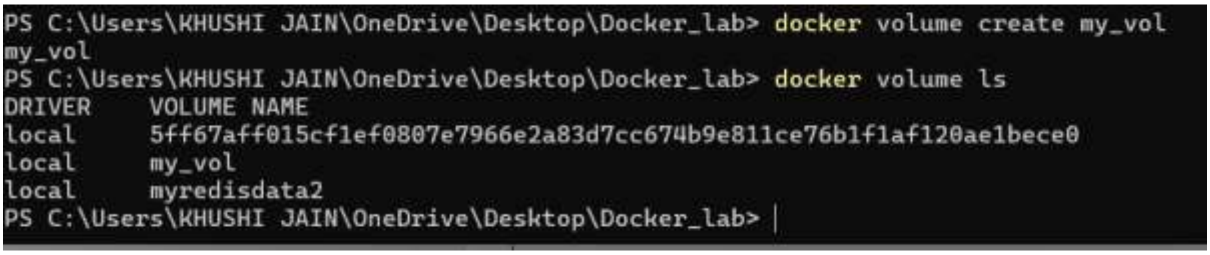


```
exit
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker volume create my_vol
my_vol
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> |
```

Verify that the volume was created:

```
docker volume ls
```

You should see my_data_volume listed among the volumes.



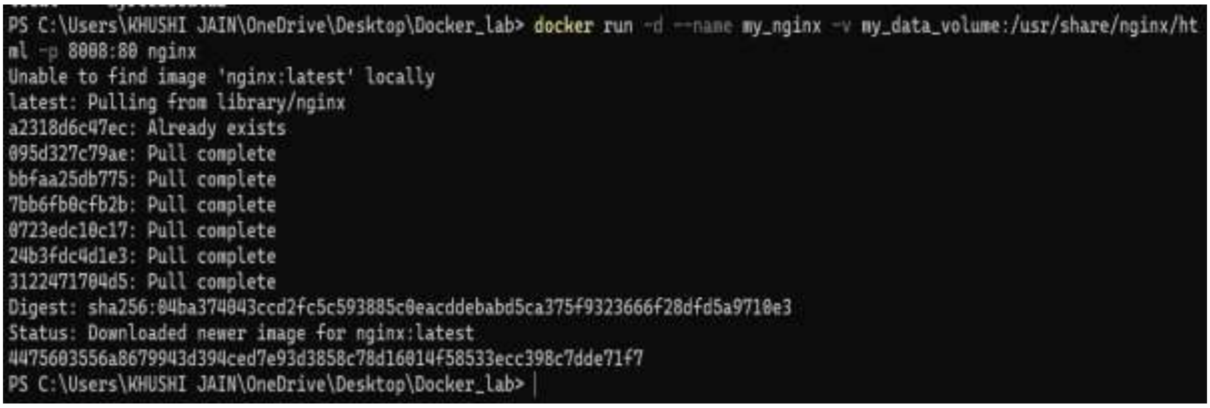
```
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker volume create my_vol
my_vol
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker volume ls
DRIVER    VOLUME NAME
local     5ff67aff015cf1ef0807e7966e2a83d7cc674b9e811ce76b1f1af120ae1bece0
local     my_vol
local     myredisdata2
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> |
```

## Step 2: Run a Container with the Volume Mounted

Run an Nginx container with the volume mounted:

```
docker run -d --name my_nginx -v my_data_volume:/usr/share/nginx/html -p
8008:80 nginx
```

This command starts an Nginx container named my_nginx and mounts the my_data_volume volume to the /usr/share/nginx/html directory inside the container.

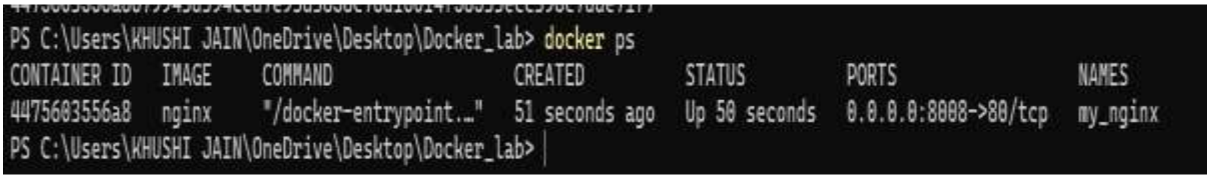


```
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker run -d --name my_nginx -v my_data_volume:/usr/share/nginx/ht
ml -p 8008:80 nginx
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
a2318d6c47ec: Already exists
095d327c79ae: Pull complete
bbfaa25db775: Pull complete
7bb6fb0cfb2b: Pull complete
0723edc10c17: Pull complete
24b3fdc4d1e3: Pull complete
3122471704d5: Pull complete
Digest: sha256:04ba374043ccd2fc5c593885c0eacddebabd5ca375f9323666f28dfd5a9710e3
Status: Downloaded newer image for nginx:latest
4475603556a8679943d394ced7e93d3858c78d16014f58533ecc398c7dde71f7
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> |
```

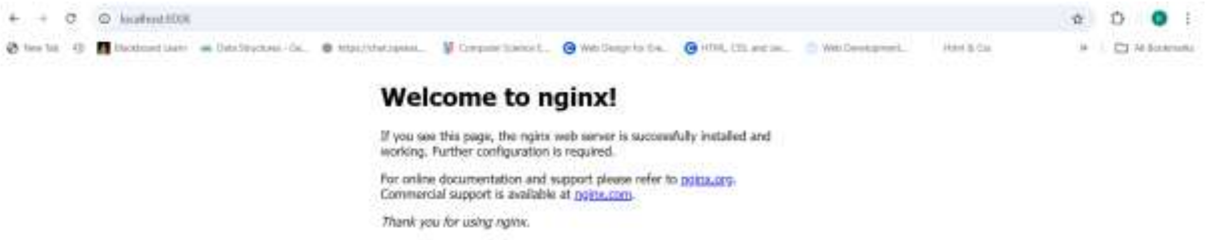
Verify that the container is running:

```
docker ps
```

You should see my_nginx listed as one of the running containers.



```
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS                  NAMES
4475603556a8   nginx     "/docker-entrypoint.…"   51 seconds ago   Up 50 seconds   0.0.0.0:8008->80/tcp   my_nginx
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> |
```



Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

*Thank you for using nginx.*

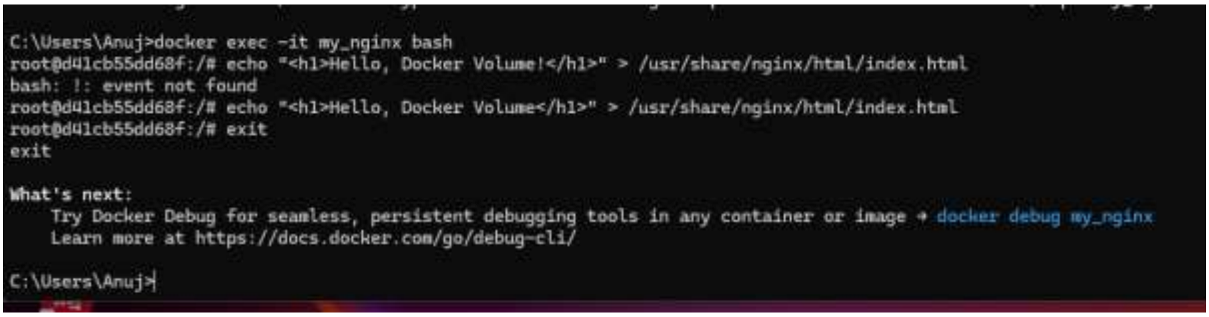
## Step 3: Interact with the Volume

Create a simple HTML file in the volume:

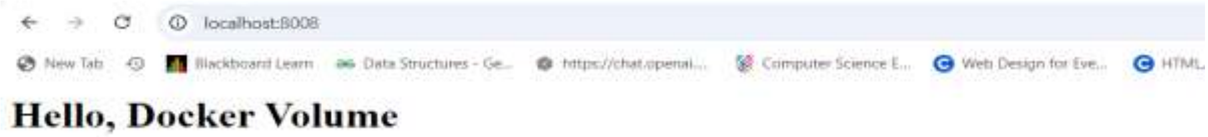
```
docker exec -it my_nginx bash

echo "<h1>Hello, Docker Volume!</h1>" > /usr/share/nginx/html/index.html

exit
```

This command creates an HTML file inside the /usr/share/nginx/html directory, which is backed by my_data_volume.

Access the Nginx server to see your file: Open a browser and navigate to http://localhost:8008. You should see the message "Hello, Docker Volume!" displayed on the page.



```
C:\Users\Anuj>docker exec -it my_nginx bash
root@d41cb55dd68f:/# echo "<h1>Hello, Docker Volume!</h1>" > /usr/share/nginx/html/index.html
bash: !: event not found
root@d41cb55dd68f:/# echo "<h1>Hello, Docker Volume</h1>" > /usr/share/nginx/html/index.html
root@d41cb55dd68f:/# exit
exit

What's next:
    Try Docker Debug for seamless, persistent debugging tools in any container or image → docker debug my_nginx
    Learn more at https://docs.docker.com/go/debug-cli/

C:\Users\Anuj>
```



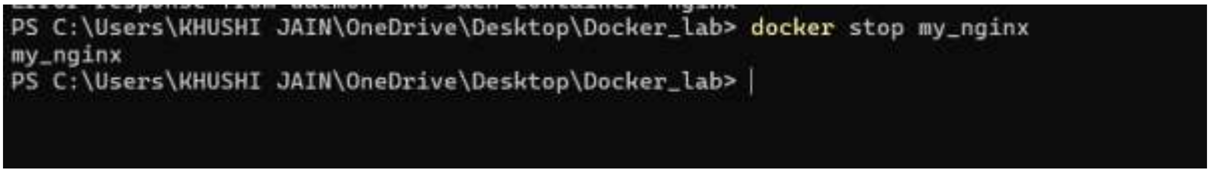
Hello, Docker Volume

## Step 4: Test Data Persistence

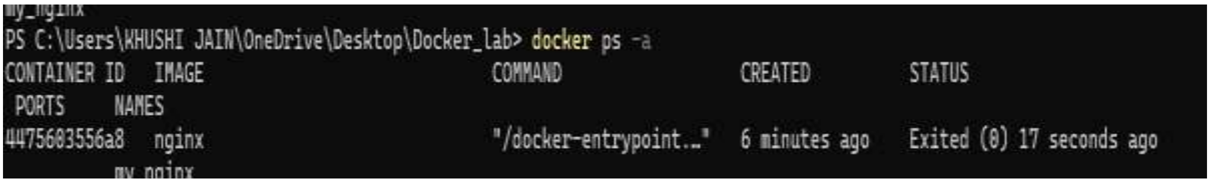
Stop and remove the container:

```
docker stop my_nginx

docker rm my_nginx
```

Run a new Nginx container using the same volume:



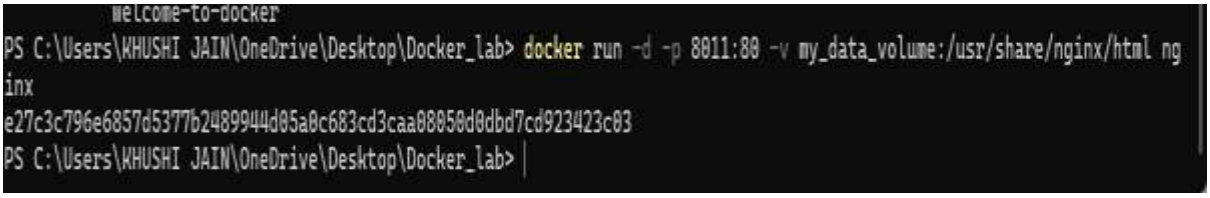
```
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker stop my_nginx
my_nginx
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> |
```



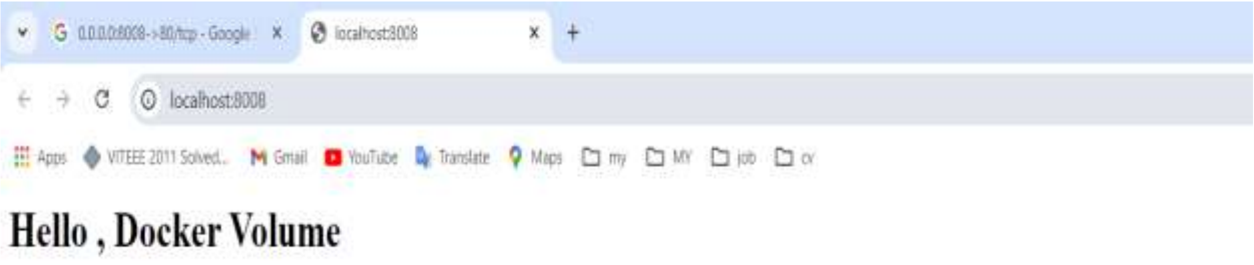
```
my_nginx
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker ps -a
CONTAINER ID   IMAGE                          COMMAND                  CREATED         STATUS
 PORTS     NAMES
4475603556a8   nginx                          "/docker-entrypoint.…"   6 minutes ago   Exited (0) 17 seconds ago
           my_nginx
```

```
docker run -d -p 8011:80 -v my_data_volume:/usr/share/nginx/html nginx
```

Access the Nginx server again: Navigate to http://localhost in your browser. You should still see the "Hello, Docker Volume!" message, demonstrating that the data persisted across container instances.



```
           welcome-to-docker
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker run -d -p 8011:80 -v my_data_volume:/usr/share/nginx/html ng
inx
e27c3c796e6857d5377b2489944d05a0c683cd3caa08050d0dbd7cd923423c03
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> |
```

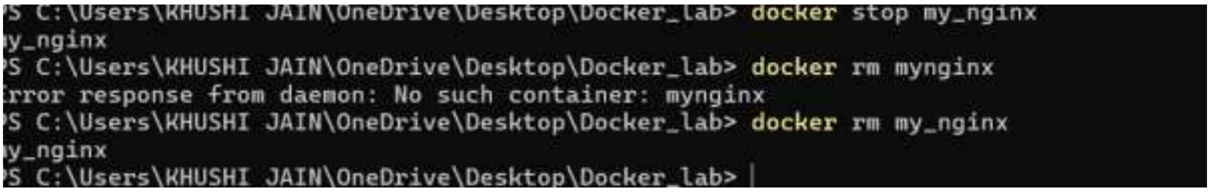


Hello , Docker Volume

## Step 5: Clean Up

Stop and remove the container:

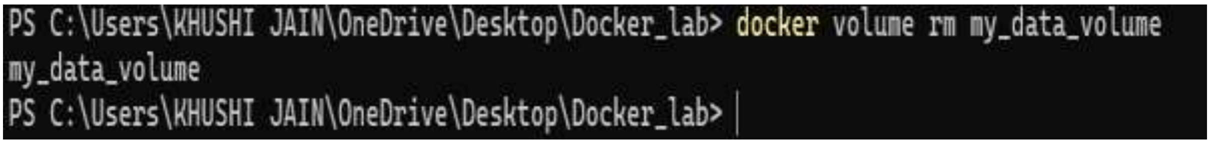
```
docker stop new_nginx

docker rm new_nginx
```



```
S C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker stop my_nginx
y_nginx
S C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker rm mynginx
rror response from daemon: No such container: mynginx
S C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker rm my_nginx
y_nginx
S C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab>
```

Remove the Docker volume:

```
docker volume rm my_data_volume
```

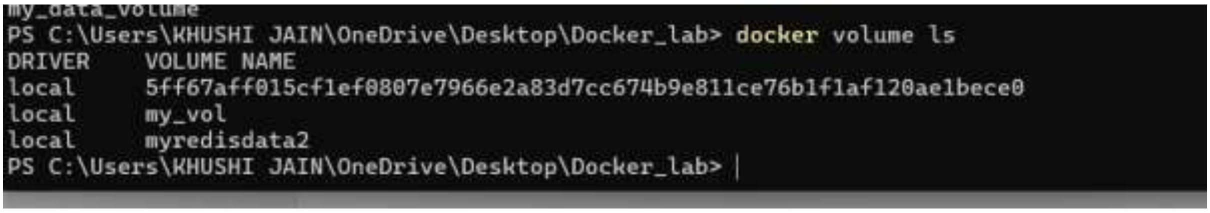


```
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker volume rm my_data_volume
my_data_volume
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab>
```

Verify that the volume is removed:

```
docker volume ls
```

Ensure that my_data_volume is no longer listed.



```
my_data_volume
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> docker volume ls
DRIVER    VOLUME NAME
local     5ff67aff015cf1ef0807e7966e2a83d7cc674b9e811ce76b1f1af120ae1bece0
local     my_vol
local     myredisdata2
PS C:\Users\KHUSHI JAIN\OneDrive\Desktop\Docker_lab> 
```