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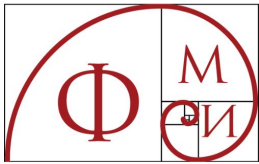
Modern DevOps Practices

Prepared for

Faculty of Mathematics and Informatics (FMI)



Program overview

1. Initial meeting
2. Software Development Life Cycle (SDLC)
3. Working with version control systems
4. Microservices and Docker
5. Kubernetes
6. **Pipelines**
7. **Continuous Integration**
8. Continuous Delivery
9. DevSecOps
10. Cloud services in AWS
11. Infrastructure as Code with Terraform
12. Database versioning

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Pipelines

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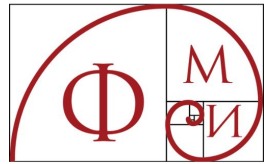

SDLC

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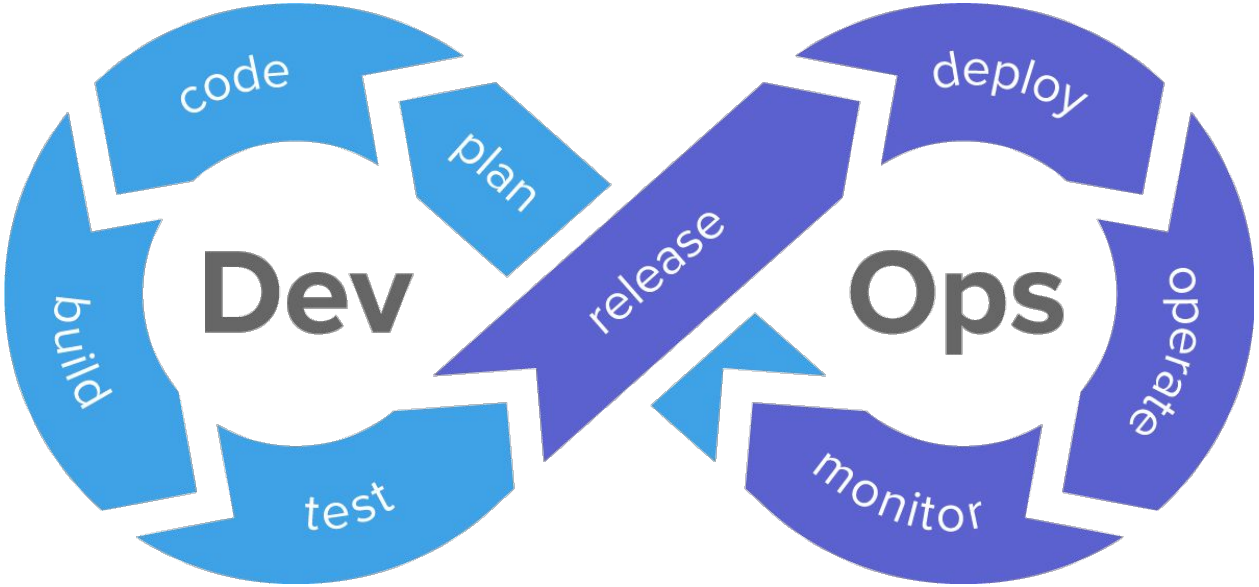

The First Way:
Systems Thinking

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Deployment Pipeline

We use a Deployment Pipeline to organise all steps required to go from idea to releasable software and we automate as much of our development process as we can, to ensure that we produce software repeatably and reliably

Deployment Pipeline

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Organising our software development work, to go from **Commit** to **Releasable Outcome**

- As quick as possible
- Repeatably
- Reliably
- Auditable

Deployment Pipeline

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- the only route to production
- includes any and all steps that are necessary for new software to be releasable
- unit tests, acceptance tests, validation, integration, version control, sign-offs and any other tests or requirements

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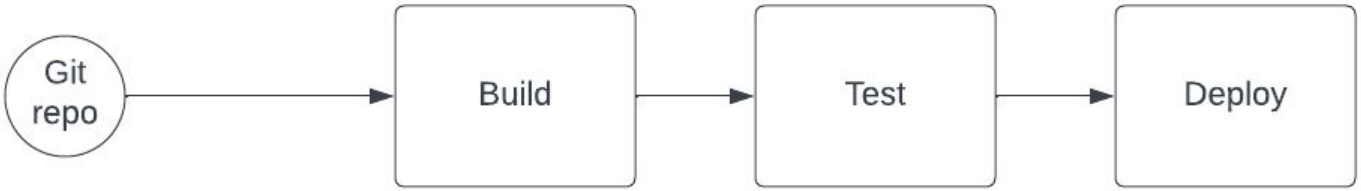

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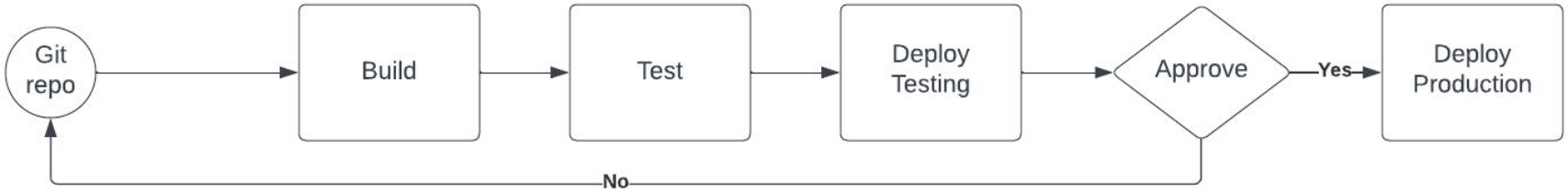

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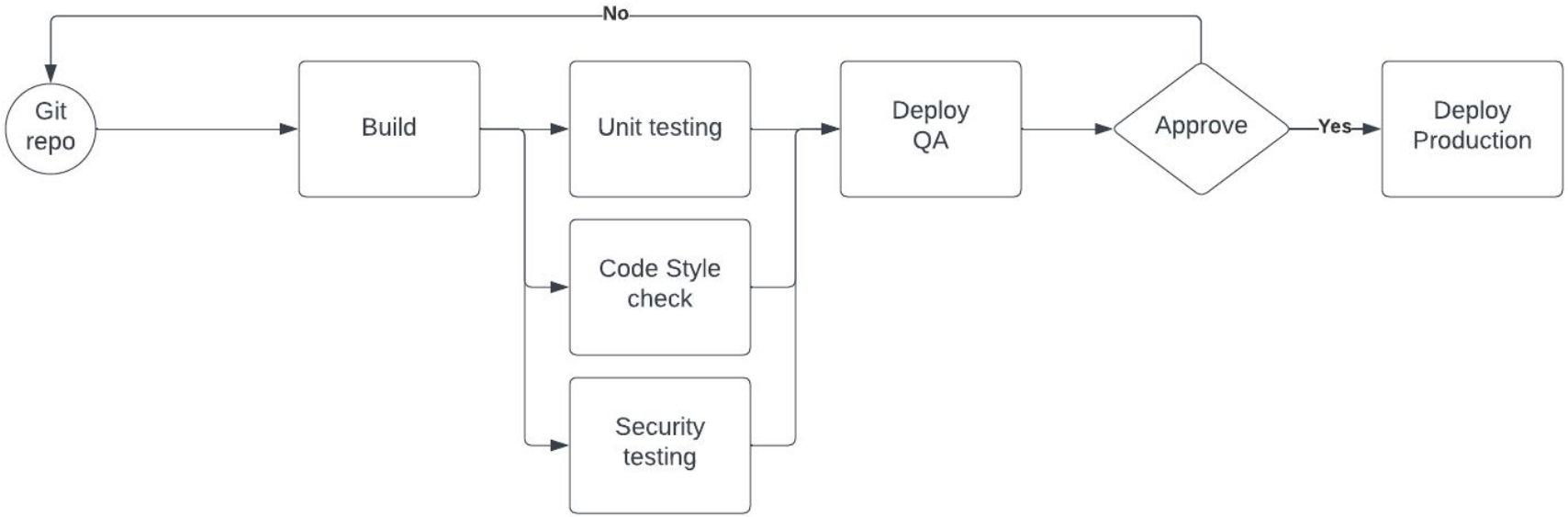

Toolchain

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GitHub	GitHub Actions
BitBucket	BitBucket Pipelines
Azure DevOps repo	Azure DevOps Pipelines
GitLab	GitLab CI
	Jenkins
	Circle CI

GitHub Actions

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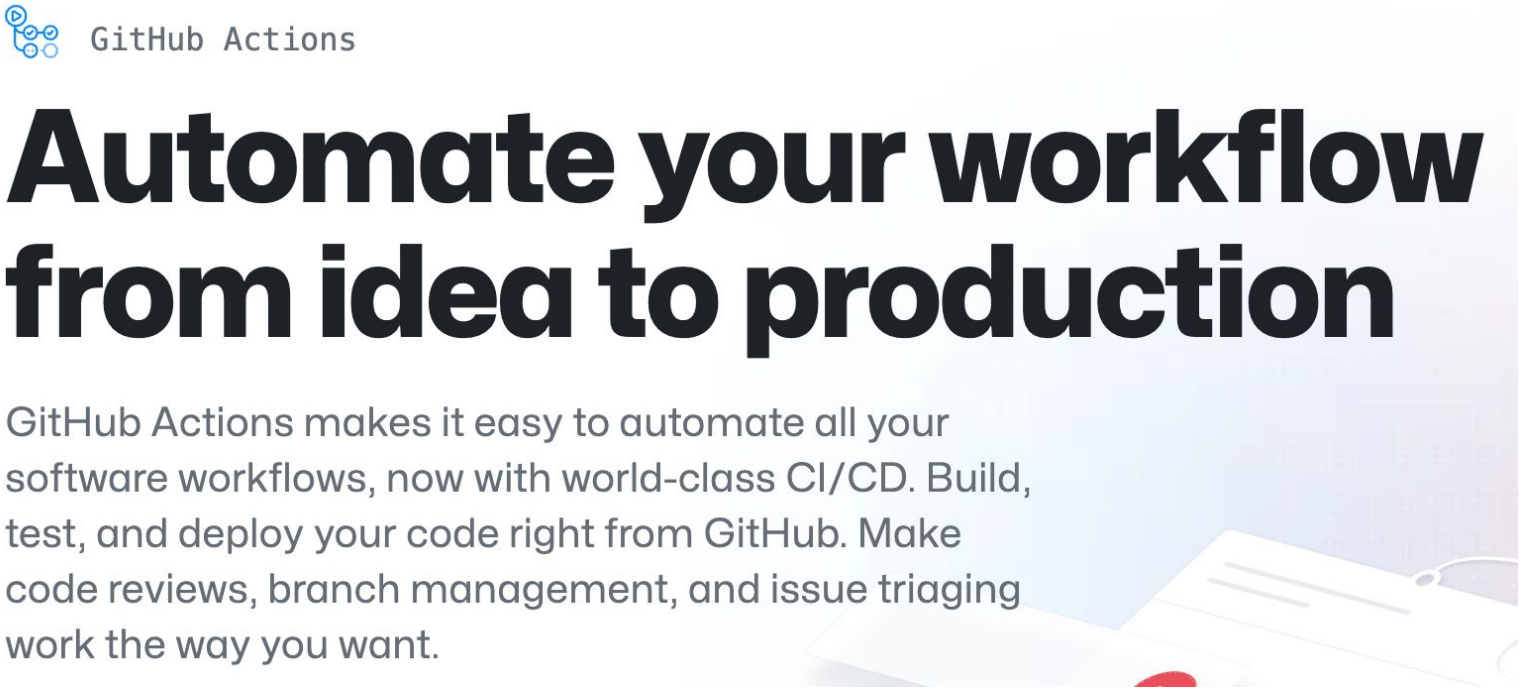
https://github.com/features/actions



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Continuous Integration (CI)

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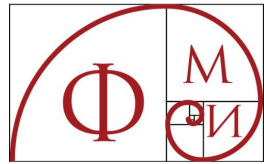

Playtime

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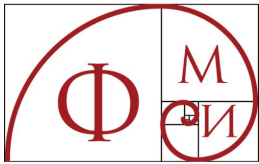
When do you consider a service ready for deployment?



What is Continuous Integration (CI)

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Software development practice where developers regularly merge their code changes into a central repository, after which automated builds and tests are run.

Continuous integration most often refers to the build or integration stage of the software release process and entails both:

- an automation component (e.g. a CI or build service)
- a cultural component (e.g. learning to integrate frequently)

Goals of CI

- find and address bugs quicker
- improve software quality
- reduce the time it takes to validate and release new software updates

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Benefits of CI

- CI enables organizations to scale in engineering team size
- Improve the feedback loop
- Enhance communication
- Team adoption and initial technical installation
- Technology learning curve

Improve Developer Productivity

Continuous integration helps your team be more productive by freeing developers from manual tasks and encouraging behaviors that help reduce the number of errors and bugs released to customers.

Find and Address Bugs Quicker

With more frequent testing, your team can discover and address bugs earlier before they grow into larger problems later.

Deliver Updates Faster

Continuous integration helps your team deliver updates to their customers faster and more frequently.

CI Practices

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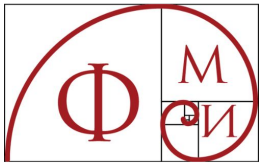
- Maintain a single source repository such as Git
- Automate the build
- Make your build self-testing
- Every commit should build on an integration machine
- Keep the build fast
- Test in a clone of the production environment
- Make it easy for anyone to get the latest executable version
- Everyone can see what’s happening
- Automate deployment



CI pipeline

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Testing practices as part of the CI process

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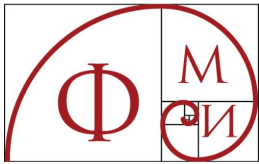
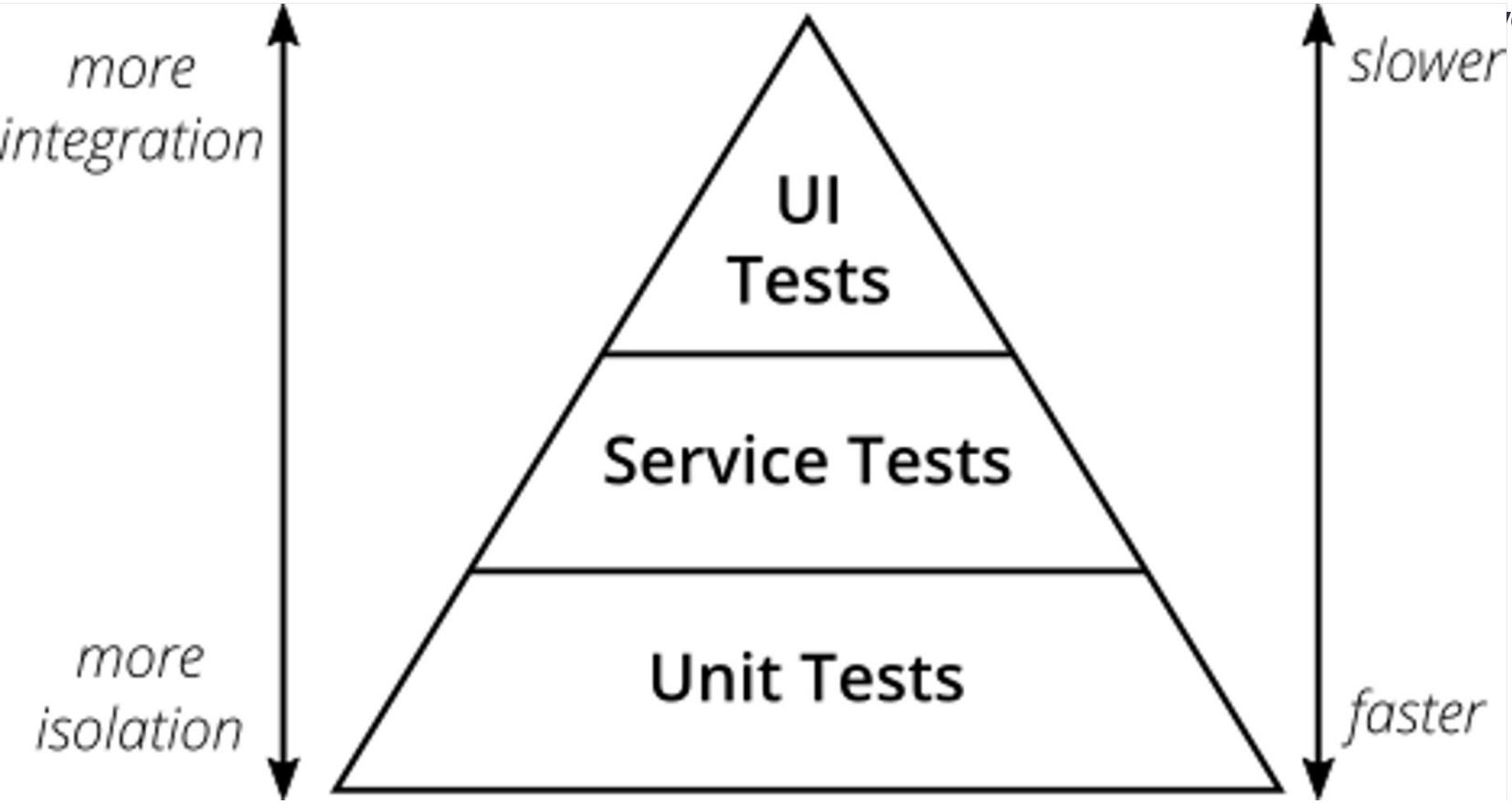
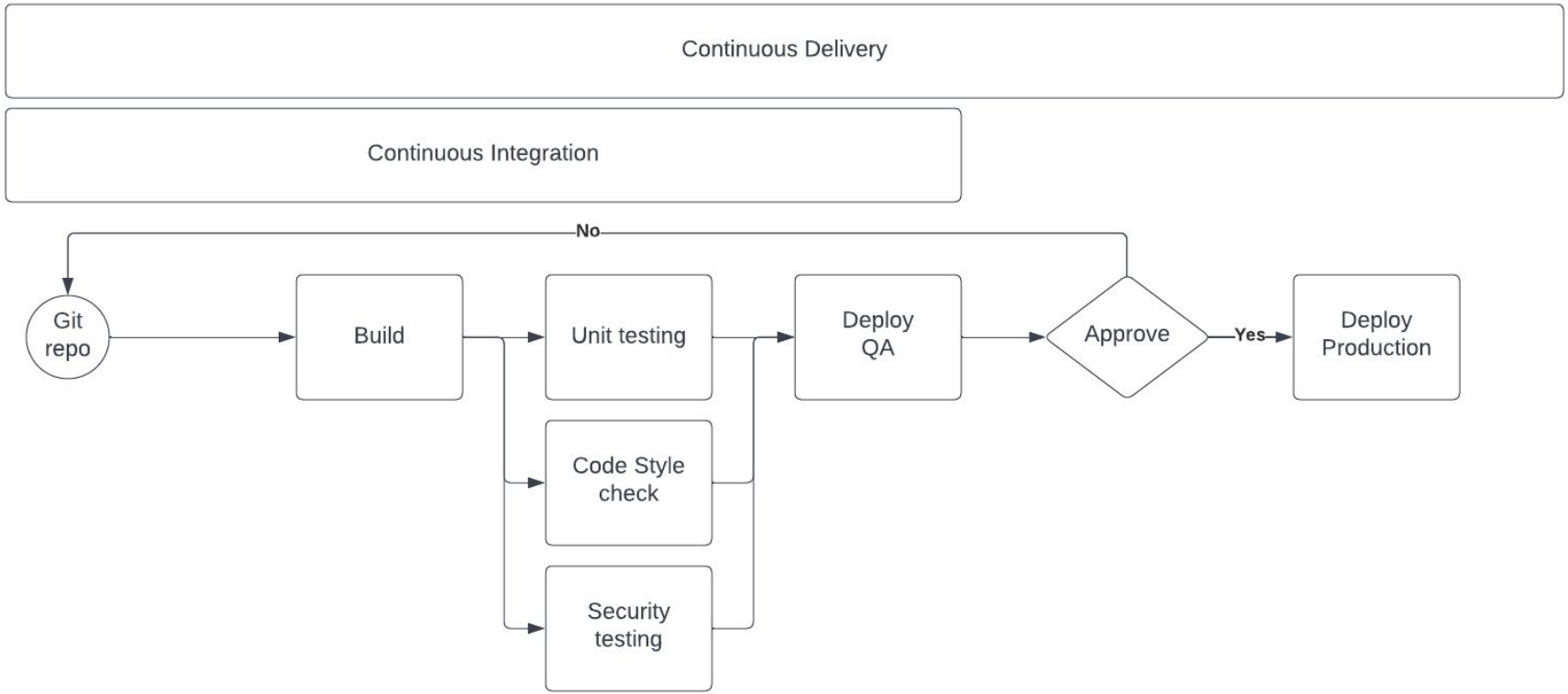
- Software build
- Unit testing
- Code quality
- Integration testing
- Security testing
- Performance testing
- UI testing
- Accessibility testing
- Test the infrastructure with the code
- Data Migration




more
integration
more
isolation
UI
Tests
Service Tests
Unit Tests
slower
faster


Continuous Delivery
Continuous Integration
No
Git repo
Build
Unit testing
Code Style check
Security testing
Deploy QA
Approve
Yes
Deploy Production

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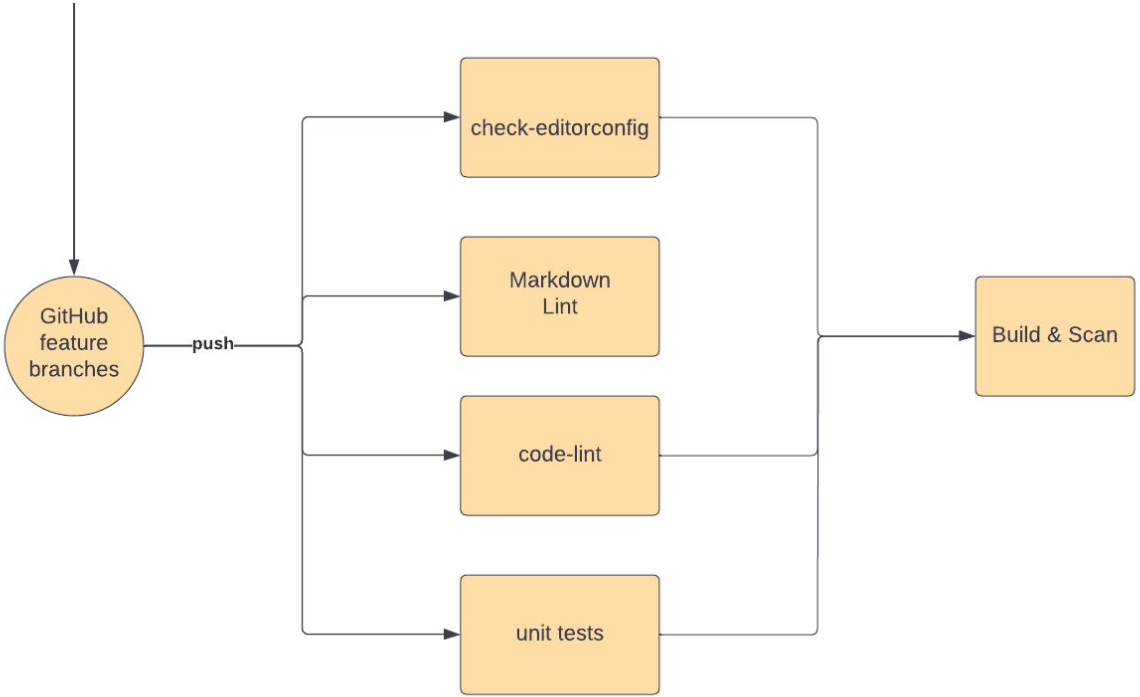

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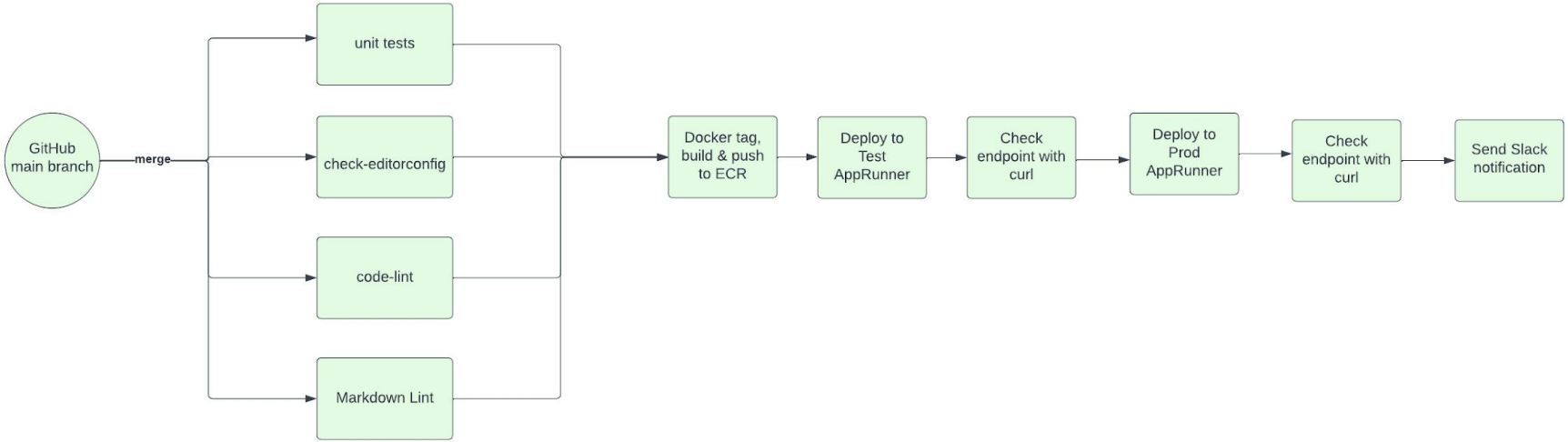

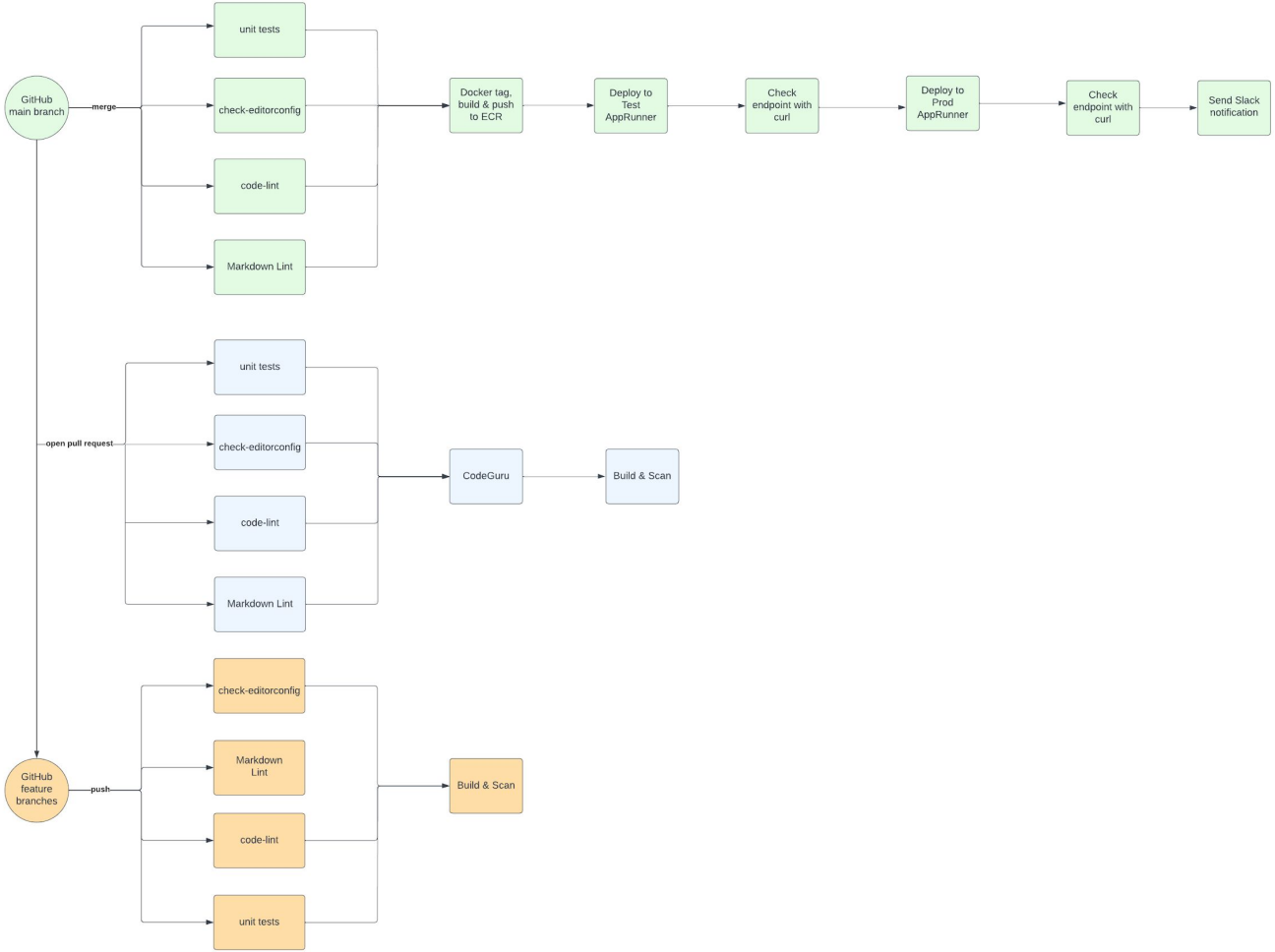

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Demo

https://docs.github.com/en/actions/quickstart

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Q & A

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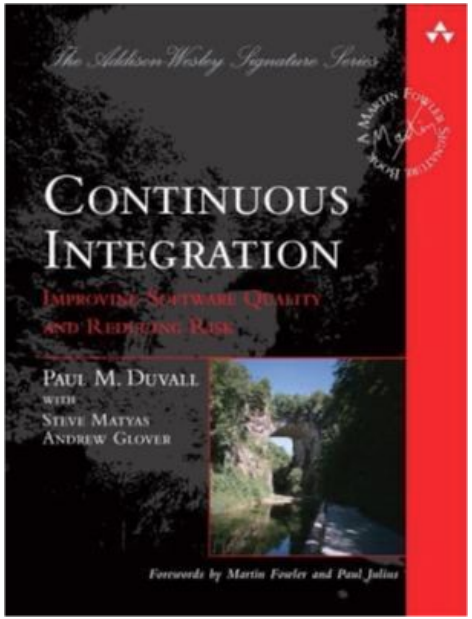
Resources

https://docs.github.com/en/actions/quickstart
https://aws.amazon.com/devops/continuous-integration/
https://www.youtube.com/@ContinuousDelivery



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Thank you!

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