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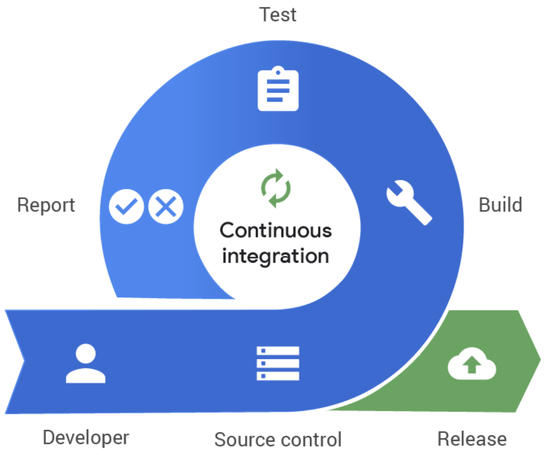
Software Testing & Debugging

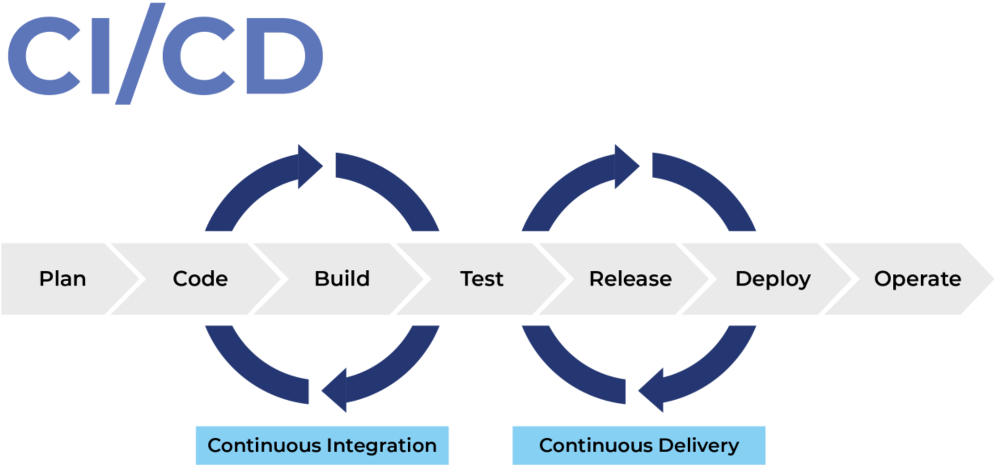
Continuous Integration (CI)

- Continuous integration (CI): a software development strategy to increase the speed of development
  - developers continually commit changes in small increments
  - each change is automatically built and tested before it is merged into the codebase.



Continuous Delivery (CD)

- Continuous Delivery: a software development strategy where code changes are automatically built, tested **and released** to production
  - CI focuses on preparing code for release (build/test), whereas CD involves the actual release of code (release/deploy).



Benefits of CI/CD

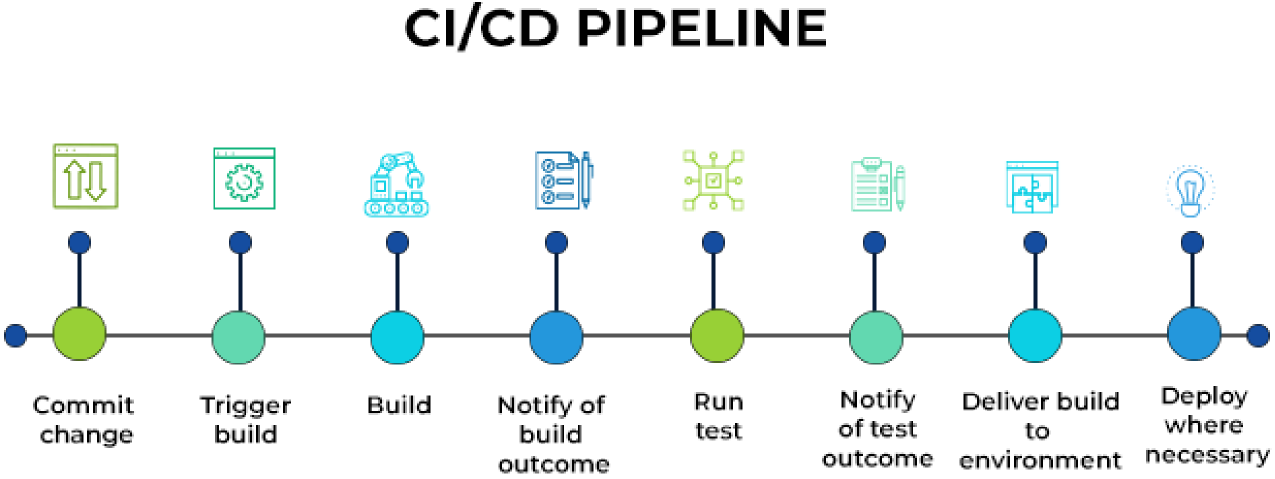
- **Improved quality of software**: Identifying and fixing problems early on.
- **Reduced risk of broken builds**: Automating your build process with CI to better avoid broken builds by resolving issues earlier in the process.
- **Increased confidence in releases**: CI/CD can help to ensure that each release is stable and ready for production. By running automated tests, CI can identify potential problems
- **Improved communication and collaboration**: Providing a central place for developers to share code and test results
- **Increased productivity**: Increasing developer productivity by automating tasks that would otherwise be time-consuming and error-prone

CI/CD Steps & Best Practices

- Maintain a code repository
- Automate the build: every commit (to baseline) should be built
- Make the build self-testing
- Everyone can see the results of the latest build
- CD step: Automate deployment

CI/CD Pipeline

- A CI/CD pipeline is the most fundamental component of automated software integration/delivery.
- A CI/CD pipeline is the full set of processes and steps to make CI/CD happen



CI/CD Pipeline

- A pipeline encompasses **workflows**, which coordinate **jobs**
  - A workflow is a set of jobs
  - A job is a set of runnable steps
- A **configuration (file)** is how we set up a workflow

CI/CD Tools & Platforms

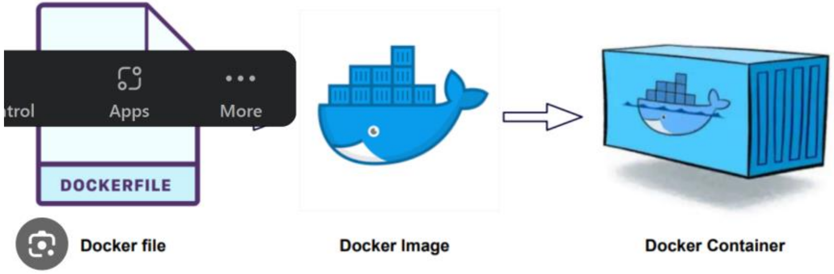
- Jenkins
- Travis CI
- CircleCI
- GitLab
- Github Actions
- Etc.

Github Actions

- GitHub Actions is a CI/CD platform, provided by Github, that allows you to **automate your build, test, and deployment pipeline:**
  - You can create **workflows** that build and test every push/pull requests to (specific branches) of the repository or deploy merged push/pull requests to production (CD).

Docker Container

- A Docker **container image** is a lightweight, standalone, executable package of software that includes everything needed to run an application: code, runtime, system tools, system libraries and settings.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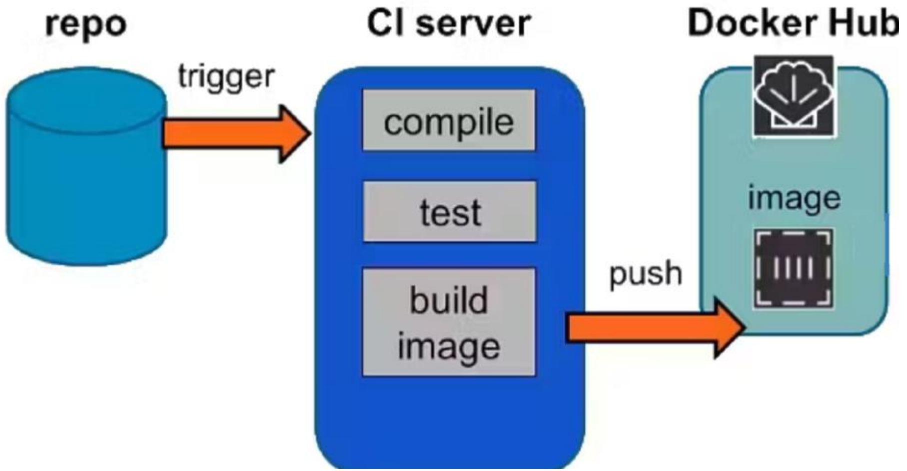
Apps
More
DOCKERFILE
Docker file
Docker Image
Docker Container


repo
CI server
Docker Hub
trigger
compile
test
build image
push
image