CI/CD PIPELINE OVERVIEW

WHAT IS CI/CD?

CI/CD stands for Continuous Integration and Continuous Deployment. It's a method of software development where code changes are automatically tested, built, and deployed to production. This modern approach ensures faster and more reliable software delivery.

KEY BENEFITS

- Detect bugs early in development

- Automated testing and building

- Faster feedback and releases

- Better collaboration between teams

STAGES OF A CI/CD PIPELINE

1. Commit – Developers push code to the repository (e.g., GitHub).
2. CI – A CI server (like GitHub Actions) runs tests and builds.
3. Testing – Automated unit/integration tests are executed.
4. Docker Build – If tests pass, a Docker image is built.
5. Push to Registry – The image is pushed to Docker Hub.
6. CD – Deployment happens automatically to a production or staging environment.

TOOLS COMMONLY USED

- Git & GitHub

- GitHub Actions (CI/CD tool)

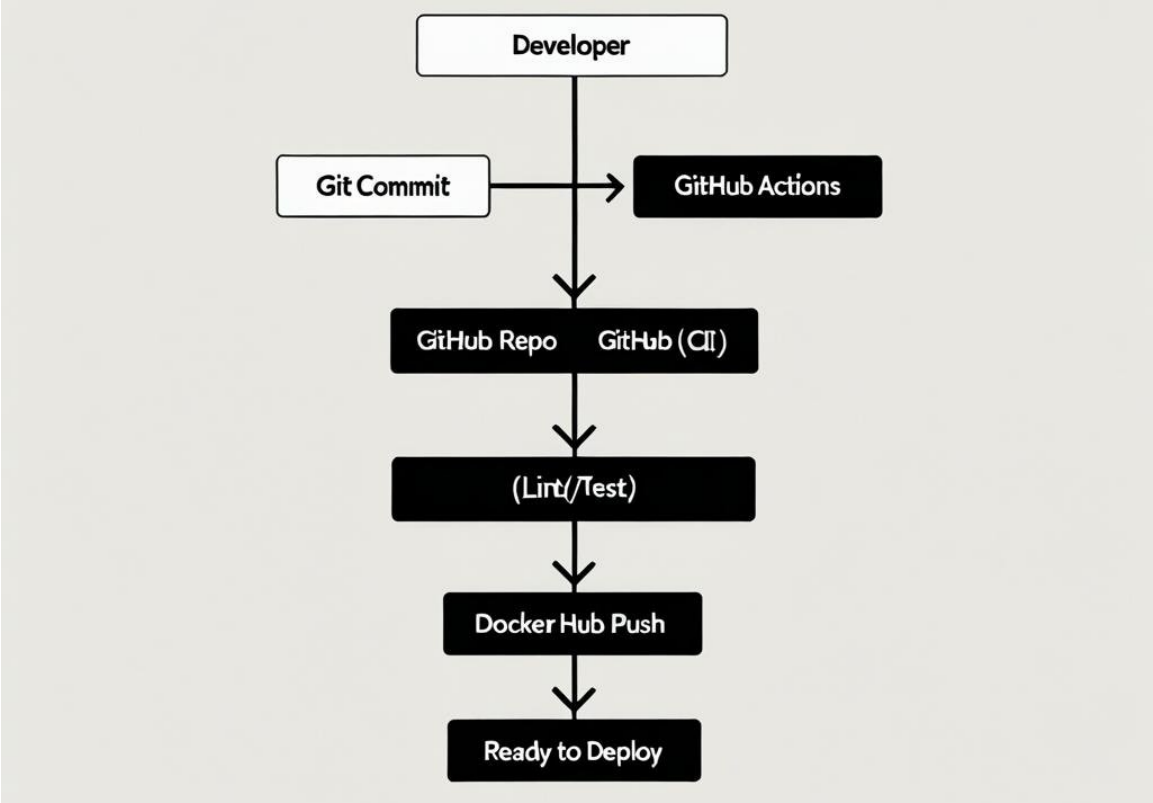
- Docker & Docker Hub

- Cloud platforms (e.g., AWS, Heroku)

EXAMPLE: WEEK 2 SUBMISSION FLOW

In this week task , the following flow was followed:
- Code was pushed to GitHub.
- GitHub Actions triggered `flake8` linting for code style checks.
- Dockerfile was used to build a Docker image of a Python app.
- Image was tagged and pushed to Docker Hub.
- (Optional) Deployment stage could push it to a live server/container.

CI/CD PIPELINE DIAGRAM



CONCLUSION

CI/CD is the backbone of modern DevOps culture. With automated integration, testing, and deployment, teams can deliver better software faster.