

Containerization and DevOps – let's automate IaaS

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1. Problem description

Manually deploying applications is a cumbersome process that drains time and resources while introducing many issues. Developers and operations teams face several challenges when they rely on manual deployment:

- Time-Consuming
- Error-prone
- Developer Overhead
- Inconsistent Environments
- Dependency on Developer Knowledge
- Lack of Version Control
- Scalability Challenges

Solution

The solution to these deployment challenges lies in automation – **CI/CD**.

Upon pushing code changes to remote repository, a pipeline should be triggered.

It should consist of several stages: build application, test, build application image, push to repository, deploy to test environment.

- Increased efficiency
- Consistency and reliability
- Continuous process
- Developer changes are easy to deploy
- Cost reduction

Manual integration and deployment give developer control, there is no initial setup overhead and it is faster and simple for small projects.

CI/CD usually means that there must be a special ops team responsible for maintenance and updating tools & pipelines.

2. Selected tools

Choice:

- Github actions – automation of development process by compiling, running tests and code deployment directly from GitHub repository.
- AWS / Azure - cloud platform where application and database will be hosted which will take away our responsibility for infrastructure
- OpenShift (powiązany z AWS / Azure) - managing containerized services, will help with management of multiple cloned instances of application
- Docker hub – Docker image repository, will be used as a way to persist the built image

3. Functional requirements

Automation of the following steps (GitHub Actions):

- Tests execution (JUnit & Testcontainers)
- Application image preparation (Docker image)
- Push application image to remote image repository (Docker Hub)
- Application deployment (OpenShift)

4. Schedule

(6th week) - Preparation of application and tests
(7th week) - GitHub Actions pipelines with image building
(8th week) - Configuration and manual application deployment on OpenShift
(9th week) - Application deployment on OpenShift with GitHub Actions pipeline
(10th week) - Testing

5. Work division

Wiktor Pawlak – 6th week, 7th week, 10th week
Szymon Ziemecki – 6th week, 7th week, 10th week
Oskar Trela – 6th week, 7th week, 10th week
Matuesz Strzelecki – 8th week, 10th week
Szymon Zakrzewski – 8th week, 10th week
Piotr Skonieczny – 9th week, 10th week
Weronika Tutkaj – 9th week, 10th week