

Software Testing AMPlification for the DevOps Team

WP 4 Development and Integration

Daniele Gagliardi, Ciro Formisano (ENG)

STAMP Project Final Review
Brussels, 6 February, 2020



The STAMP project received funding from European Union's Horizon 2020 research and innovation programme under grant agreement 731529.

WP4 tasks

| ID | Description | M1 | M36 |
|------|--|-----|-----|
| T4.1 | Collaborative Software Engineering Platform setup and management | M1 | M36 |
| T4.2 | Stamp product architecture definition and implementation | M1 | M30 |
| T4.3 | STAMP assets integration in various software factory | M1 | M36 |
| T4.4 | Stamp assets documentation | M12 | M36 |

WP Leader: ENG

WP Participants: ATOS, ActiveEon, XWiki, INRIA, KTH



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WP4 Deliverables

| ID | Description | Date |
|------|--|------|
| D4.1 | STAMP Collaborative Software Engineering Platform | M6 |
| D4.2 | First public version of the API and initial implementation of services and courseware | M14 |
| D4.3 | Second public version of the API and initial implementation of services and courseware | M24 |
| D4.4 | Final public version of the API and initial implementation of services and courseware | M26 |



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Development & Integration

Software Testing Amplification

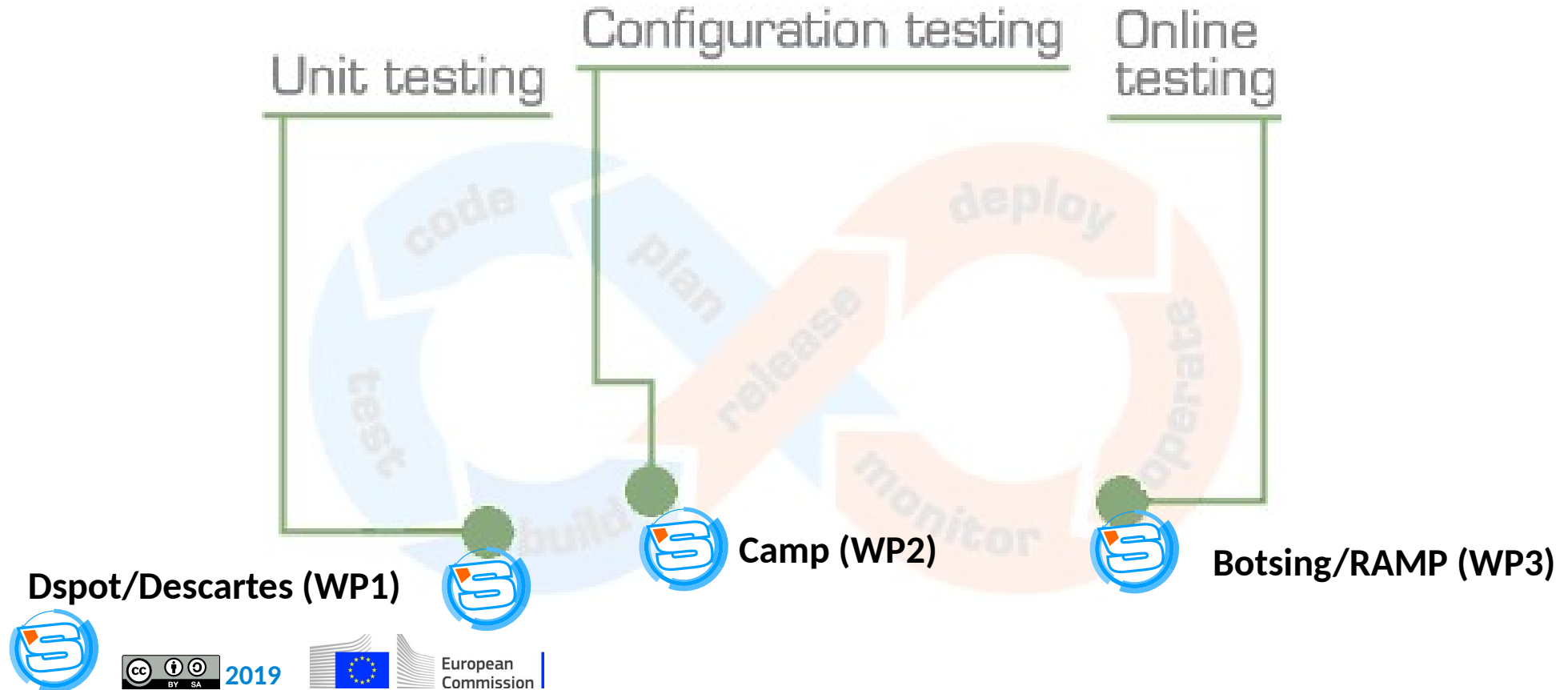


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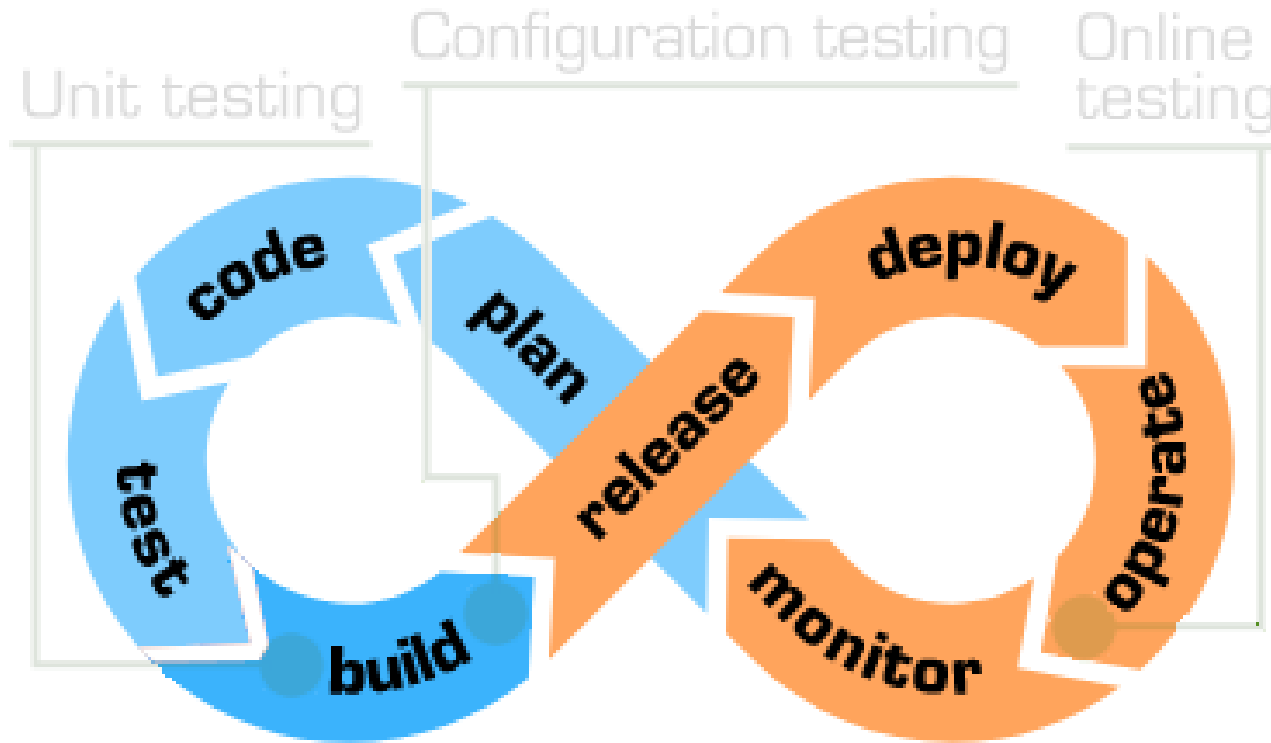


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What did we do?

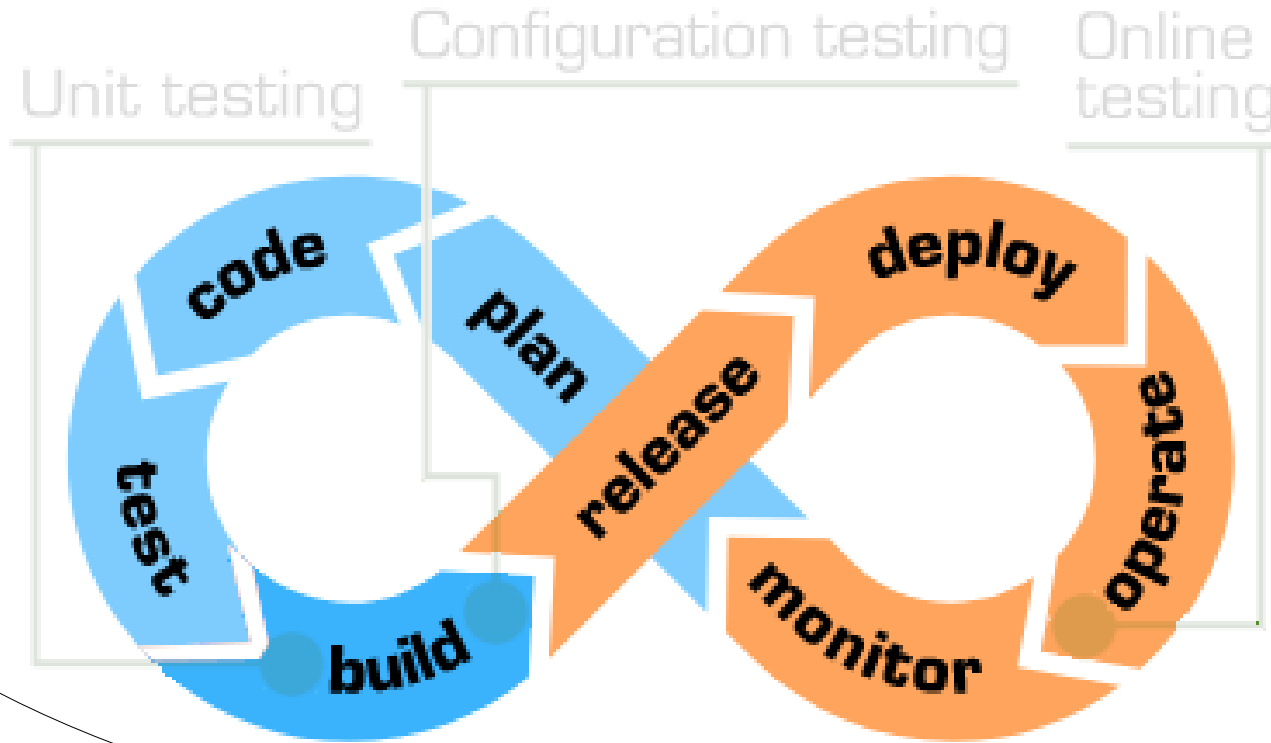


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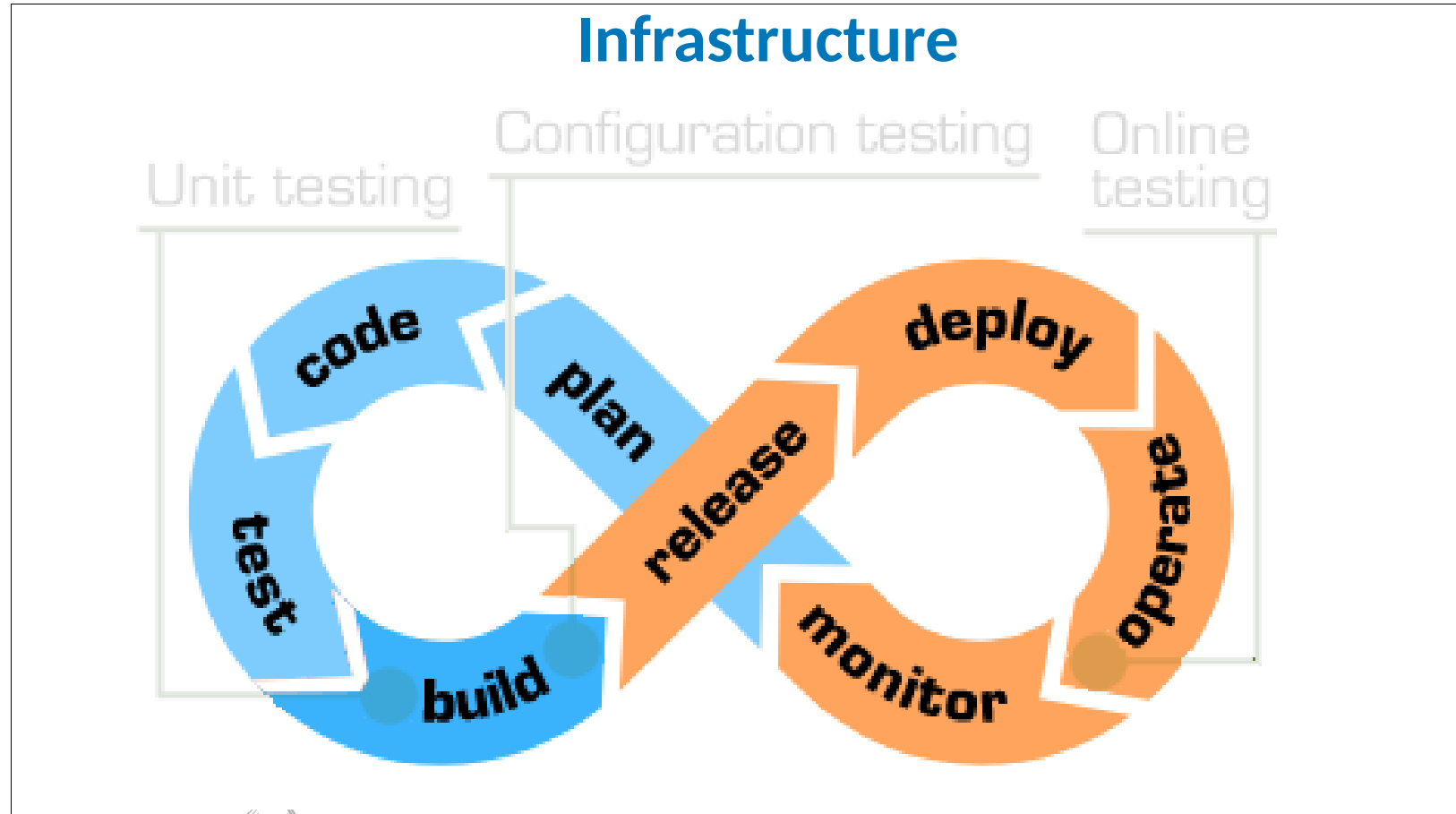


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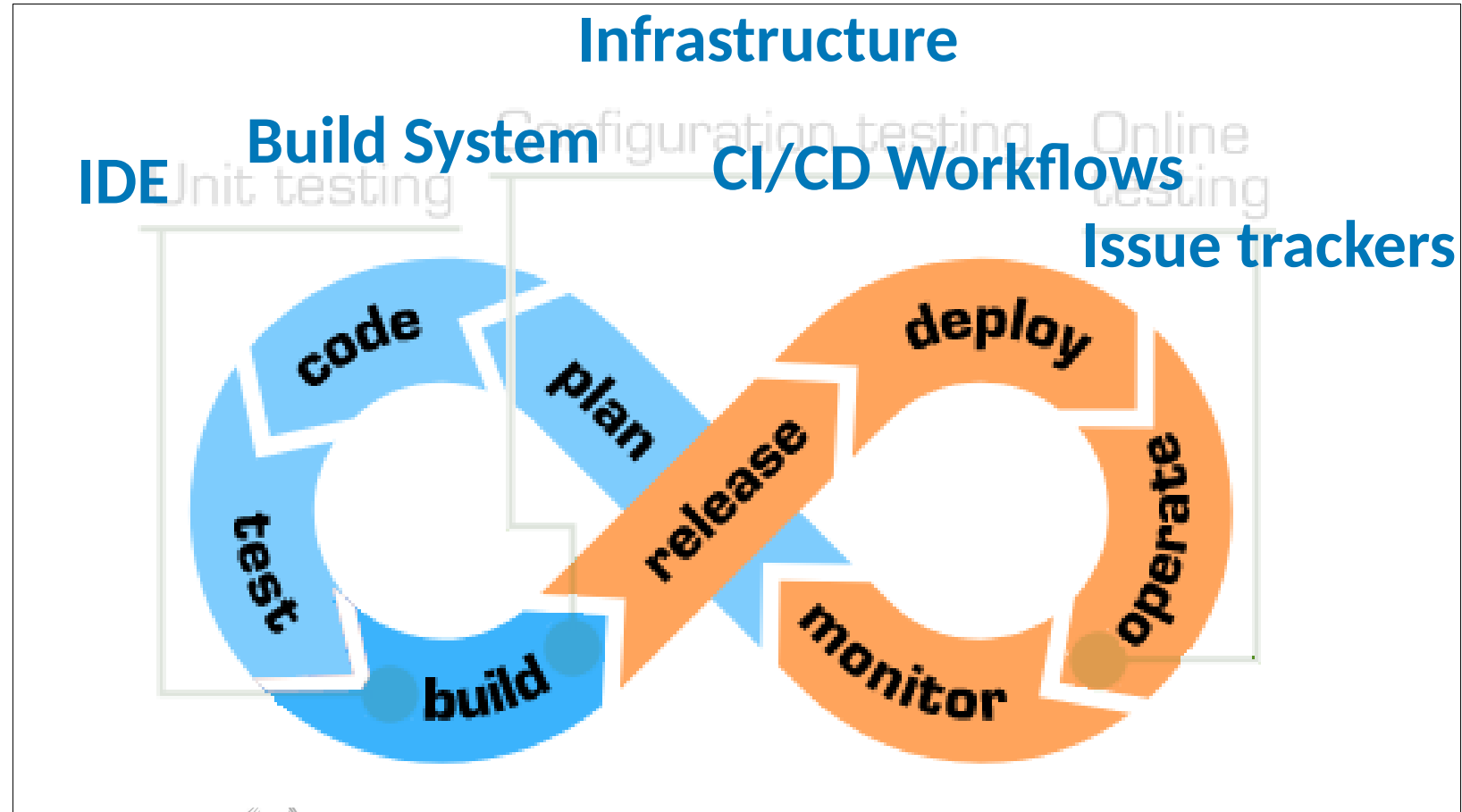
Scenarios



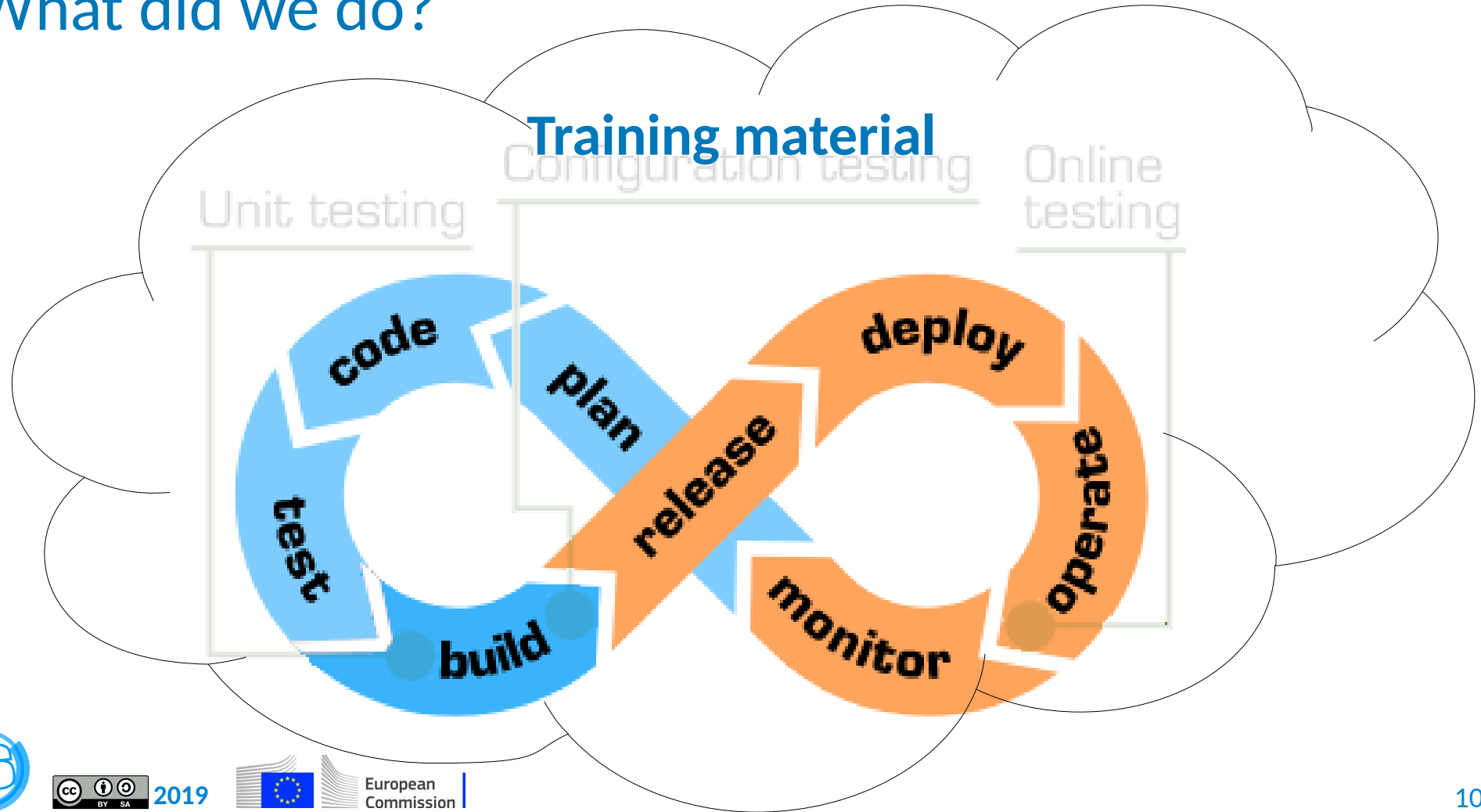
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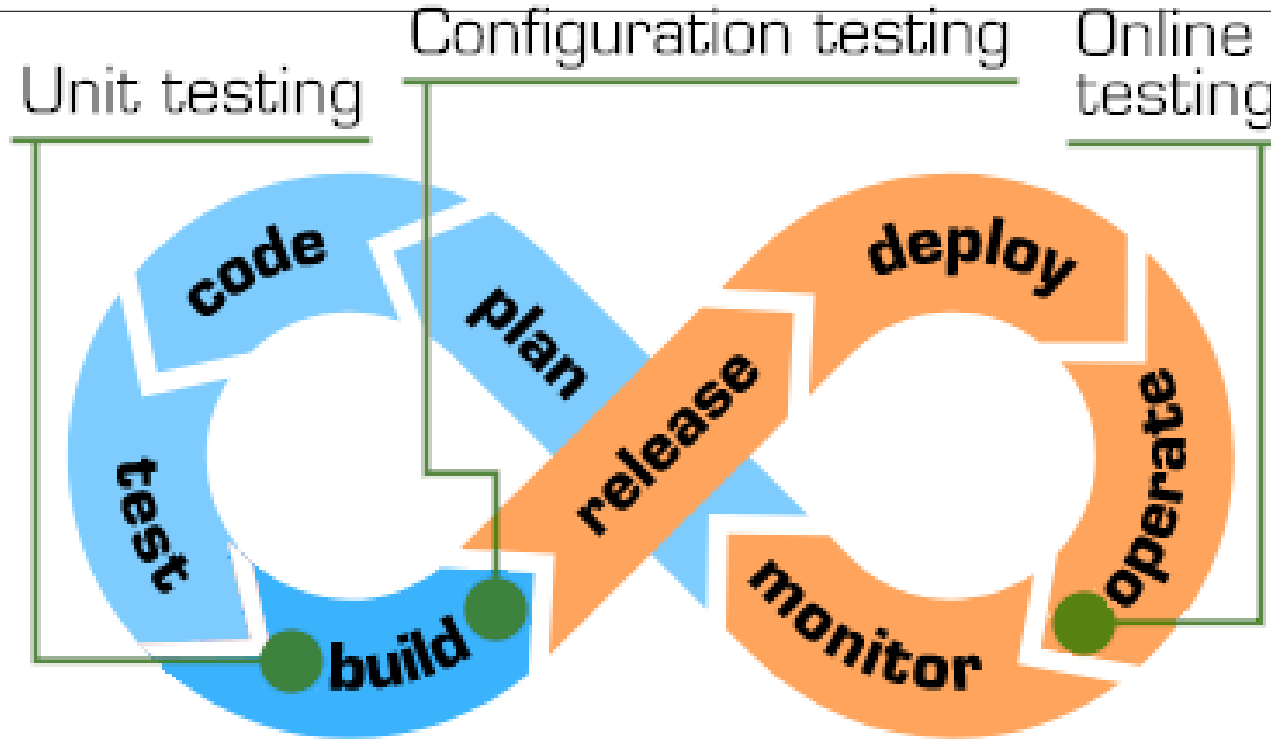


What did we do?



What did we do?

Important target: to preserve existing infra & processes



Scenarios

Software Testing Amplification



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Starting point: use cases and scenarios

- Software companies interested in increasing the quality of their products
- Cover different areas, providing generic and specific requirements to obtain an highly exploitable outcome
- One of the objectives of the work on development and integration is to support provided experimentation and scenarios



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Use cases: concrete requirements providers

Heterogeneous domains covered

- Enterprise wiki ()
- Business processes management (Proactive – )
- Open source projects marketplace ()
- Cloud and IoT ()
- Smart cities solutions ()

Integration requirements mainly originated by the use cases

- Wide **exploitability** due to the wide overall domain covered
- High **extensibility**



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Integration

Software Testing Amplification



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Client side: STAMP IDE

- **Requirements:**
 - test amplification feature to a usable IDE
 - solution based on a widespread tool to preserve existing processes
- **Solution:**
 - Eclipse integration
 - Support for DSpot, Descartes, Botsing and RAMP
 - Enhanced wizards
 - interoperability with Jira



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Server side: Build Systems

- **Requirements:**

- Integrate development lifecycle with test amplification
- solution based on widespread tools to preserve existing processes

- **Solution:**

- Maven and Gradle integration
- Available for DSpot, Descartes, Botsing and RAMP
- Integrated with Botsing Server to interoperate with Jira and GitHub



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Maven™

 **Gradle** Build Tool

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- <https://github.com/STAMP-project/botsing-gradle-plugin>



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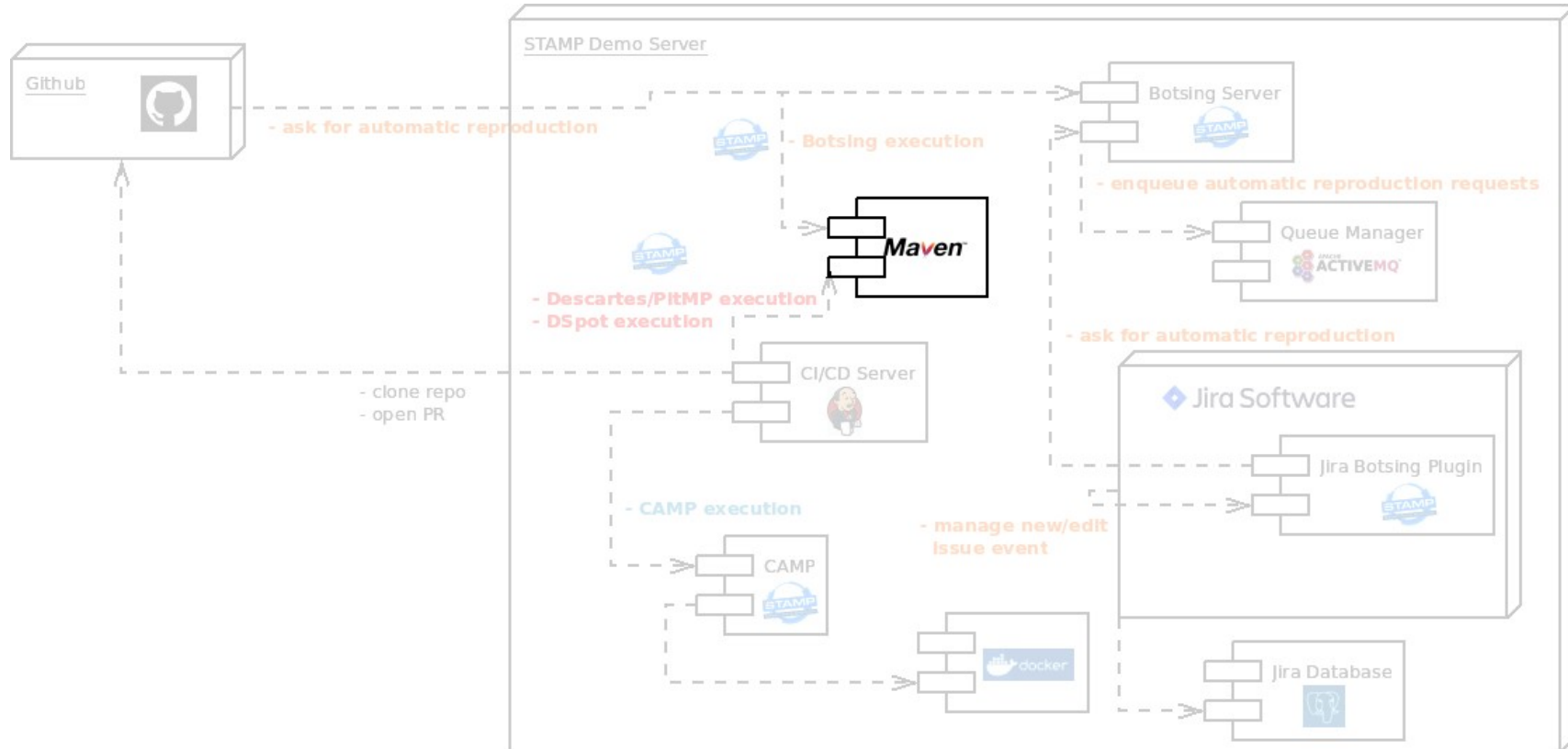
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Towards STAMP Server



Server side: CI/CD workflows

- **Requirements:**

- support for complete CI/CD workflow
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- **Solution:**

- Jenkins pipeline libraries and pipelines for test & configuration amplification
- Available for DSpot and Descartes (tests assessment and amplification)
- Available for CAMP (functional and performance tests)



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- <https://github.com/STAMP-project/stamp-ci/>
- <https://github.com/STAMP-project/e2e-STAMP-CI-demo/blob/master/code/camp-perf-test/Jenkinsfile>



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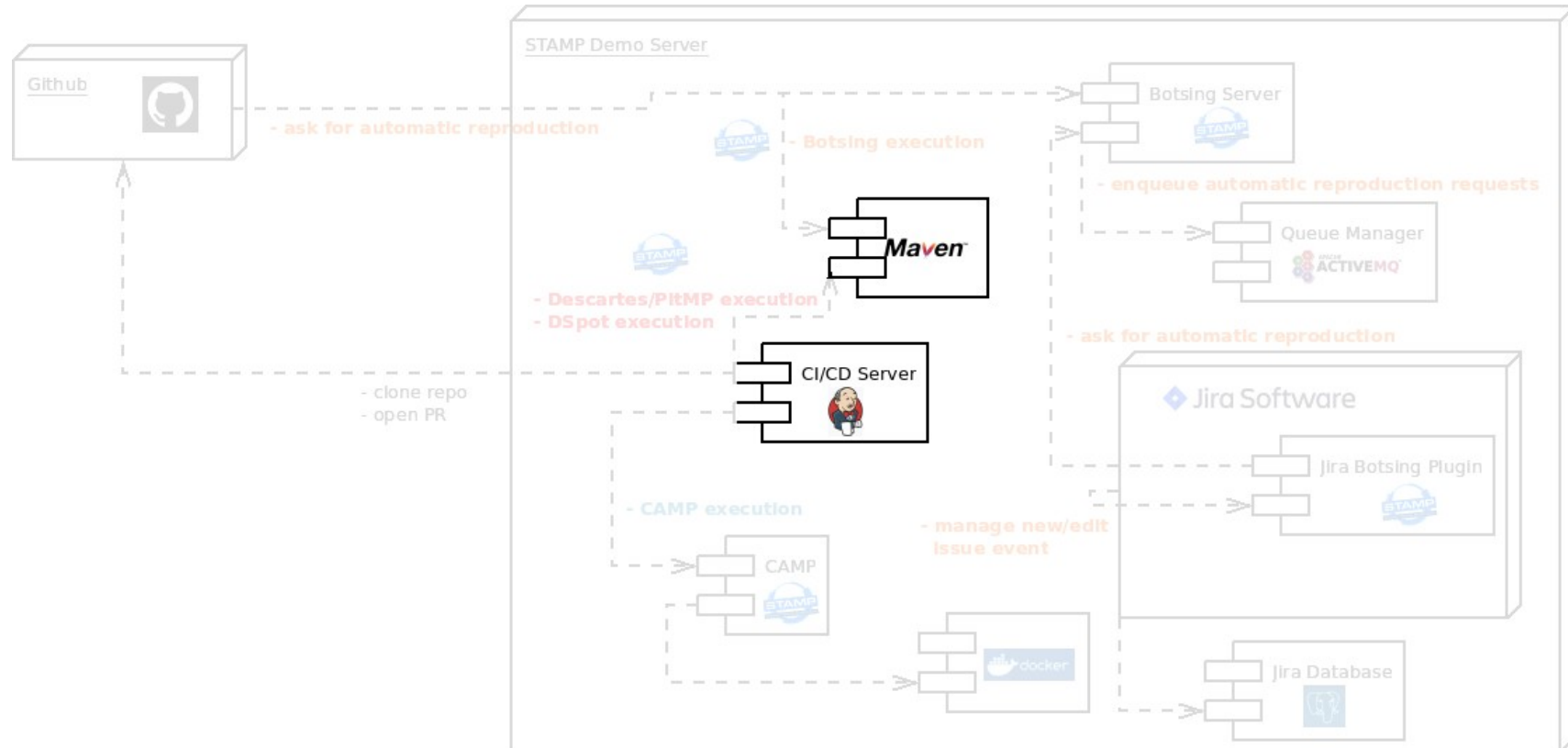
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Towards STAMP Server



Server side: Issue trackers

- Requirements:

- Keep track of all the issues and bugs
- Manage the CI/CD process
- solution based on a widespread tool to preserve existing processes

- Solution:

- Botsing Maven plugin
 - Botsing Gradle plugin
 - Jira plugin
 - GitHub Issues integration
- } Botsing Server



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Botsing Server

GitHub
 **Jira Software**



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Server side: Issue trackers

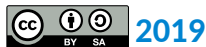
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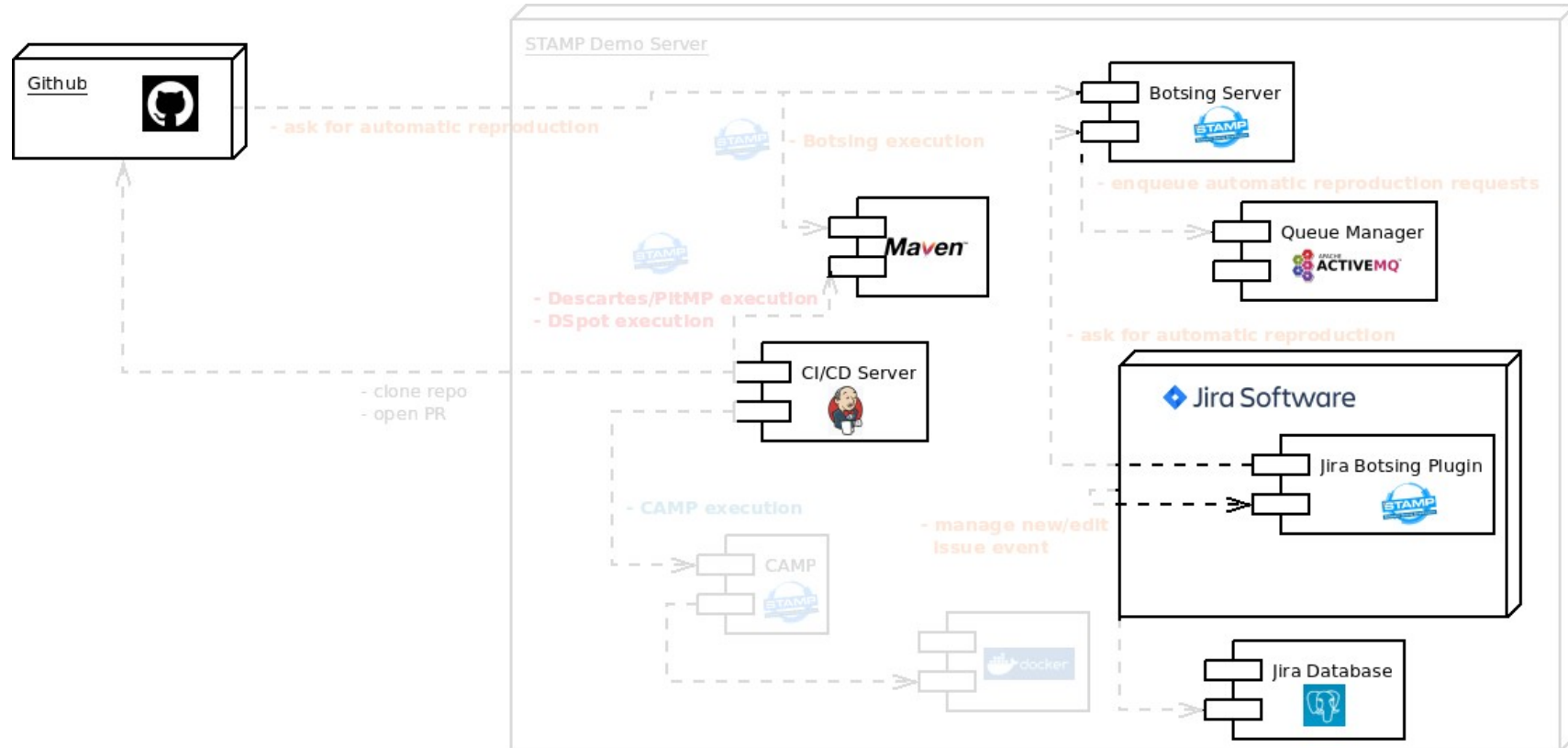
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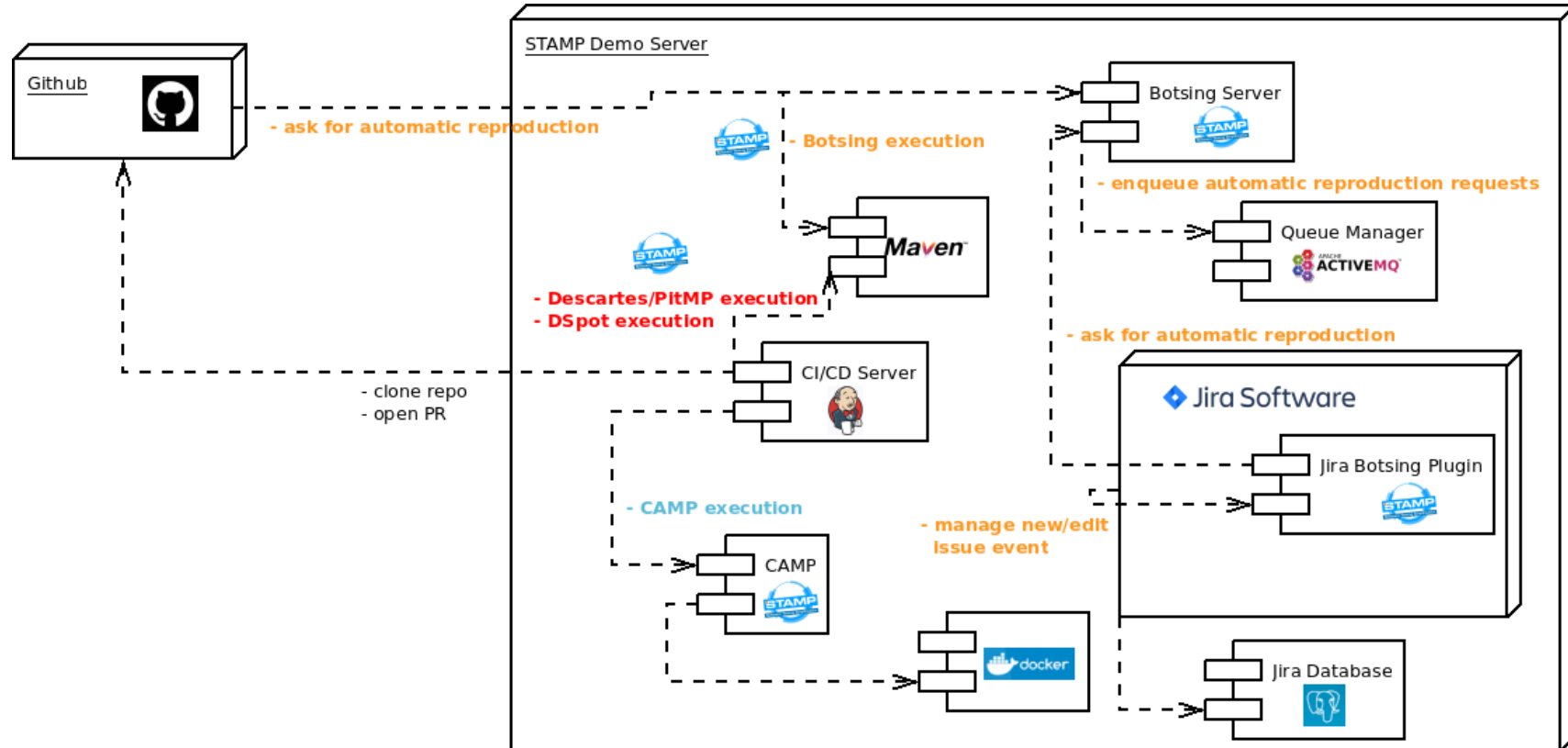
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Towards STAMP Server



STAMP Server



Training material

Software Testing Amplification



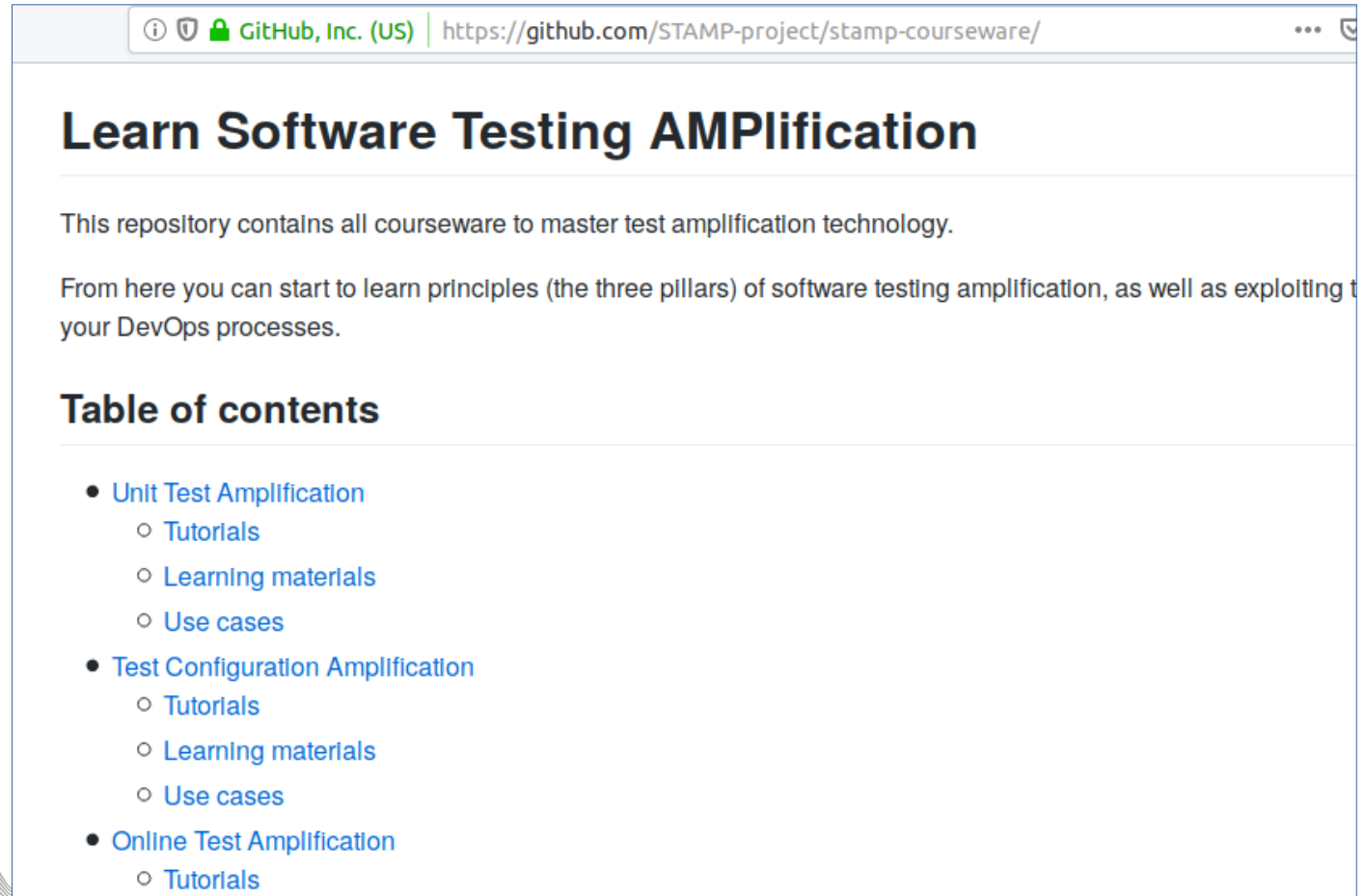
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Training material

A Learning path



The screenshot shows a web browser window displaying the GitHub repository page for `STAMP-project/stamp-courseware`. The page title is "Learn Software Testing AMPLification". Below the title, there is a description: "This repository contains all courseware to master test amplification technology." and "From here you can start to learn principles (the three pillars) of software testing amplification, as well as exploiting t your DevOps processes." Below this, there is a section titled "Table of contents" which lists three main categories: "Unit Test Amplification", "Test Configuration Amplification", and "Online Test Amplification". Each category has sub-items: "Tutorials", "Learning materials", and "Use cases".

GitHub, Inc. (US) | <https://github.com/STAMP-project/stamp-courseware/>

Learn Software Testing AMPLification

This repository contains all courseware to master test amplification technology.

From here you can start to learn principles (the three pillars) of software testing amplification, as well as exploiting t your DevOps processes.

Table of contents

- [Unit Test Amplification](#)
 - [Tutorials](#)
 - [Learning materials](#)
 - [Use cases](#)
- [Test Configuration Amplification](#)
 - [Tutorials](#)
 - [Learning materials](#)
 - [Use cases](#)
- [Online Test Amplification](#)
 - [Tutorials](#)

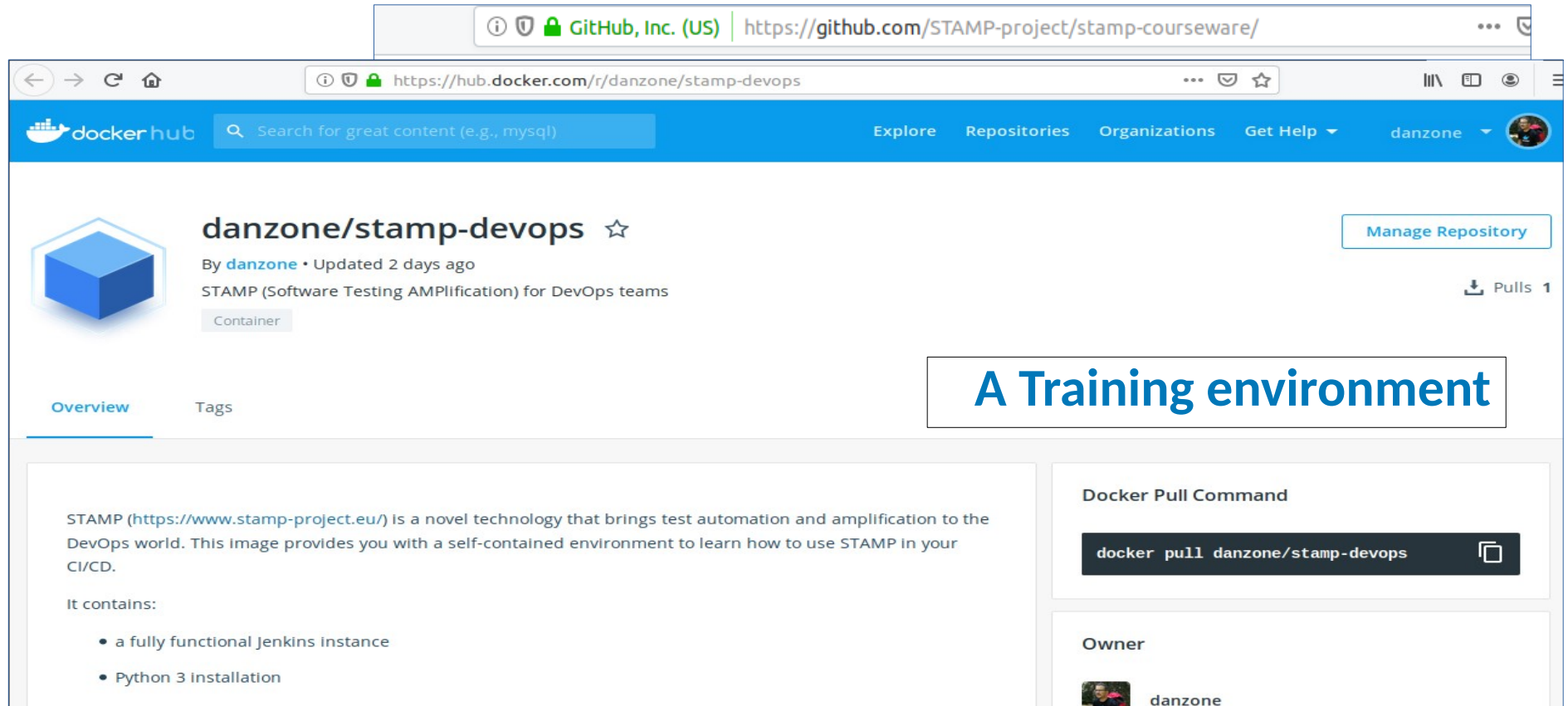


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Training material



The screenshot shows the Docker Hub page for the repository `danzone/stamp-devops`. The page includes a search bar, navigation links, and a description of the repository. A text box on the right side of the page contains the text "A Training environment".

danzone/stamp-devops ☆

By [danzone](#) • Updated 2 days ago

STAMP (Software Testing AMplification) for DevOps teams

Container

[Manage Repository](#)

↓ Pulls 1

[Overview](#) [Tags](#)

STAMP (<https://www.stamp-project.eu/>) is a novel technology that brings test automation and amplification to the DevOps world. This image provides you with a self-contained environment to learn how to use STAMP in your CI/CD.


It contains:

- a fully functional Jenkins instance
- Python 3 installation

Docker Pull Command

```
docker pull danzone/stamp-devops
```

Owner

 [danzone](#)



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- [Online Test Amplification](#)
 - [Tutorials](#)

Training material

STAMP DevOps Docker image

This image provides you with a self-contained environment to learn how to use STAMP In your CI/CD.

It contains:

- a fully functional Jenkins Instance
- Python 3 Installation
- CAMP 0.6.2
- CAMP dependencies:
 - Z3 solver, version 4.7.1
 - Docker
 - Docker Compose

A Training environment

To run it, simply execute:

```
docker run -p 8080:8080 -p 50000:50000 -v /var/run/docker.sock:/var/run/docker.sock -v jenkins_home:/var,
```

This command will download and run a Jenkins CI server in your machine, and STAMP components to perform unit test amplification and test configuration amplification within it. For more information about first steps, go [here](#).

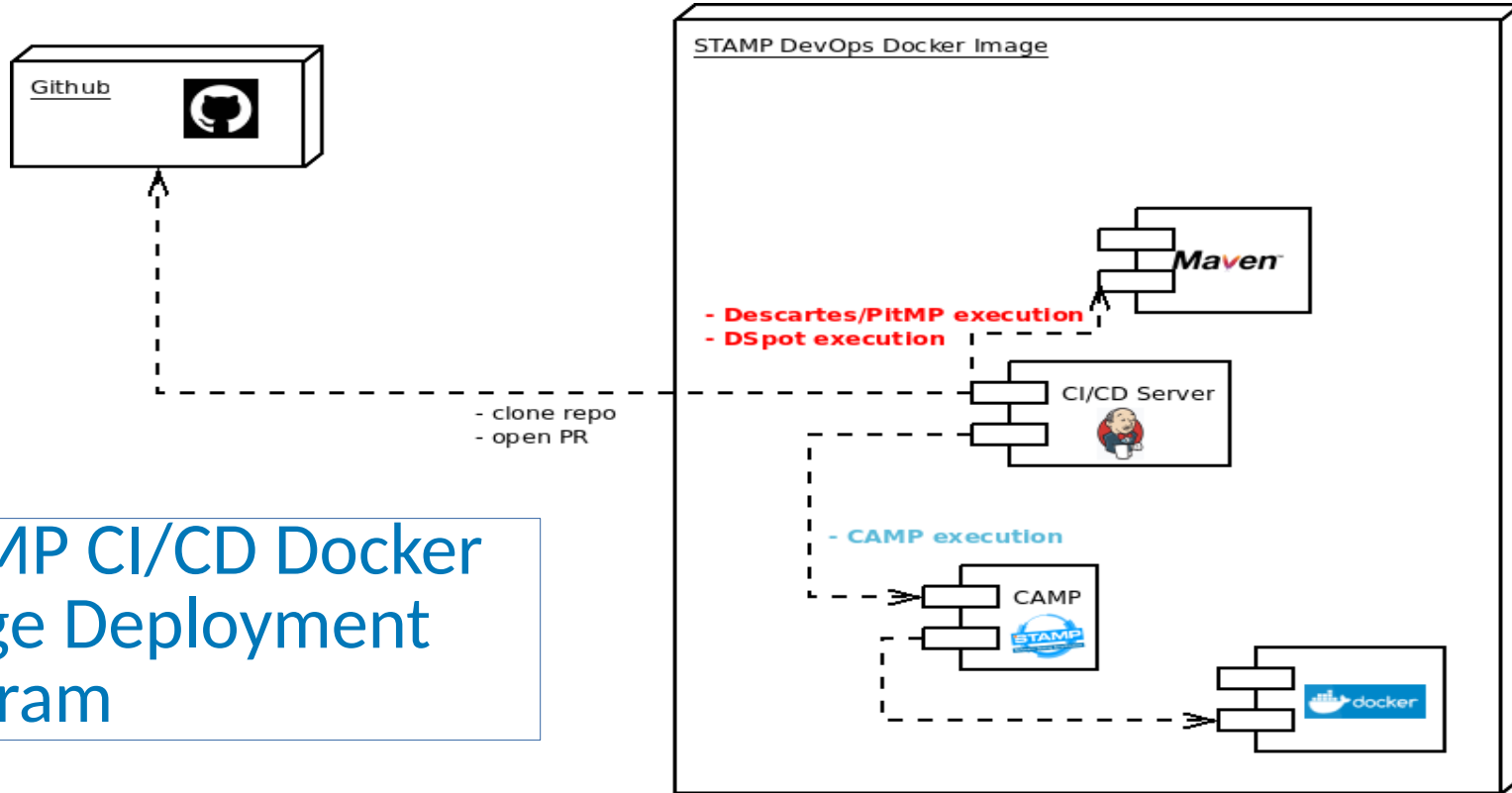


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Training material



STAMP CI/CD Docker Image Deployment Diagram



Training material

 **GitHub, Inc. (US)** | <https://github.com/STAMP-project/stamp-courseware/blob/master/devo> ...  

 **danzone** Fixed wrong comment asserting that install script would install Docke... e986f7d 2 days ago

1 contributor

20 lines (14 sloc) | 808 Bytes

Raw Blame History  

```
1 FROM jenkins/jenkins:lts
2
3 MAINTAINER Daniele Gagliardi <daniele.gagliardi@eng.it>
4
5 # Update Python to Python 3
6 USER root
7 RUN apt-get update && apt-get install -y python3 python3-pip libgomp1 maven && apt-get clean && \
8     rm -f /usr/bin/python && ln -s /usr/bin/python3 /usr/bin/python && \
9     ln -s /usr/bin/pip3 /usr/bin/pip
10
11 # Update pip and install dependencies needed to install CAMP
12 RUN pip install --upgrade pip
13 RUN pip install setuptools
14
15 # Install CAMP from setup script. Docker, Docker Compose and last version of Z3 Solver are installed as well
16 RUN curl -L https://github.com/STAMP-project/camp/raw/master/install.sh | bash -s -- --install-z3 --z3-version '4.7.1' --z3-pyt
17
18 # drop back to the regular jenkins user
19 USER jenkins
```



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Collaboration

- Collaborative platform:
 - OW2
- DSpot and Descartes Integration:
 - INRIA
 - ATOS
- CAMP Integration:
 - XWiki
 - ActiveEon
- Botsing Integration:
 - ActiveEon
 - TUD



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Collaboration

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WP4: Conclusions

- To start from the use cases provided two advantages
 - The integrated version of STAMP is immediately and concretely usable
 - The wide range of domains covered assures high exploitability far beyond the mere use cases
- Heterogeneous functionalities and tools successfully integrated
 - Plugins mechanism allows to interact with the most popular ALM and CI/CD tools (e.g. Jira and Jenkins)
 - A complete amplification test framework released for the whole CI/CD Process
 - The developed mechanism is potentially further extensible
- Learning material (Learning path & containerized training environment) publicly available on GitHub and DockerHub



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Thank you!

The STAMP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731529.

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