WALCHAND COLLEGE OF ENGINEERING, SANGLI

Walchand Linux Users' Group

WLUG
COMMUNITY | KNOWLEDGE | SHARE

Celebrates

OPEN SOURCE DAY 2K24

LEARN & CONTRIBUTE

- Introduction to GIT
- GIT Branching
- GIT Commands
- GitHub Contribution

FREE FOR ALL

- Introduction to CI / CD
- Principles of CI / CD
- CI / CD Tools
- CI / CD Pipelines

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www.wcewlug.org

CONTACT WITH US

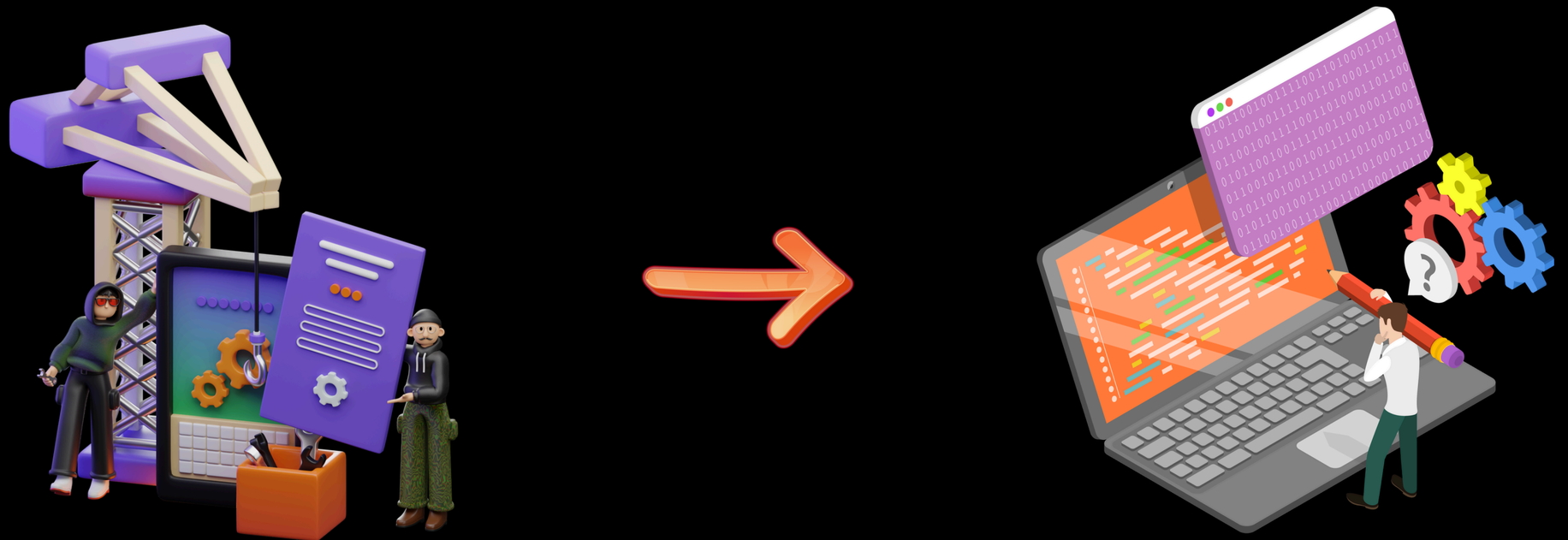
20 OCT 2024

MAIN CCF

70209 96503
82084 32514

Mr. Yash Patil	Dr. M. A. Shah	Dr. R. R. Rathod	Dr. A. J. Umbarkar	Dr. A. R. Surve	Dr. M. M. Khot	Dr. U. A. Dabade
President WLUG	HoD Computer Science and Engineering	HoD Information Technology	Staff Advisor WLUG	Staff Advisor WLUG	Associate Dean Student Activities	I/C Director WCE, Sangli

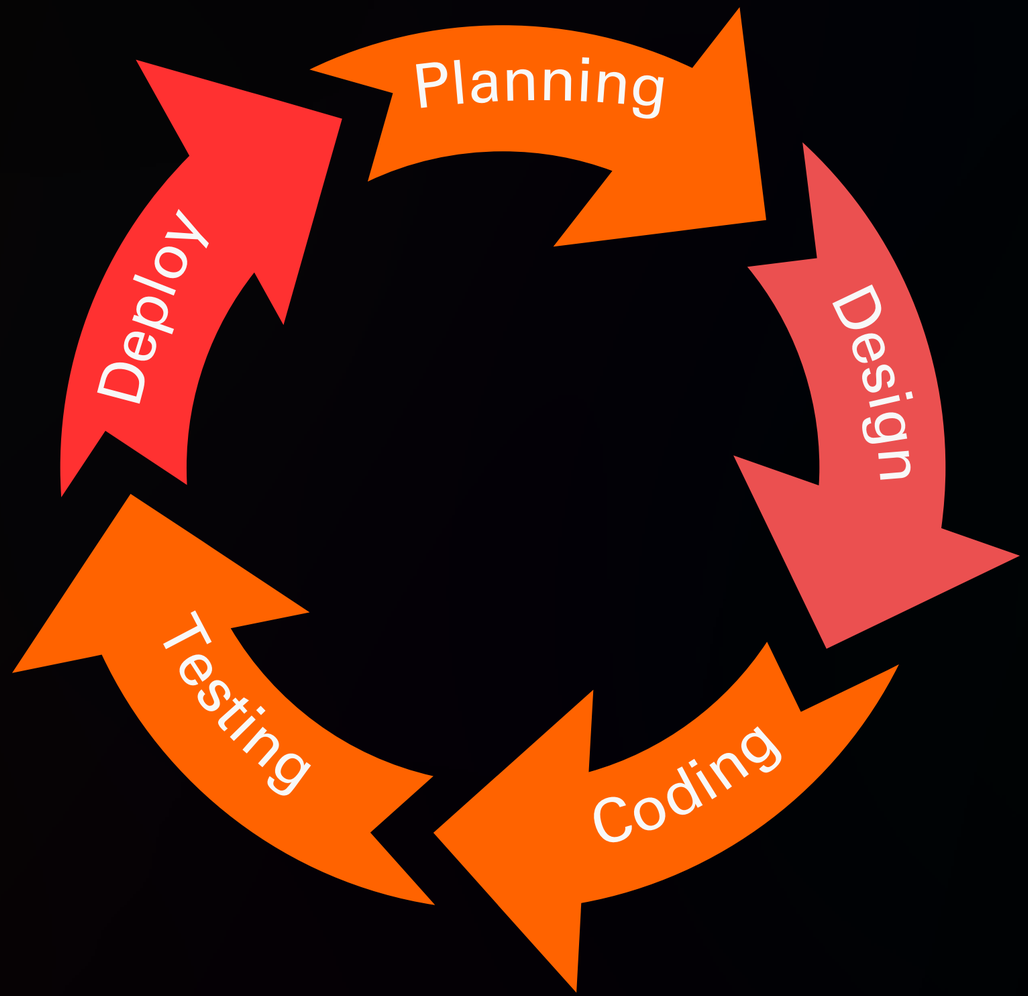
How is Software Built?



What is SDLC?

What is SDLC?

Phases of SDLC



Roadblocks in Software Development

Miscommunication and lack of collaboration

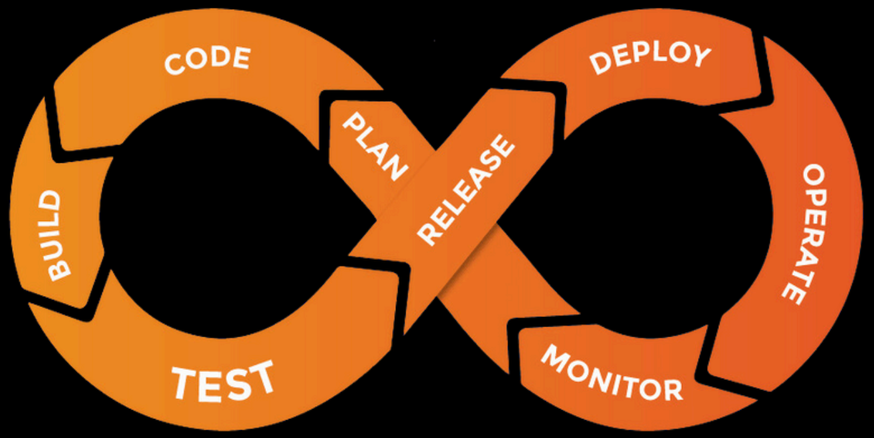
Conflict of Interest

Application testing

Manual deployment

What is DevOps?

- Combines software development (Dev) and IT operations (Ops)
- Improves collaboration between teams
- Streamlines the process of building, testing and deploying software



Key Concepts of DevOps

- Collaboration
- Continuous integration
- Continuous delivery
- Automation

Why DevOps?

- Faster delivery
- Improved quality
- Scalability
- Increased efficiency

Tools Used in DevOps

- GitHub
- Jenkins
- Docker

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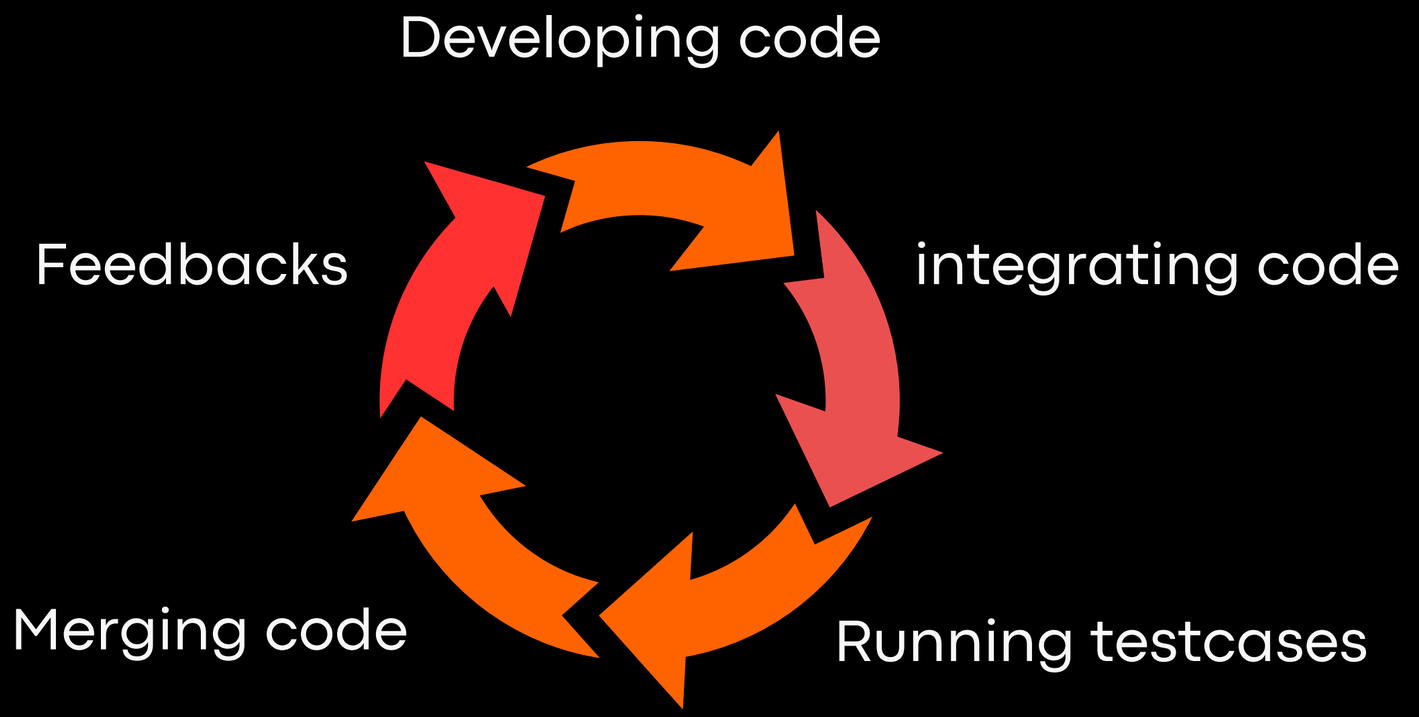
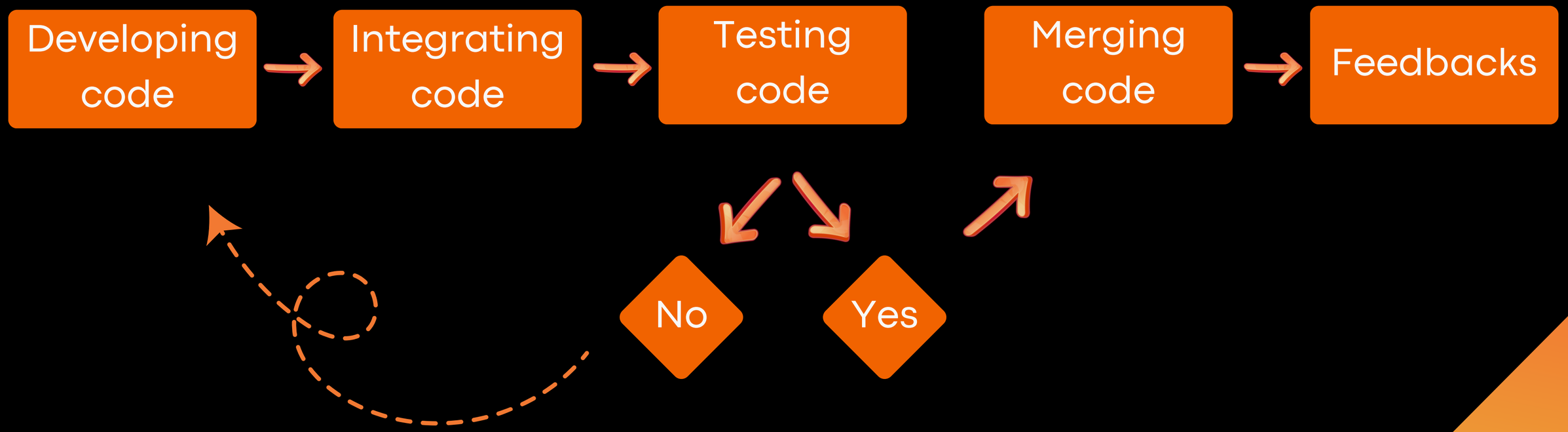
Continuous Integration



Continuous Integration



Key Features

- Automated testing
- Frequent commits
- Immediate feedback
- Build automation

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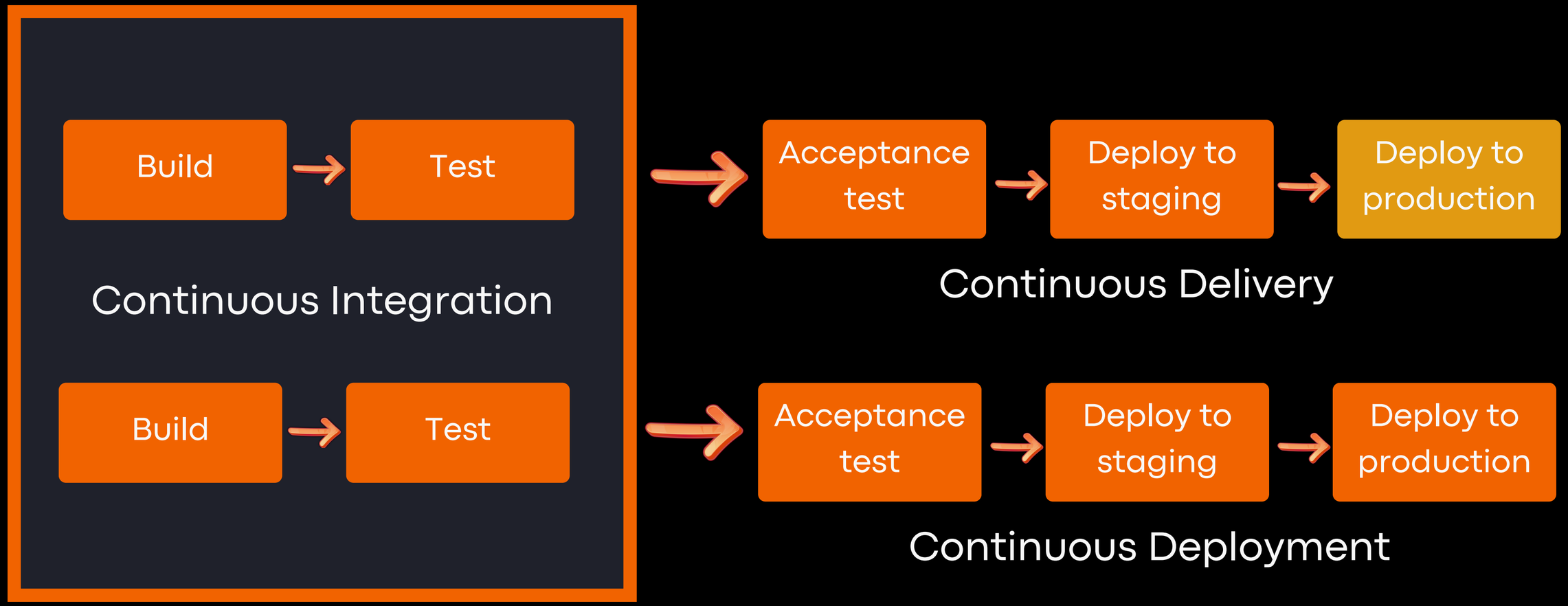
CONTINUOUS DELIVERY & DEPLOYMENT


Build
Test
Continuous Integration
Acceptance test
Deploy to staging
Deploy to production
Continuous Delivery
Build
Test
Acceptance test
Deploy to staging
Deploy to production
Continuous Deployment

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Continuous Delivery

- Manual intervention is needed
- Partially automated
- Teams have control over when to release changes to production

Vs

Continuous Deployment

- Manual intervention is not needed
- Fully automated
- Changes are deployed immediately after passing tests

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TOOLS AND ARCHITECTURE

Git and Github

- Git: Distributed Version Control system
- Provides local and remote repository management
- GitHub: cloud based platform for repository management

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Dev 1

Feature 1

Codebase with feature 1 only

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Dev 2

Feature 2

Codebase with feature 1 and 2

Codebase ready

Perform tests

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Codebase ready

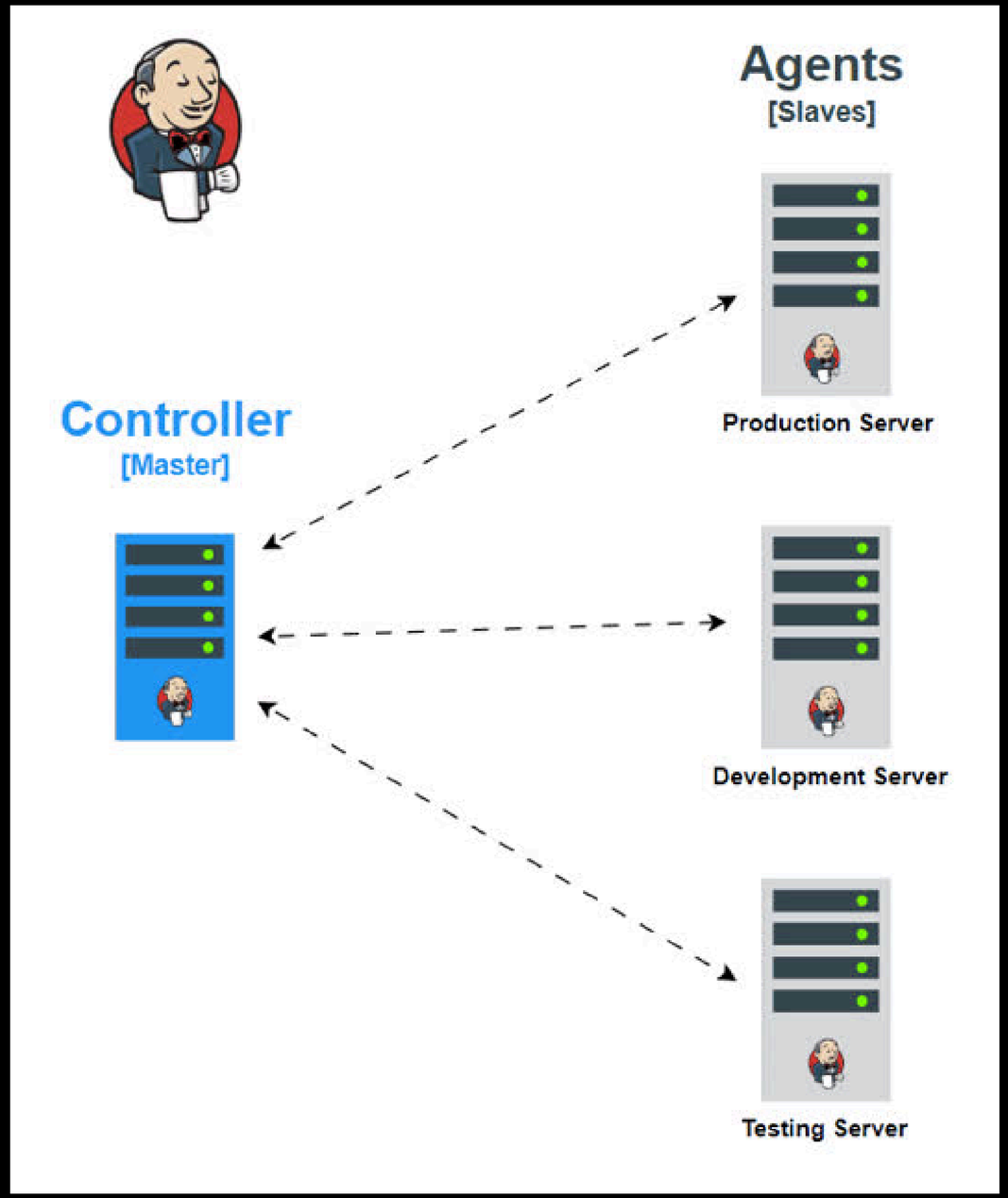
Perform tests

Features not compatible

What Happened?

Jenkins To The Rescue

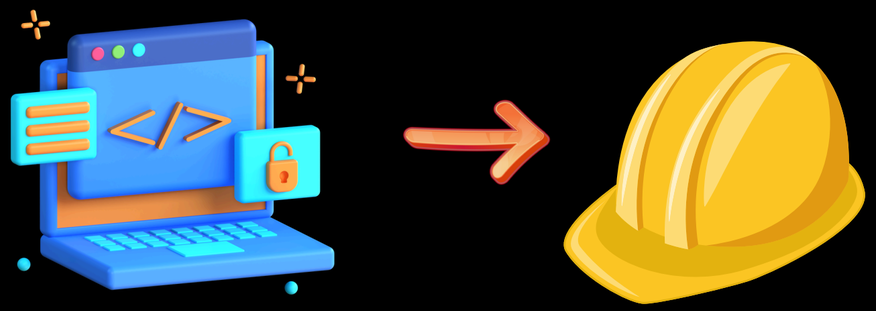
- Developers can commit to a shared repository
- Changes can be made continuously
- Rollbacks can be made instantly
- Supported on Master-Slave architecture


Agents
[Slaves]
Controller
[Master]
Production Server
Development Server
Testing Server

Software Artifacts

Source code

Software Artifacts

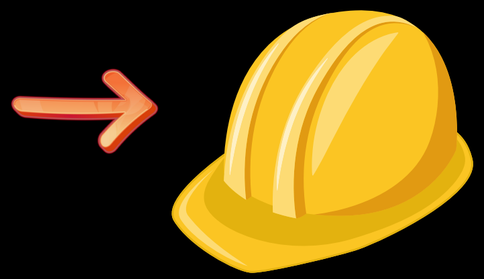


Source code

Build tools

Software Artifacts

Source code



Build tools

Compilation

Software Artifacts

Source code

Build tools

Compilation

Dependencies

Binary code

Jfrog

- Open source and commerical versions
- Database of DevOps
- Souce code : Git :: Artifacts : Jfrog

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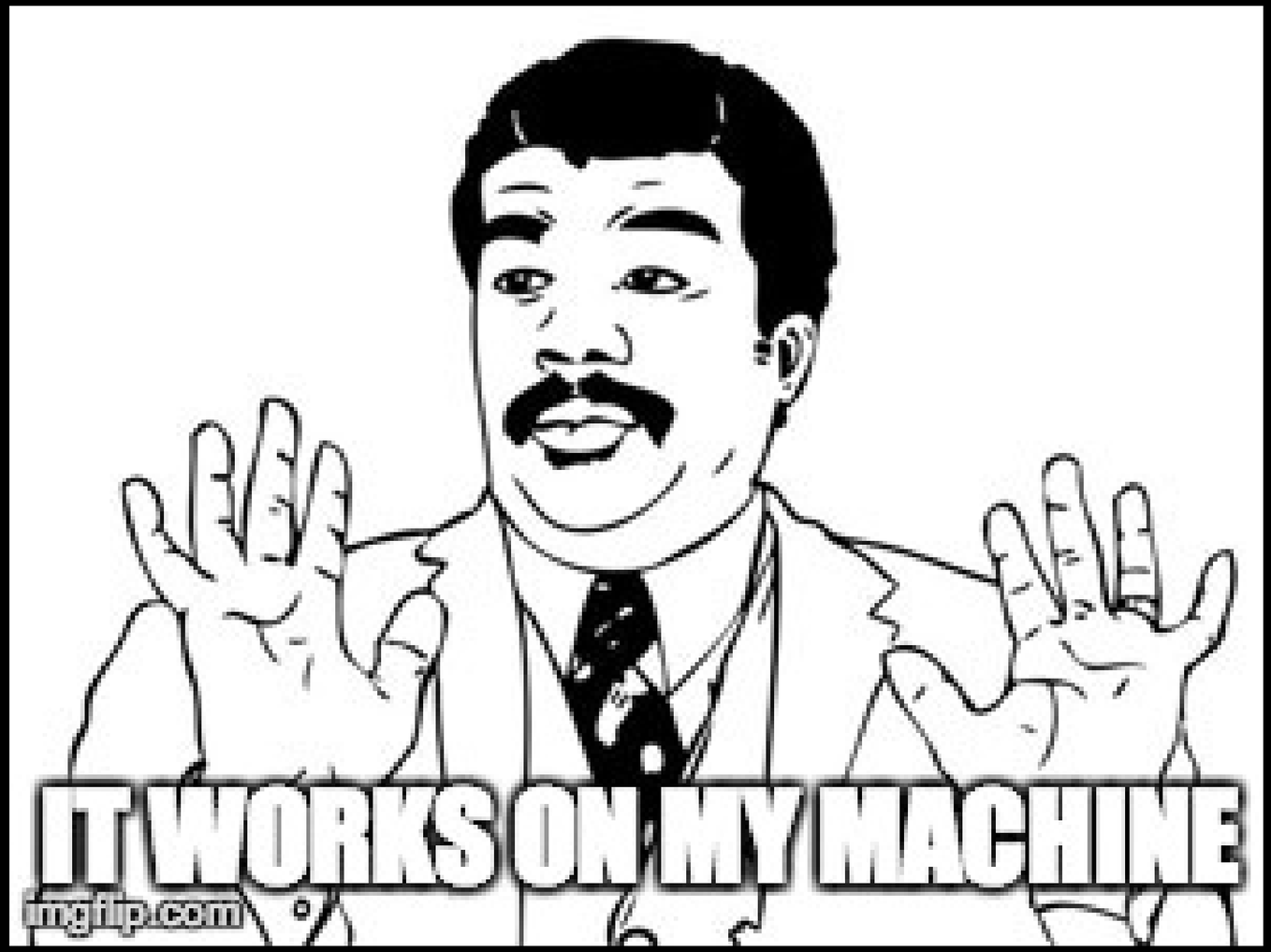

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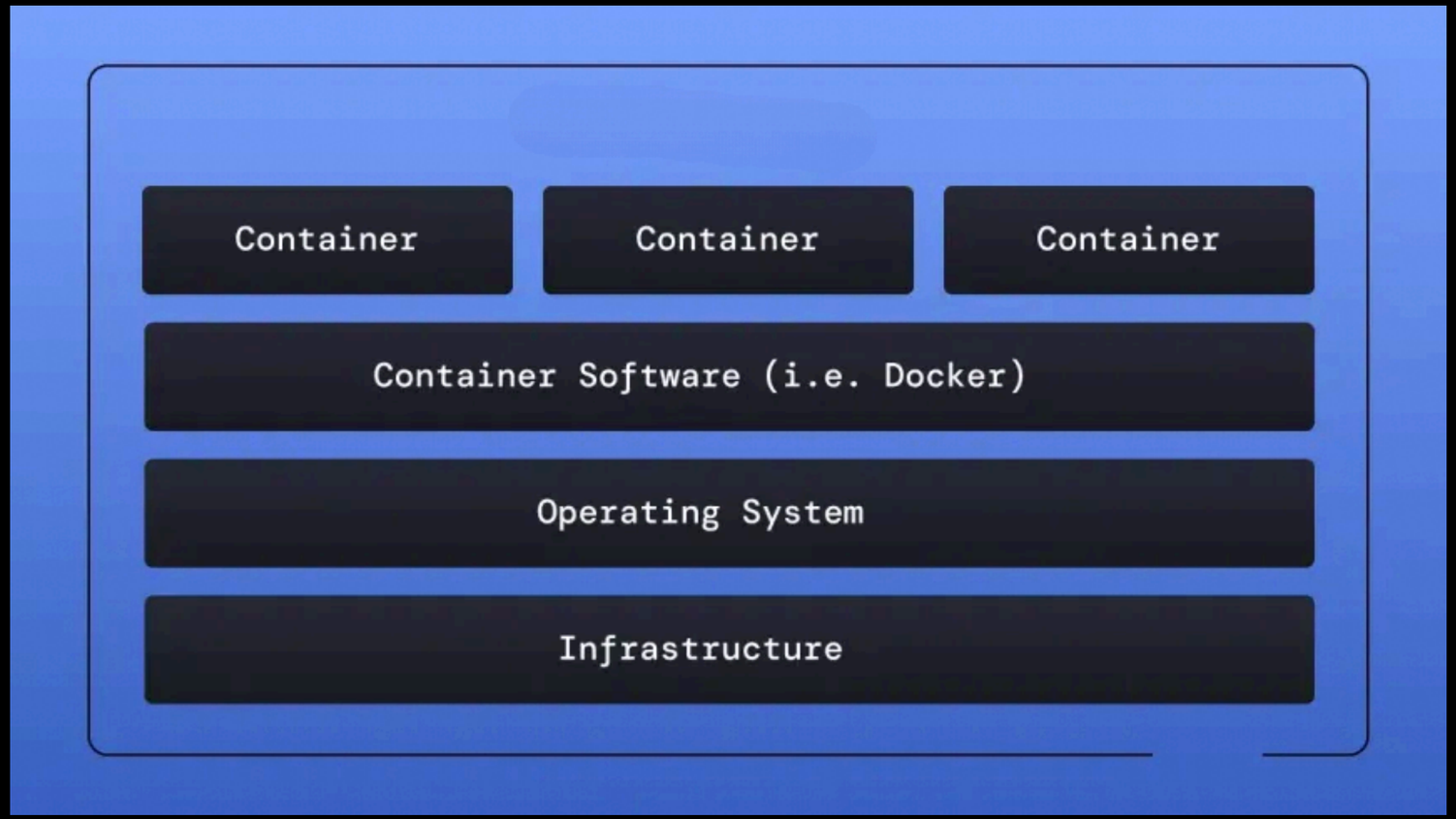
Containerisation



Docker

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- Open source containerisation software, written in Golang
- Portable and lightweight containers
- Isolated and self-contained entities for efficient deployment and scaling

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Dockerfile

```
FROM coffee-machine:latest

RUN install-cups && start-machine

COPY recipe /vendor/recipe

COPY premix /vendor/premix

RUN unpack-premix && prep-coffee

CMD ["brew-coffee"]
```

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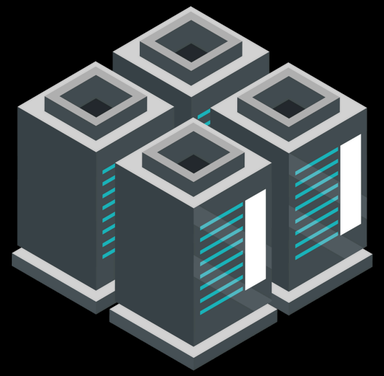
Virtual machines



Load balancers

Database

Cloud provider’s interface

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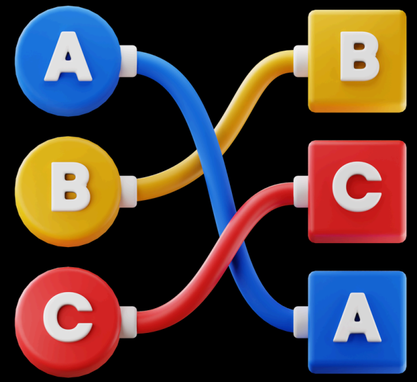
Expanding Business

New project



Change in database structure

The Plan

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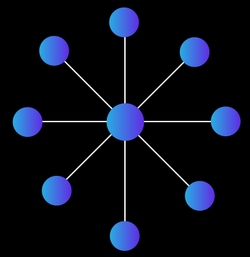
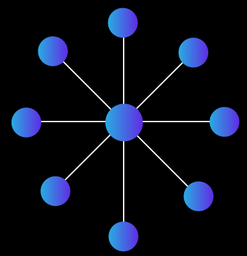
Staging environment setup



Production environment setup



The Execution

Minor error in configuration

Site faces downtime

Dev questions his life

Terraform

- Developed by hashicorp inc.
- Reduced costs and automated backups
- Infrastructure as code (IAC)
- Stores cloud infrastructure configuration setup as easy-to-read code

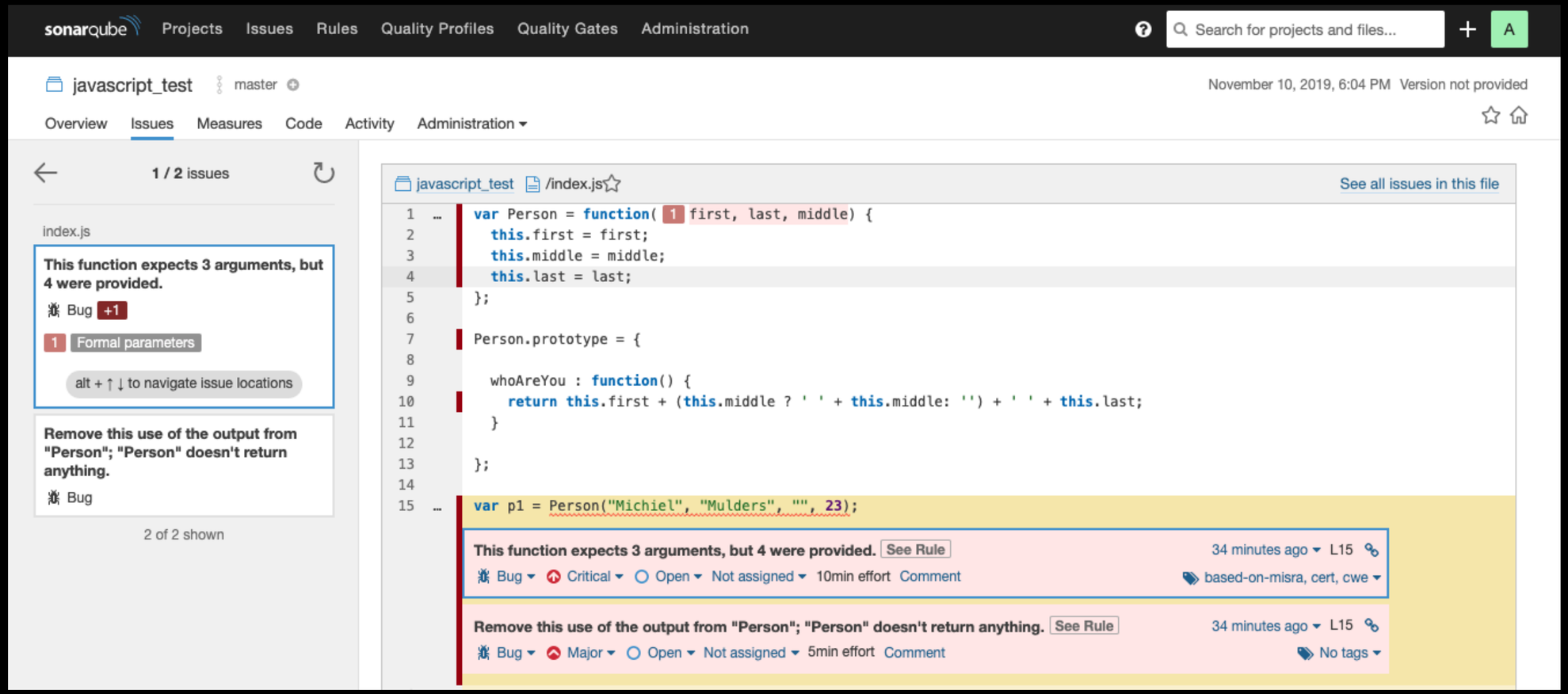
HCL in Action

```
resource "aws_vpc" "default_vpc" {
    cidr_block = "172.31.0.0/16"
    tags = {
        Name = "example_vpc"
} }
```

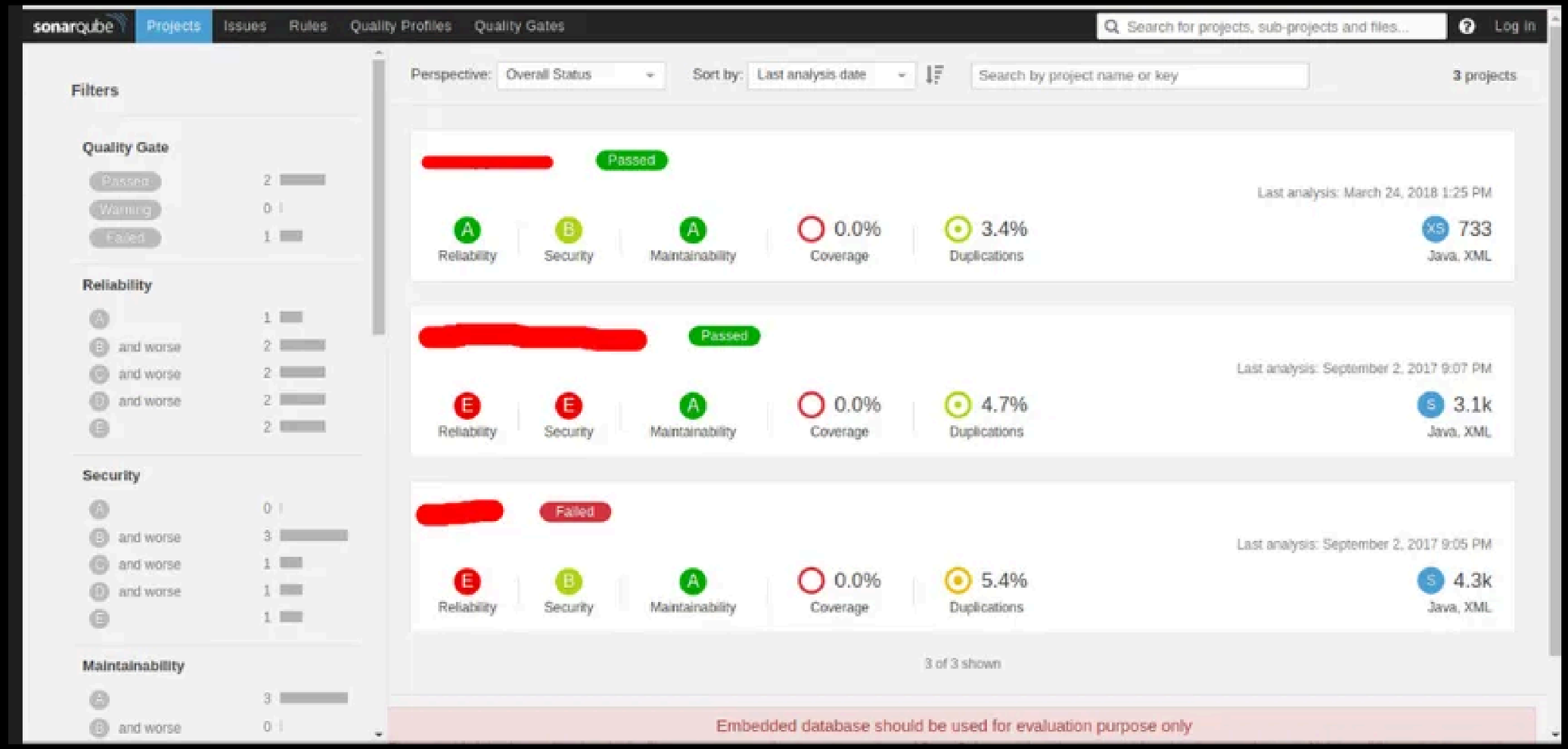
SonarQube

- Open source, developed by SonarSource
- Provide QA testing and code quality benchmarks
- Static and dynamic testing supported
- Multi-language support

SonarQube


sonarqube
Projects
Issues
Rules
Quality Profiles
Quality Gates
Administration
Search for projects and files...
A
javascript_test
master
November 10, 2019, 6:04 PM Version not provided
Overview
Issues
Measures
Code
Activity
Administration
1 / 2 issues
index.js
This function expects 3 arguments, but 4 were provided.
Bug +1
1 Formal parameters
alt + ↑ ↓ to navigate issue locations
Remove this use of the output from "Person"; "Person" doesn't return anything.
Bug
2 of 2 shown
javascript_test /index.js
See all issues in this file
1 var Person = function(1 first, last, middle) {
2 this.first = first;
3 this.middle = middle;
4 this.last = last;
5 };
6
7 Person.prototype = {
8
9 whoAreYou : function() {
10 return this.first + (this.middle ? ' ' + this.middle: '') + ' ' + this.last;
11 }
12
13 };
14
15 var p1 = Person("Michiel", "Mulders", "", 23);
This function expects 3 arguments, but 4 were provided. See Rule
34 minutes ago L15
Bug Critical Open Not assigned 10min effort Comment
based-on-misra, cert, cwe
Remove this use of the output from "Person"; "Person" doesn't return anything. See Rule
34 minutes ago L15
Bug Major Open Not assigned 5min effort Comment
No tags

SonarQube


sonarqube
Projects
Issues
Rules
Quality Profiles
Quality Gates
Search for projects, sub-projects and files...
Log In
Filters
Quality Gate
Passed 2
Warning 0
Failed 1
Reliability
A 1
B and worse 2
C and worse 2
D and worse 2
E 2
Security
A 0
B and worse 3
C and worse 1
D and worse 1
E 1
Maintainability
A 3
B and worse 0
Perspective: Overall Status
Sort by: Last analysis date
Search by project name or key
3 projects
[redacted]
Passed
Last analysis: March 24, 2018 1:25 PM
A Reliability
B Security
A Maintainability
0.0% Coverage
3.4% Duplications
XS 733 Java, XML
[redacted]
Passed
Last analysis: September 2, 2017 9:07 PM
E Reliability
E Security
A Maintainability
0.0% Coverage
4.7% Duplications
S 3.1k Java, XML
[redacted]
Failed
Last analysis: September 2, 2017 9:05 PM
E Reliability
B Security
A Maintainability
0.0% Coverage
5.4% Duplications
S 4.3k Java, XML
3 of 3 shown
Embedded database should be used for evaluation purpose only

CI / CD Pipeline

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Code

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Code

Commit

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Code

Commit

Build

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Code

Commit

Build

Unit tests

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Code

Commit

Build

Unit tests

Integration tests

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Code

Commit

Build

Unit tests

Integration tests

Review

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Code

Commit

Build

Unit tests

Integration tests

Review

Staging

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Code

Commit

Build

Unit tests

Integration tests

Review

Staging

Deploy to production

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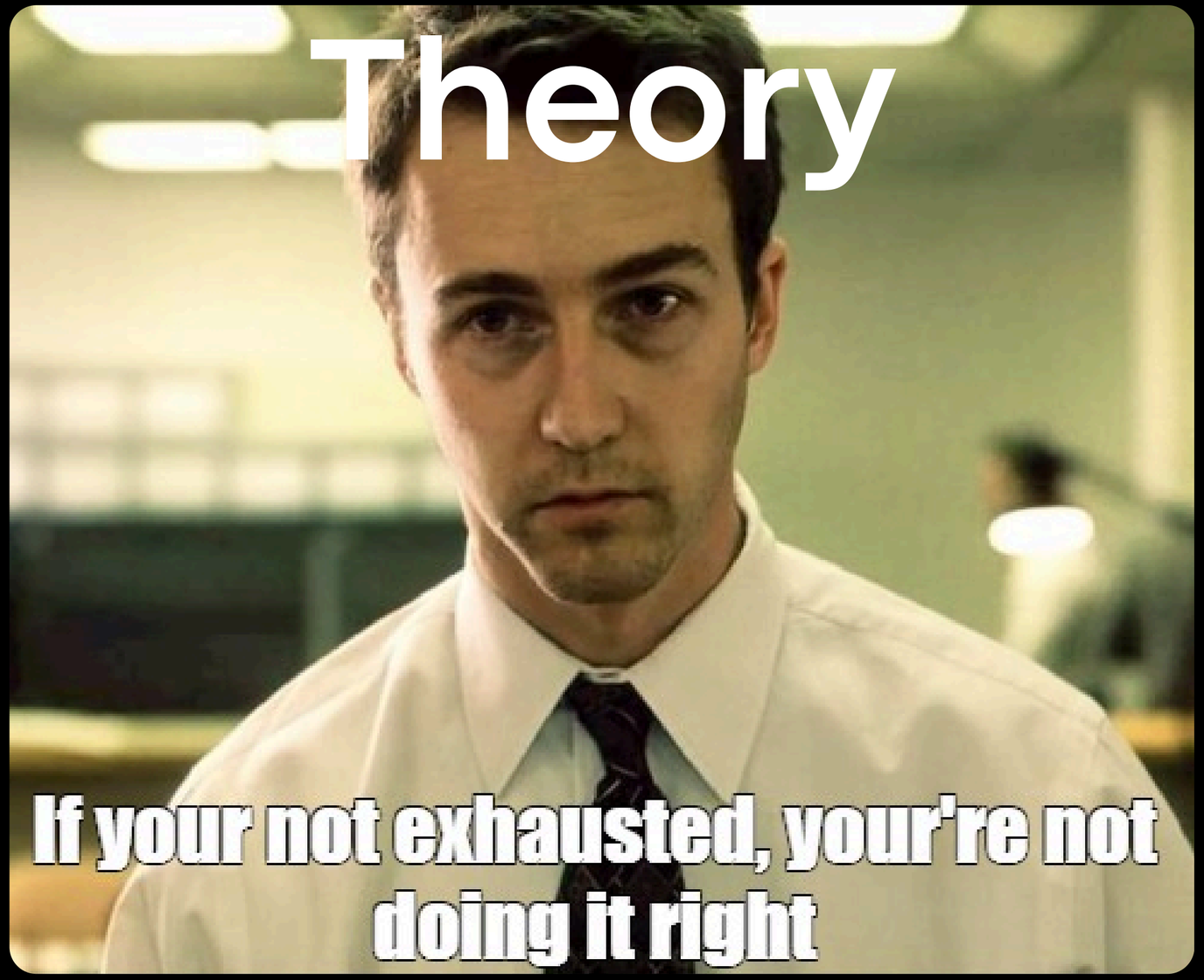
Theory



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Hands On Time!!!

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Thank You