DEVOPS AND CI/CD FOR WINCC OPEN ARCHITECTURE APPLICATIONS AND FRAMEWORKS

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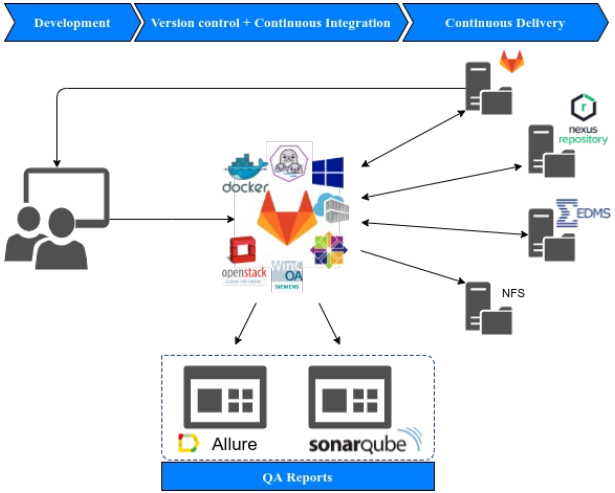
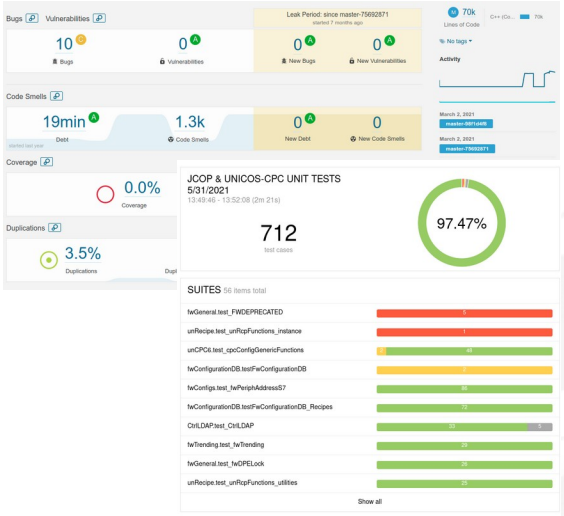
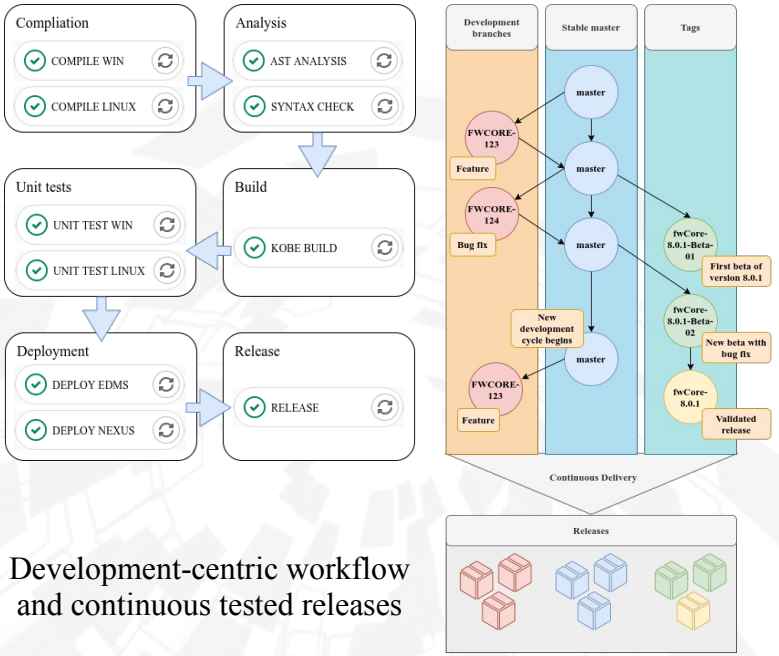
ICALEPCS 2021



Industry standard DevOps tooling used as a power amplifier



Continuous validation through automated static analysis and testing



Development-centric workflow and continuous tested releases

- ✔ Standardized development processes and development oriented workflow, leveraging industry standard DevOps tooling
- ✔ Automates testing and releases for projects containing millions of lines of source code in multiple languages
- ✔ Hundreds of thousands of automated releases per year – an increase of two orders of magnitude
- ✔ Reduced reliance on experts for highly repetitive tasks involved in releases and testing
- ✔ Drastically improved quality and security through fully automated, containerized, and continuous testing

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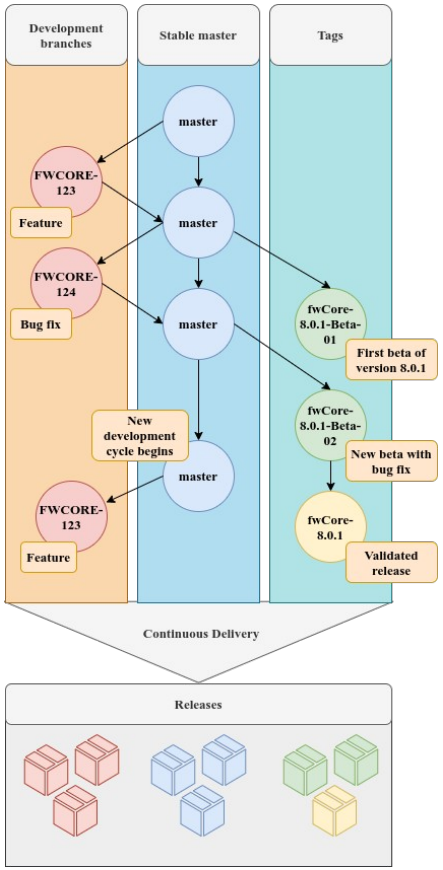
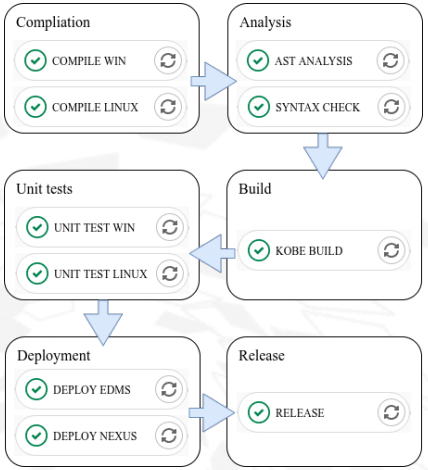
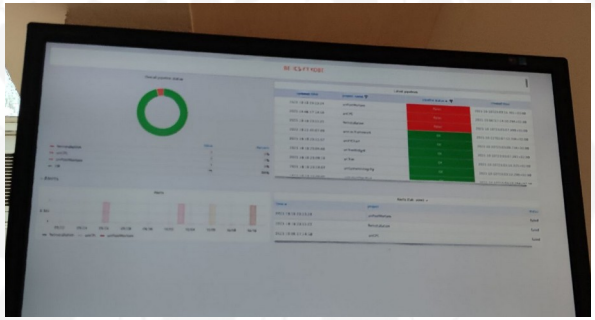


Developer workflow

- ✔ GitHub inspired workflow
  - ✔ Stable master and short-lived development branches
- ✔ GitLab-CI used as a power amplifier
  - ✔ Pushes and tags trigger pipelines
- ✔ Continuous Integration
  - ✔ Code compilation and documentation generation
  - ✔ Automated versioning, analysis and testing
  - ✔ Each release triggers further downstream pipelines
- ✔ Continuous Delivery
  - ✔ Each release deployed to various repositories
- ✔ Each stage run in a clean container
  - ✔ Custom tooling included in the containers
  - ✔ Standard containers ensuring easy reproducability
- ✔ All pipelines automatically monitored
  - ✔ Pipeline statuses collected to a database
  - ✔ Historical trends made available
  - ✔ Overall status visualized and presented



Automated pipeline



Management overview

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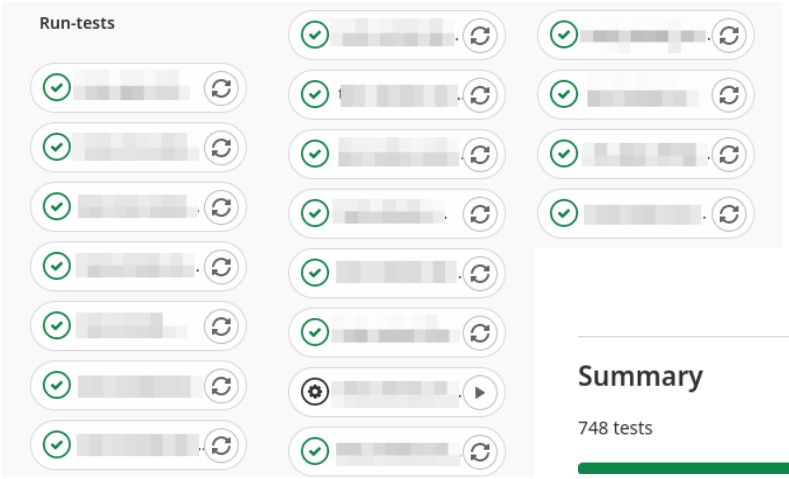
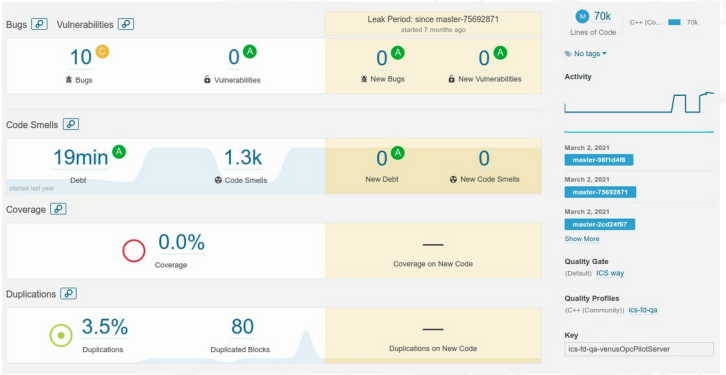
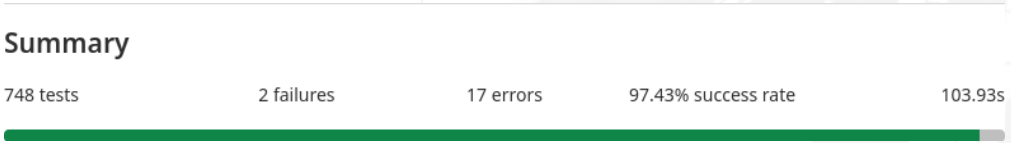
- ✔ Improved product quality through continuous validation through static analysis and testing
- ✔ Improved accountability and added incentive from automated, and public unit test and quality assurance reports, immediately available to product owners
- ✔ Insight from trends in historical quality
- ✔ Simple integration to any project through templates



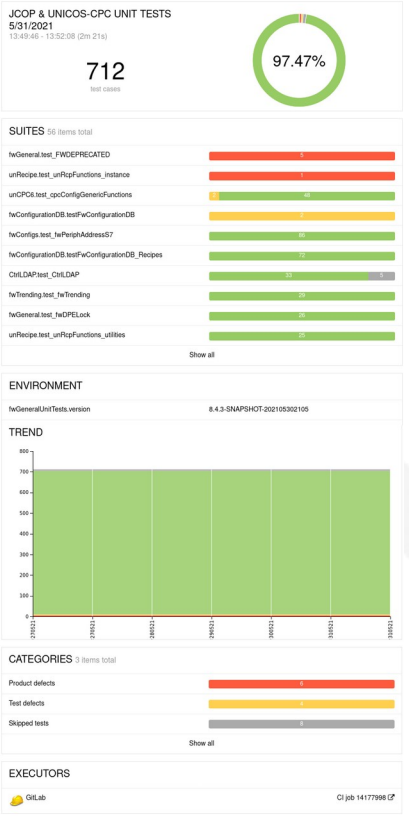
Continuous Validation: WinCC OA



SonarQube Reports: Static Analysis



Continuous Validation: Components and Frameworks



Allure Reports: Unit & Integration Tests

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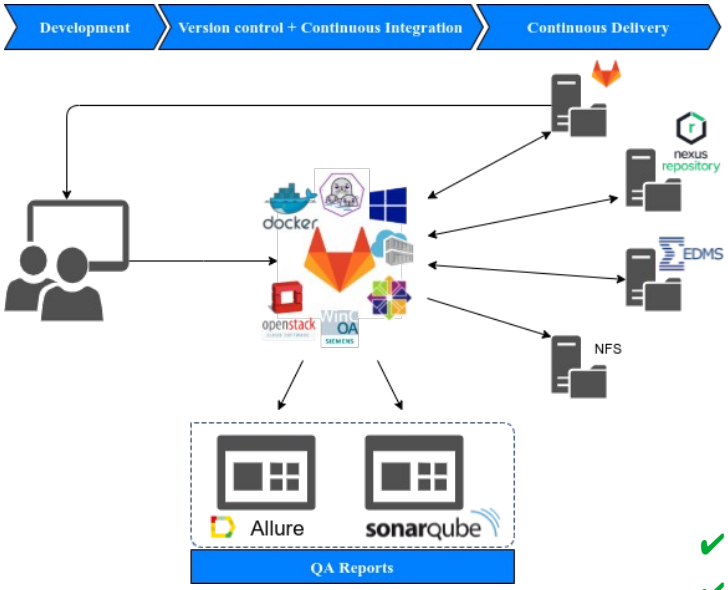
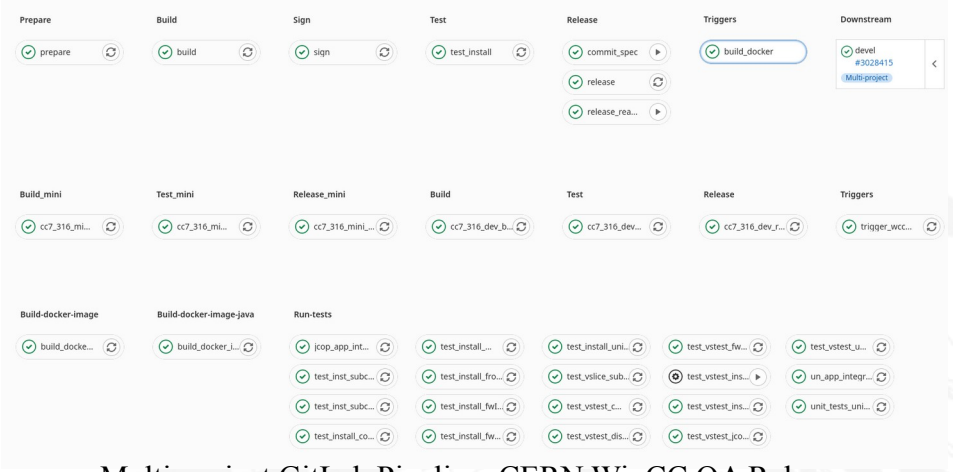


Release Flow: From Development to Delivery



Multi-project GitLab Pipeline: CERN WinCC OA Release

- ✔ Automated building of CERN WinCC OA releases
- ✔ Automated building of CERN WinCC OA Development and Test container images
- ✔ All validated automatically through series of tests run at each part of the pipeline

- ✔ GitLab acts as the backbone of the infrastructure
- ✔ Set of other industry standard tooling – containers, virtual machines, etc
- ✔ Private runners execute jobs inside containers, ensuring a clean, easy to replicate environment
- ✔ Automated deployment to end repositories removes further slow, repetitive tasks, and makes releases immediately available