DevOps Internship Project Report

CI/CD Pipeline with GitHub Actions & Docker

Name: Omer Ahmed

Email: omerahmed9224@gmail.com

Phone: 9010994527

Internship: DevOps Intern at Elevate Labs

GitHub: https://github.com/Omerofficial

DockerHub: https://hub.docker.com/u/omerahmed2001

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1. Introduction

This project demonstrates how to build a complete CI/CD pipeline using GitHub Actions and Docker. It focuses on automating the software deployment process from the point of code push to a running container image, ensuring smoother workflows and faster release cycles.

2. Abstract

The goal of this project was to containerize a simple Python Flask application and automate its deployment using GitHub Actions. Every time new code is pushed to the main branch, a GitHub Actions workflow is triggered. It installs dependencies, builds a Docker image, logs in to Docker Hub using secrets, and pushes the built image to Docker Hub. This setup offers a consistent and repeatable DevOps pipeline with minimal manual effort.

3. Tools Used

- GitHub for version control and repository hosting
- GitHub Actions for workflow automation
- Docker for containerization
- Docker Hub for image storage and distribution
- Python (Flask) for the application
- PowerShell for local development and terminal commands

4. Steps Involved

1. Created a Flask app with a single route.
2. Defined dependencies in requirements.txt.
3. Created a Dockerfile to containerize the app.
4. Initialized a Git repository and pushed it to GitHub.
5. Created a .github/workflows/ci-cd.yml GitHub Actions workflow file.
6. Added Docker Hub credentials as GitHub secrets.
7. Each push triggered a build that:

- Installed Python and Flask
- Built the Docker image
- Logged in to Docker Hub
- Pushed the image to Docker Hub repository

5. Conclusion

This project showcased how to automate the build and deployment process using open-source tools without any cloud infrastructure. The workflow offers an efficient and reliable process for CI/CD and demonstrates a real-world DevOps setup.

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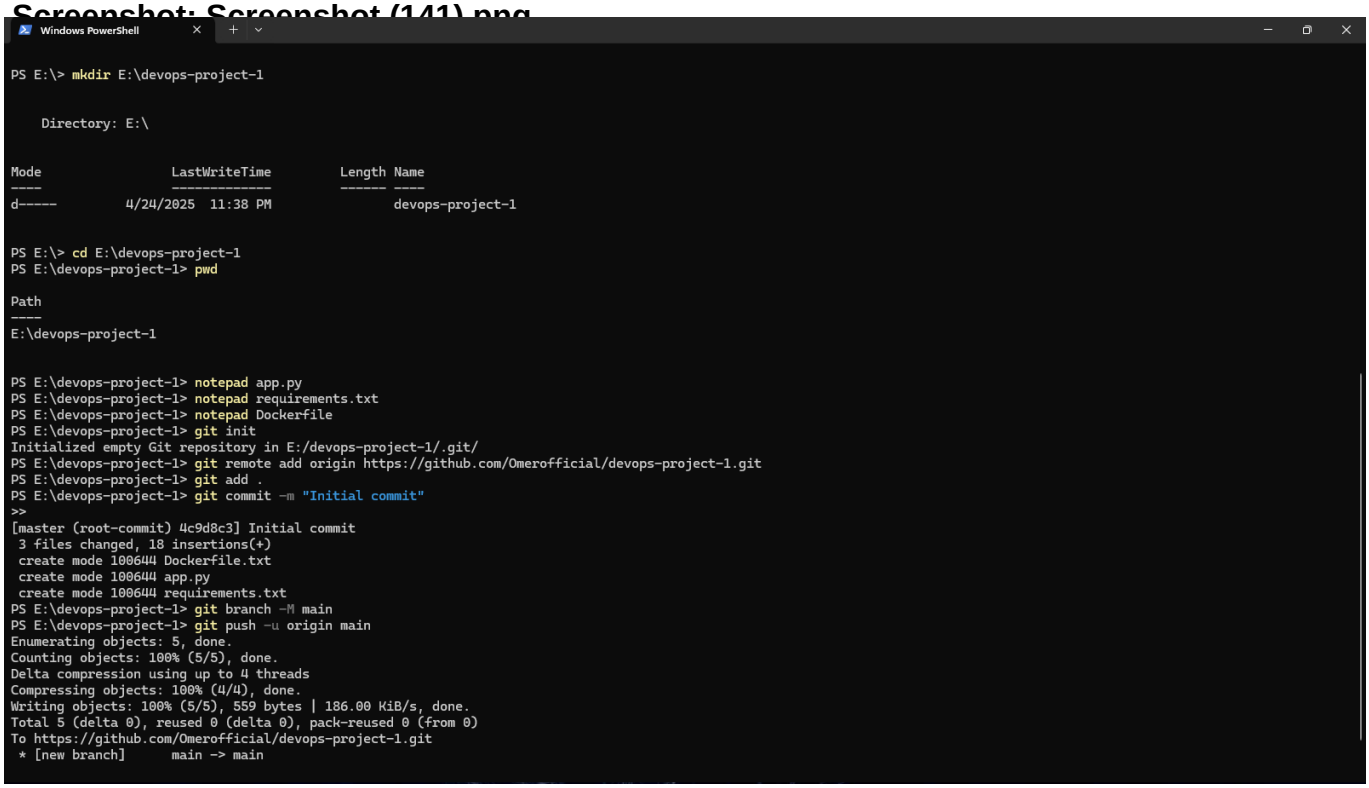
Screenshot: Screenshot (141).png



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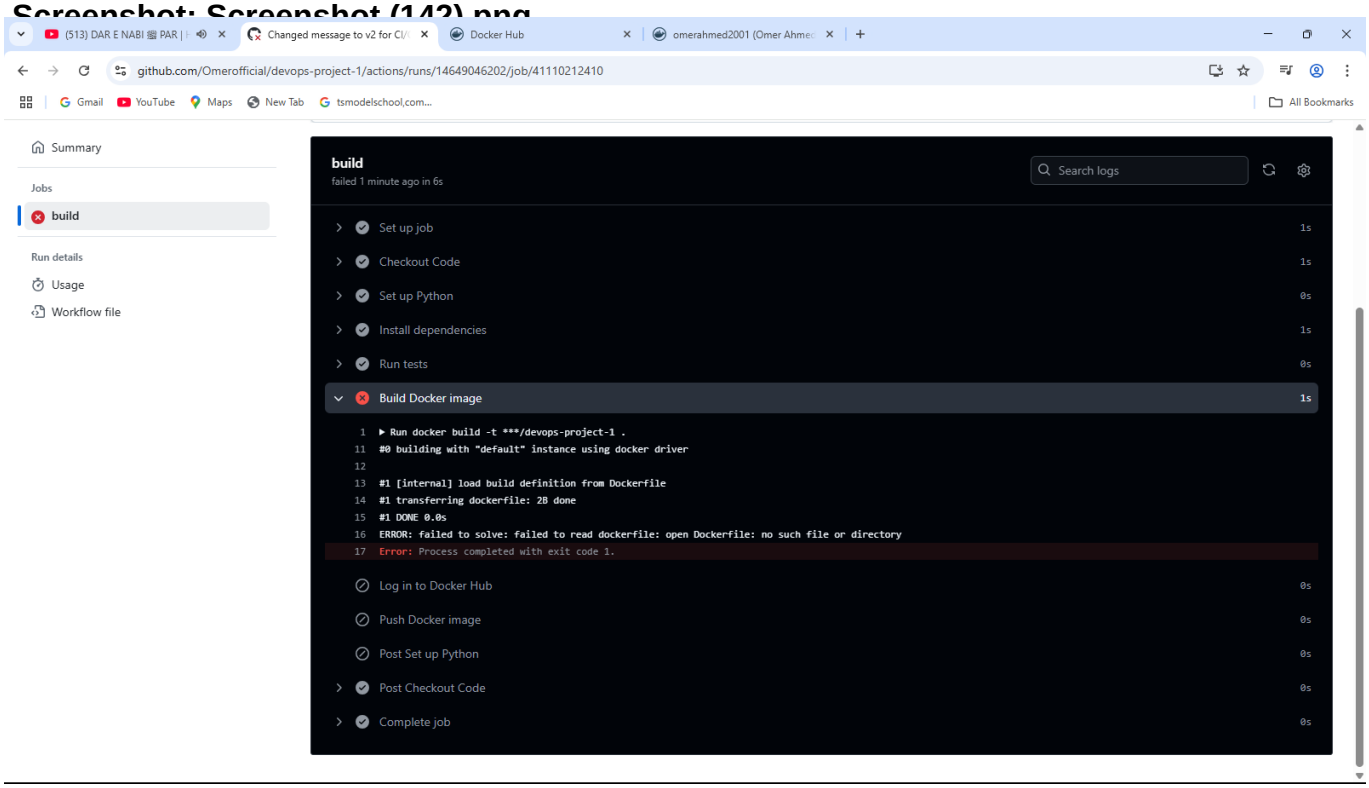
Screenshot: Screenshot (142).png



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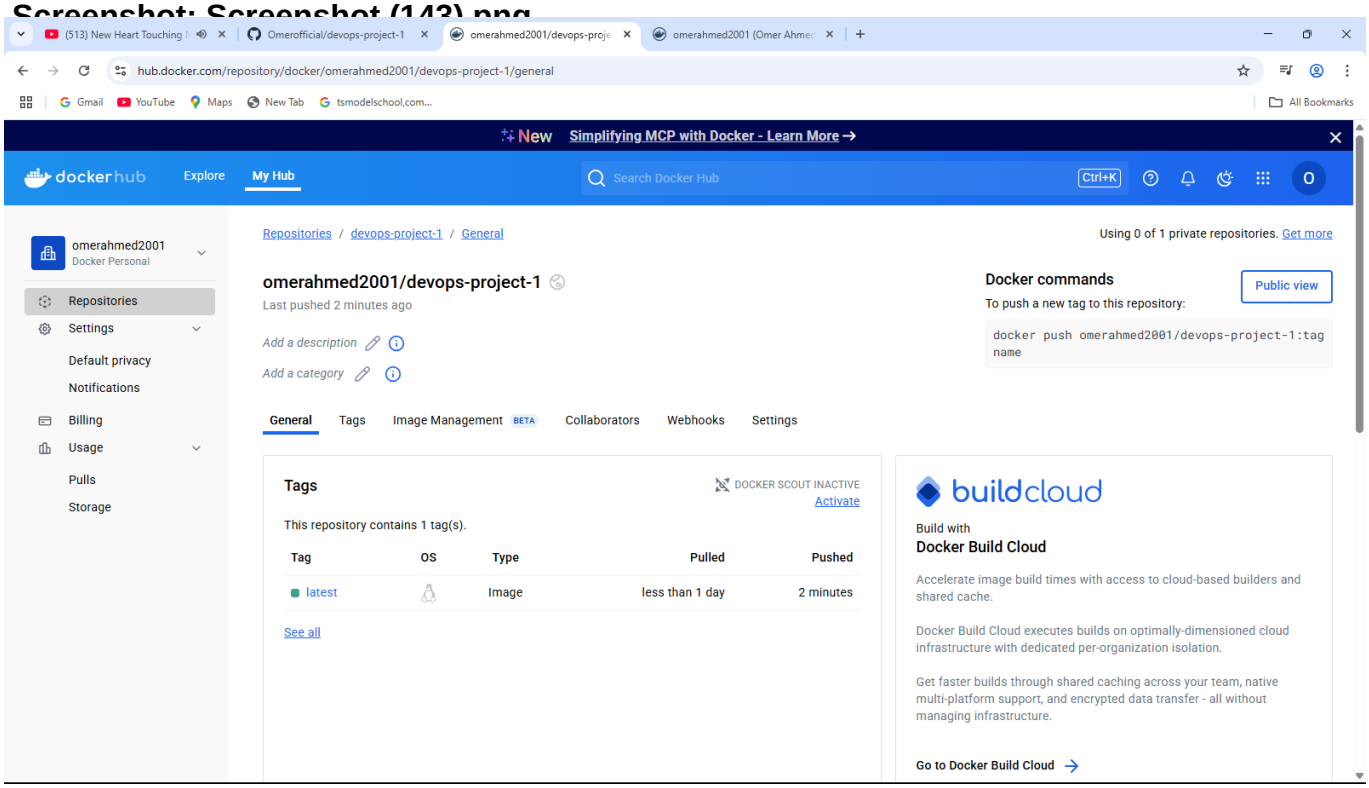
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