



gsi
UPM

OSLC for DevOps event-based automation

Guillermo García Grao

Agenda



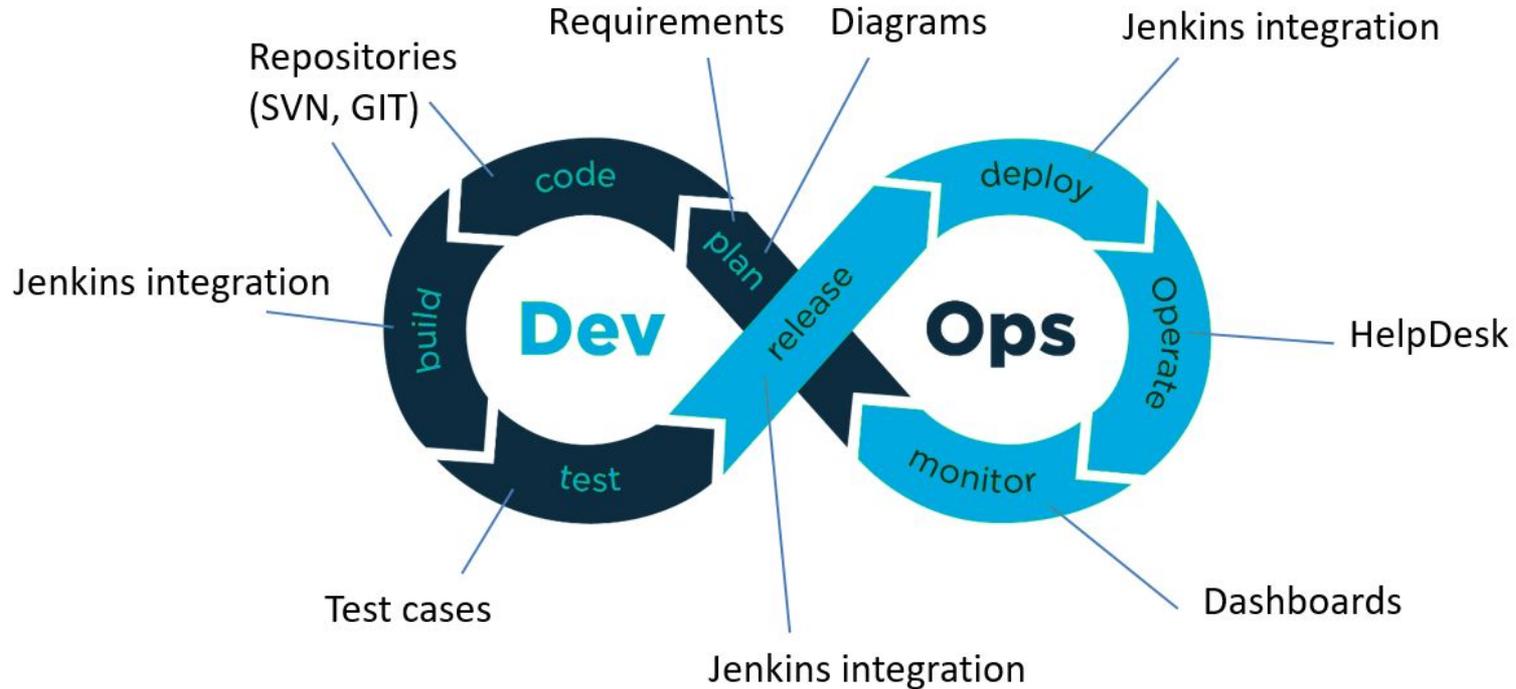
1. Introduction and Context
2. Integrating DevOps Services
3. Automation as a Service
4. Standardizing Event-based Automation
5. Case study

1.

Introduction and Context

DevOps:
definition and
challenges

Context



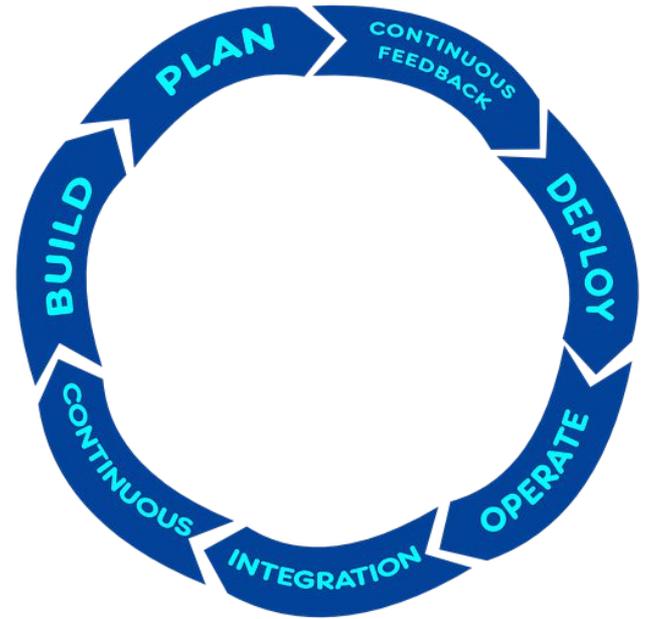


“A **collaborative** and **multidisciplinary** effort within an organization to **automate continuous delivery** of new software versions, while guaranteeing their **correctness** and **reliability**.”

Leite et. al. (2019). A survey of DevOps concepts and challenges.

DevOps Goal

Faster application
production, integration
and **delivery**.

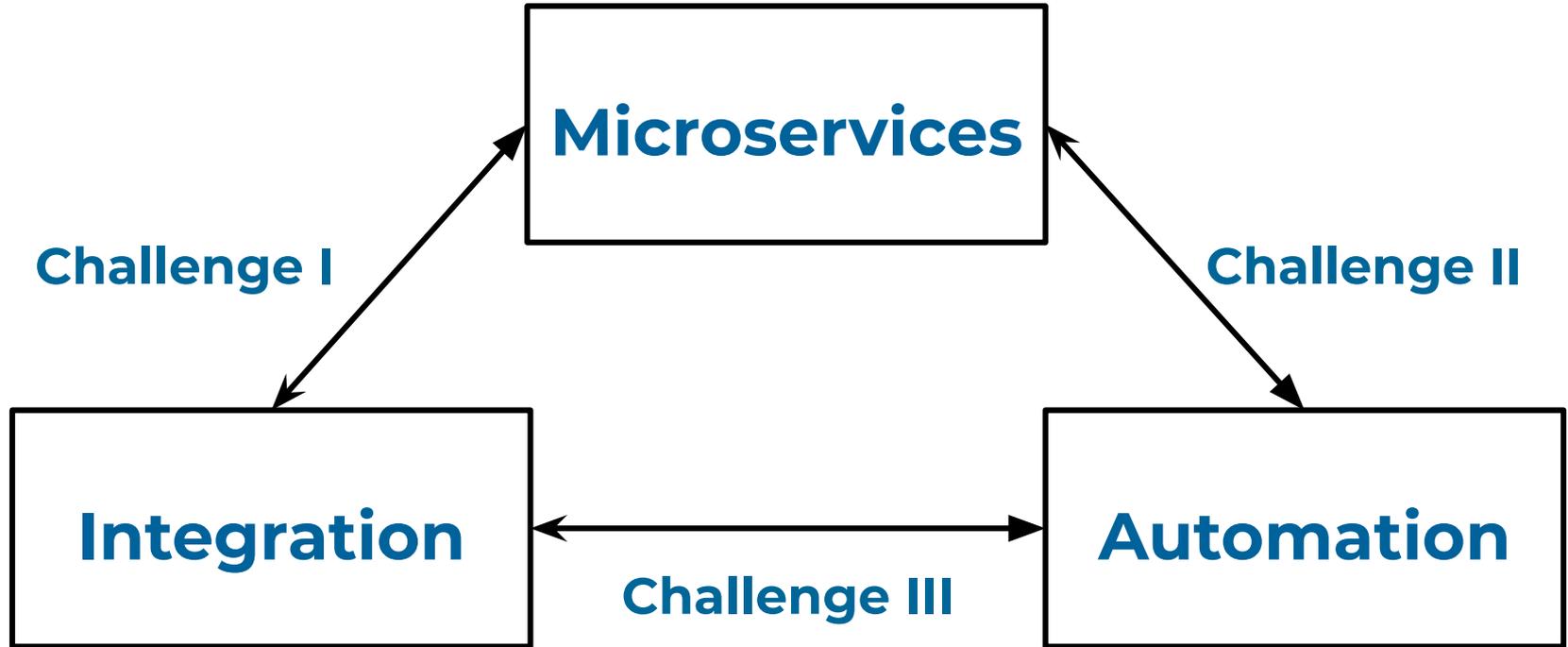




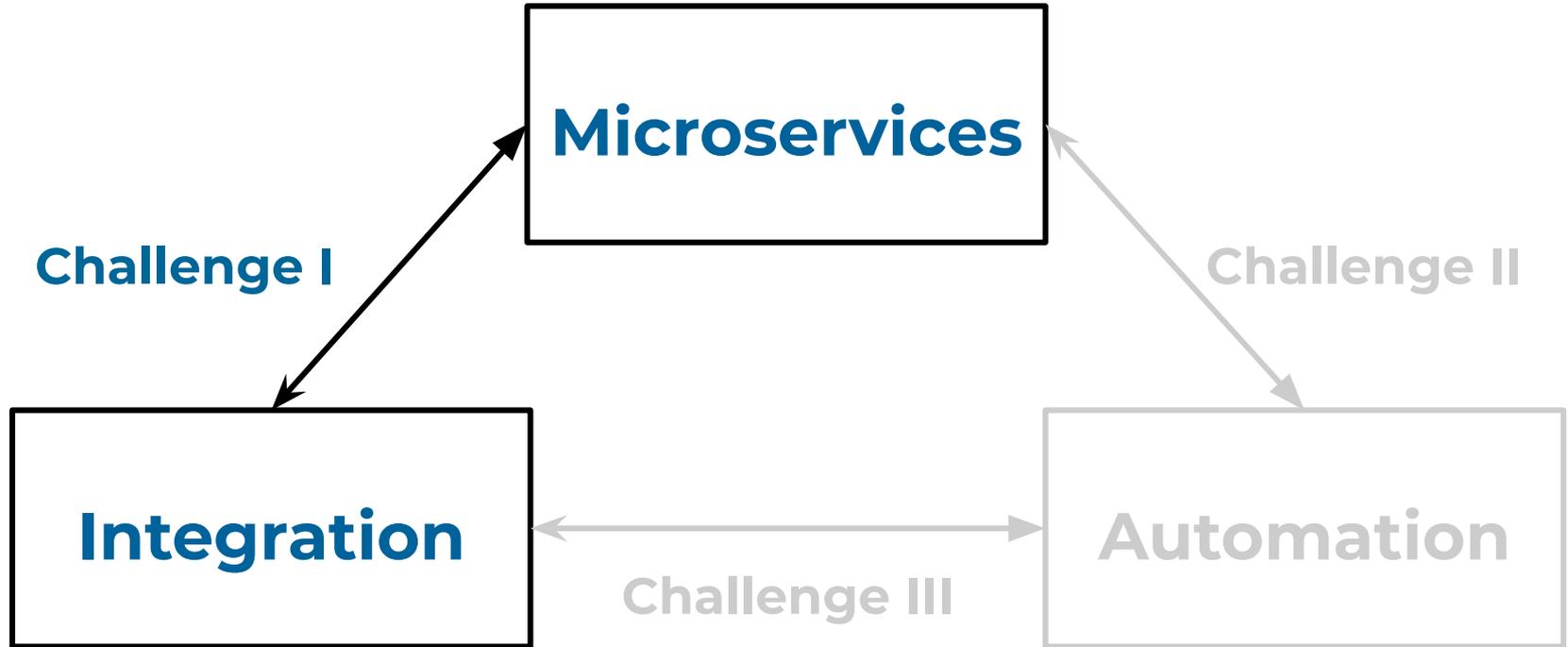
Desired DevOps Features

- ▣ **Scalability**
 - ▣ Microservices architecture
- ▣ **Adaptability** to rapid changes
 - ▣ Fast services integration
- ▣ **Automation**: building, testing, deployment
 - ▣ Continuous Delivery (CD)

DevOps Challenges



DevOps Challenges



2.

Challenge I

Integrating
DevOps
Services



Challenge I - Presentation

Microservices vs Adaptability:

- ▣ **Expensive** to migrate APIs
- ▣ **Vendor lock-in**
- ▣ Lack of **flexibility** and **versatility**

Challenge I - Current State

- ❑ Manual migrations
 - ❑ Slow
 - ❑ Expensive

- ❑ Non-standardized APIs
 - ❑ Hard to cover every possible tool
 - ❑ Lack of flexibility for developers



Challenge I - Potential Solution



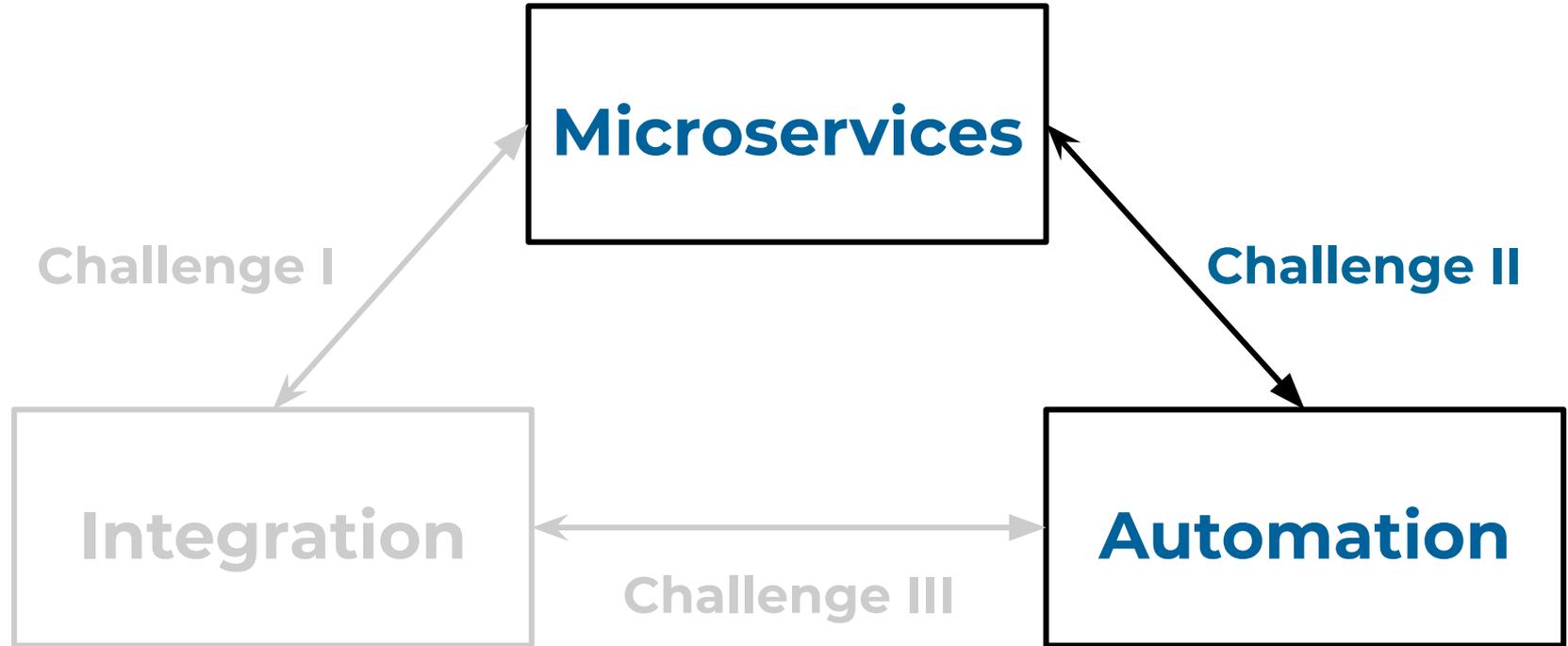
OSLC



Challenge I - Potential Solution

- **Seamless integration** between compliant tools
- **No assumptions** about tool's internal structure
- Flexible model: **Linked Data**

DevOps Challenges



3.

Challenge II

Automation as
a Service



Challenge II - Presentation

Microservices and Automation:

- ▣ Service that **provides automation**
- ▣ Concept: **Automation as a Service**
- ▣ Implementation: **Task Automation Server**

Challenge II - Current State

Task Automation Servers (TAS)

- ▣ Provide **automation capabilities** to other services
- ▣ Based on the **ECA model**
 - ▣ **Event** triggered
 - ▣ **Condition** evaluated
 - ▣ **Action** executed



Challenge II - Current State

User applications:



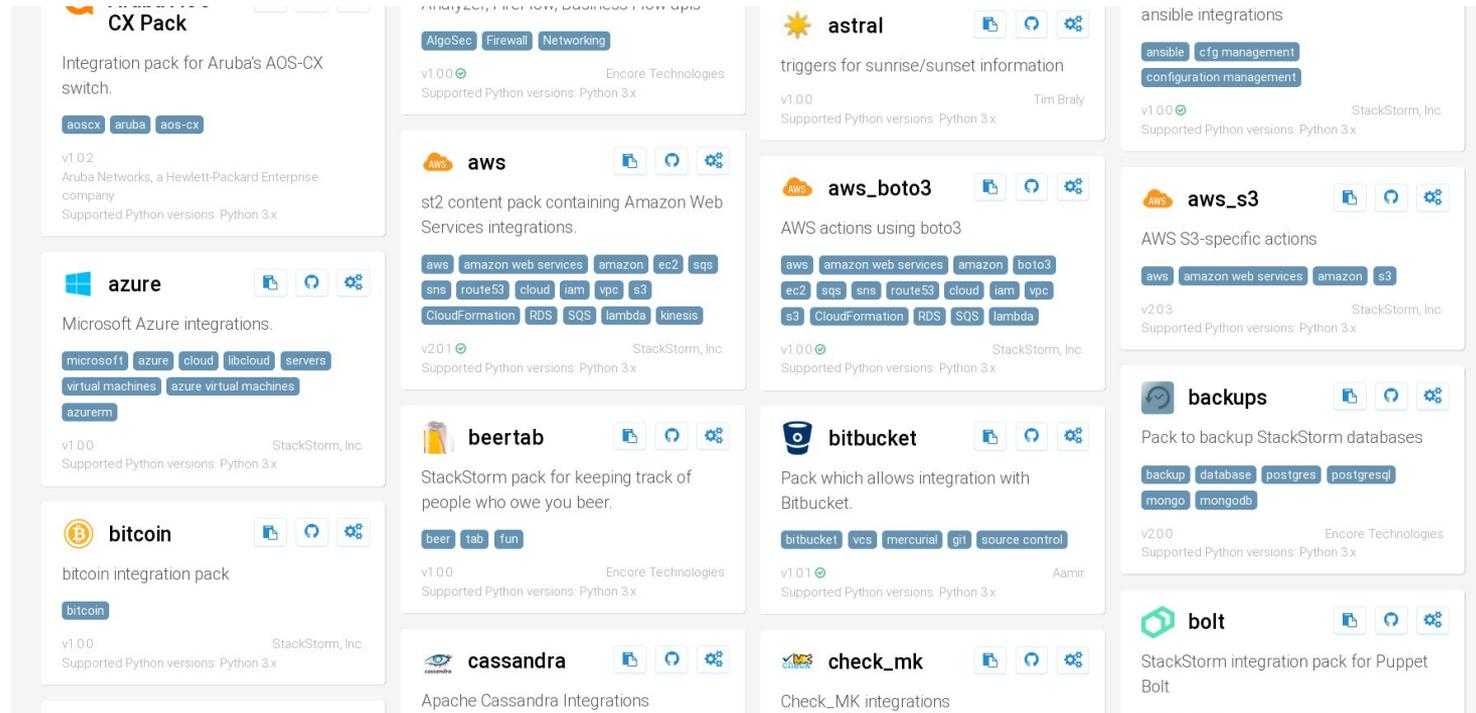
zapier

Automatelt

DevOps:



Challenge II - Current State



The screenshot displays a grid of integration packs available in the StackStorm marketplace. Each pack card includes a title, description, version number, supported Python versions, and a list of associated services or technologies. The packs shown are:

- CX Pack**: Integration pack for Aruba's AOS-CX switch. Version v1.0.2. Supported Python versions: Python 3.x. Tags: aoscx, aruba, aos-cx.
- azure**: Microsoft Azure integrations. Version v1.0.0. Supported Python versions: Python 3.x. Tags: microsoft, azure, cloud, libcloud, servers, virtual machines, azure virtual machines, azurem.
- bitcoin**: bitcoin integration pack. Version v1.0.0. Supported Python versions: Python 3.x. Tag: bitcoin.
- AlgoSec Firewall Networking**: Version v1.0.0. Supported Python versions: Python 3.x. Encore Technologies.
- astral**: triggers for sunrise/sunset information. Version v1.0.0. Supported Python versions: Python 3.x. Tim Braly.
- ansible integrations**: Version v1.0.0. Supported Python versions: Python 3.x. StackStorm, Inc. Tags: ansible, cfg management, configuration management.
- aws**: st2 content pack containing Amazon Web Services integrations. Version v2.0.1. Supported Python versions: Python 3.x. StackStorm, Inc. Tags: aws, amazon web services, amazon, ec2, sqs, sns, route53, cloud, iam, vpc, s3, CloudFormation, RDS, SQS, lambda, kinesis.
- aws_boto3**: AWS actions using boto3. Version v1.0.0. Supported Python versions: Python 3.x. StackStorm, Inc. Tags: aws, amazon web services, amazon, boto3, ec2, sqs, sns, route53, cloud, iam, vpc, s3, CloudFormation, RDS, SQS, lambda.
- aws_s3**: AWS S3-specific actions. Version v2.0.3. Supported Python versions: Python 3.x. StackStorm, Inc. Tags: aws, amazon web services, amazon, s3.
- beertab**: StackStorm pack for keeping track of people who owe you beer. Version v1.0.0. Supported Python versions: Python 3.x. Encore Technologies. Tags: beer, tab, fun.
- bitbucket**: Pack which allows integration with Bitbucket. Version v1.0.1. Supported Python versions: Python 3.x. Aamir. Tags: bitbucket, vcs, mercurial, git, source control.
- backups**: Pack to backup StackStorm databases. Version v2.0.0. Supported Python versions: Python 3.x. Encore Technologies. Tags: backup, database, postgres, postgresql, mongo, mongodb.
- cassandra**: Apache Cassandra Integrations. Version v1.0.0. Supported Python versions: Python 3.x. Encore Technologies.
- check_mk**: Check_MK integrations. Version v1.0.0. Supported Python versions: Python 3.x. Encore Technologies.
- bolt**: StackStorm integration pack for Puppet Bolt. Version v1.0.0. Supported Python versions: Python 3.x. Encore Technologies.

Challenge II - Current State

Task Automation Servers (StackStorm)

- ▣ How to migrate automations?
- ▣ **Vendor lock-in**... again





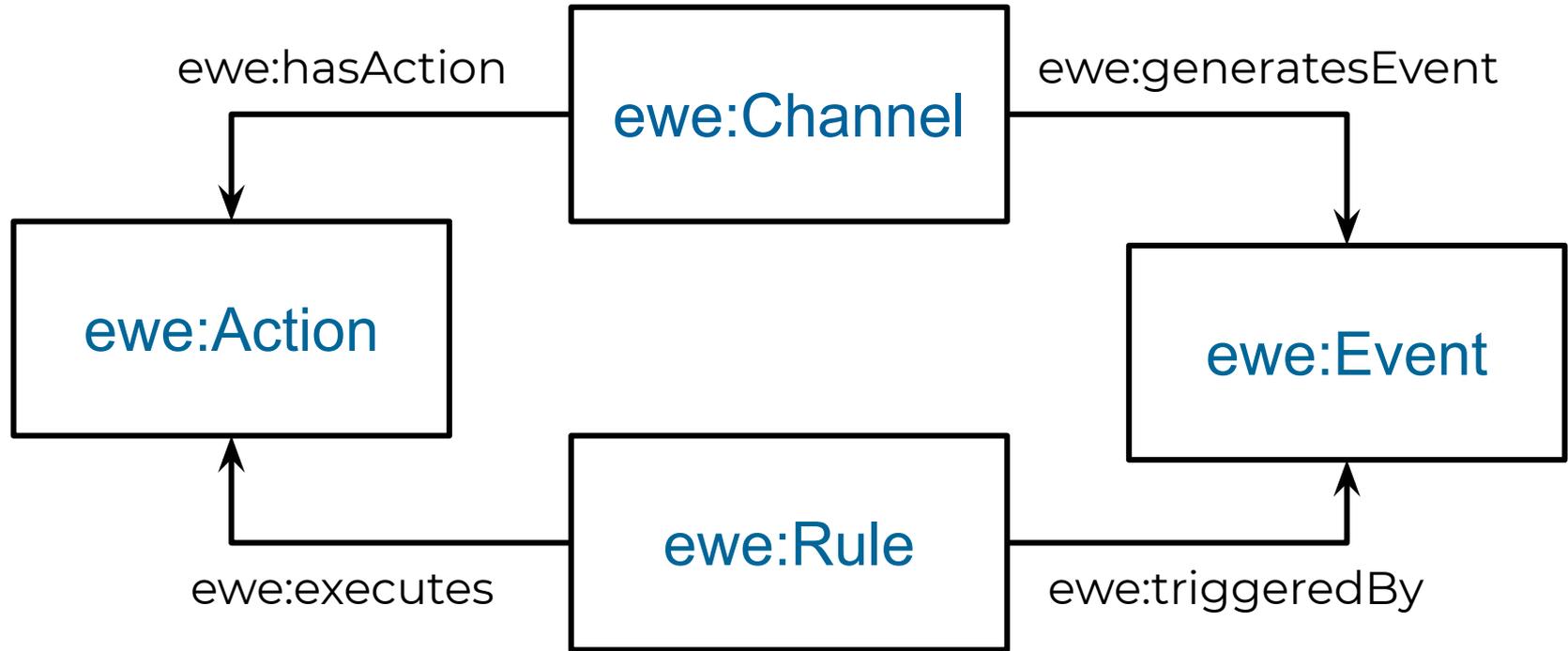
Challenge II - Potential Solution

- ▣ **Semantic** model for TAS
- ▣ Rule **interoperability**
- ▣ **EWE** (Evented WEb) ontology



Challenge II - Potential Solution

- ▣ **Semantic** model for TAS
- ▣ Rule **interoperability**
- ▣ **EWE** (Evented WEb) ontology
 - ▣ Linked Data flexibility
 - ▣ Reasoning capabilities



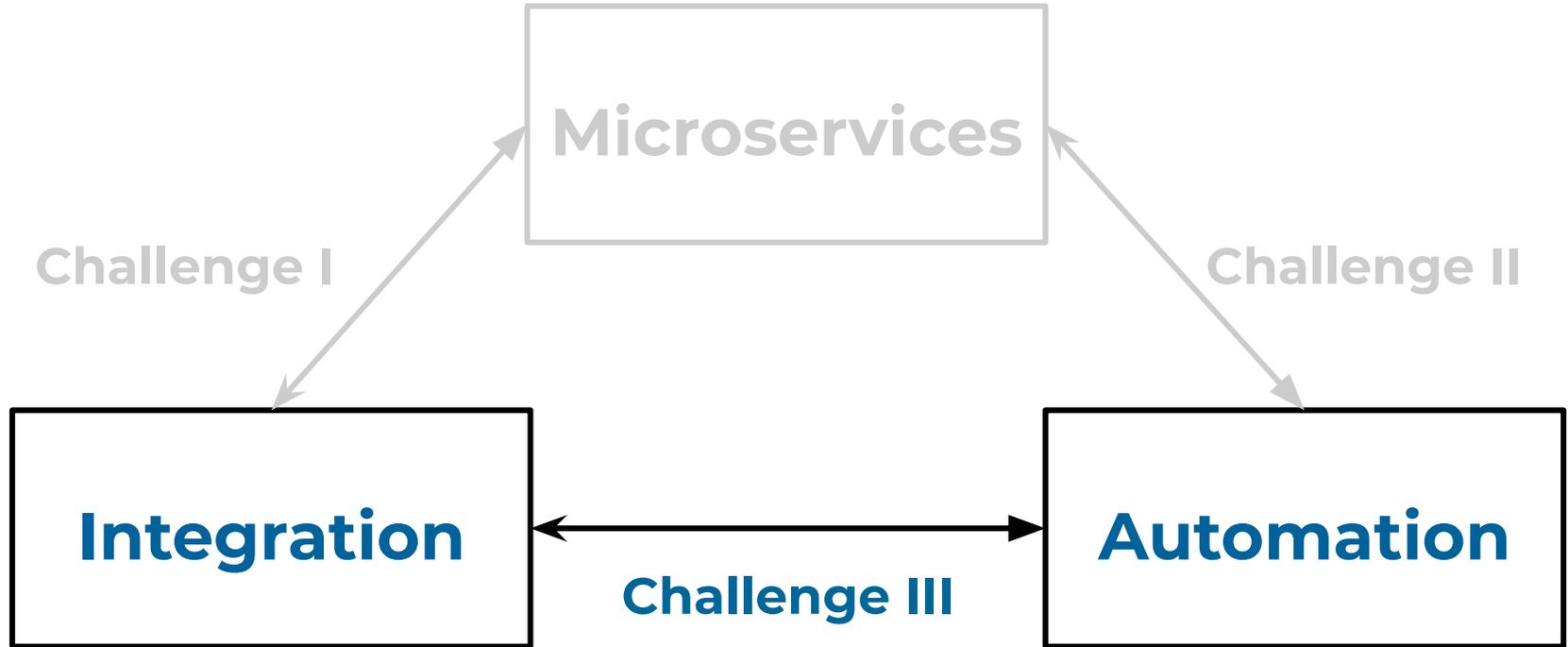
EWE model simplified

Challenge II - Potential Solution

EWE Tasker

- ▣ TAS implementation **based on EWE** semantic model
- ▣ Rule engine: **EYE reasoner**

DevOps Challenges



4.

Challenge III

Standardizing
Event-based
Automation



Challenge III - Presentation

Standardized interfaces between services

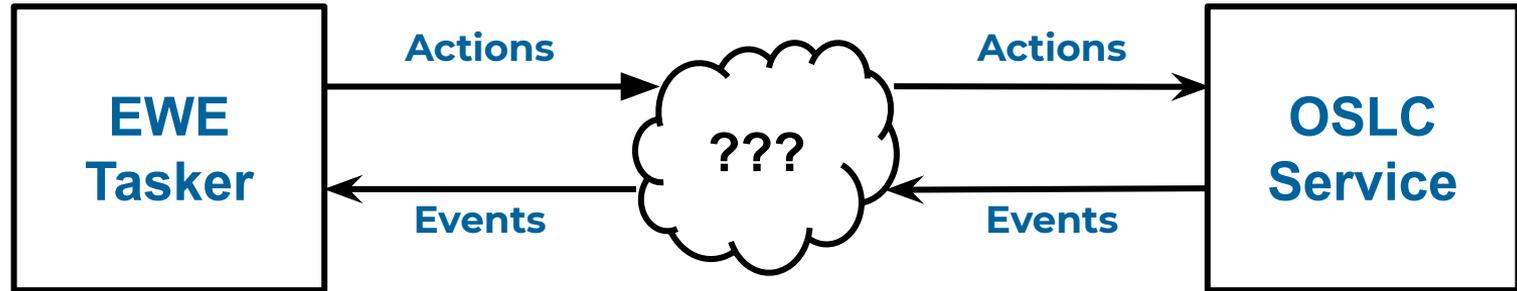
Semantic modeling for Task Automation Servers





Challenge III - Presentation

- Interaction between **TAS** and **OSLC Services**





Challenge III - Presentation

- Interaction between **TAS** and **OSLC Services**



Challenge III - Current State

OSLC Automation:

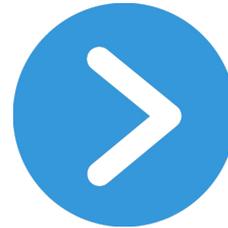
- ▣ Should be **extended**
- ▣ OSLC **interface for TAS**

Challenge III - Current State

Events in OSLC



Actions in OSLC

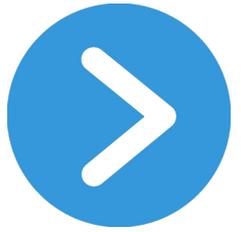




Challenge III - Current State

Events in OSLC

- ▣ **Tracked Resource Set** (TRS)
 - ▣ Creation, Modification, Deletion
 - ▣ TRS Patch for more complex events (TRS 3.0)
- ▣ **New spec** (?)



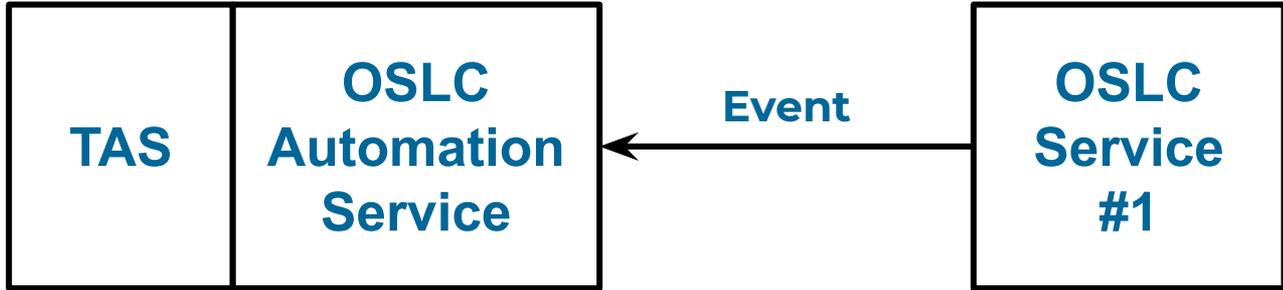
Challenge III - Current State

Actions in OSLC

- ▣ **CRUD** (Create, Read, Update, Delete)
 - ▣ HTTP POST, PUT and DELETE methods
- ▣ **OSLC Actions** (?)

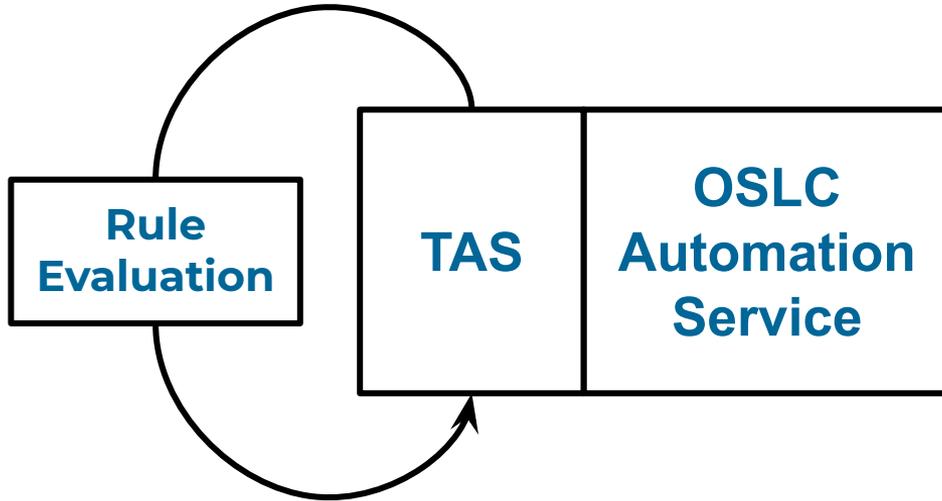
Challenge III - Potential Solution

OSLC Automation + **TAS**



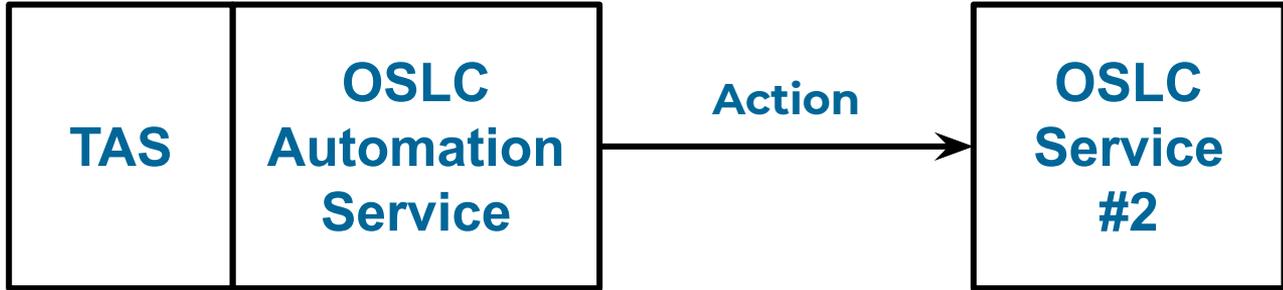
Challenge III - Potential Solution

OSLC Automation + **TAS**



Challenge III - Potential Solution

OSLC Automation + **TAS**



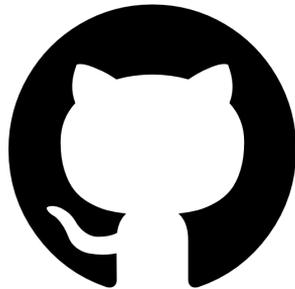
4.

Case study

Github -
Bugzilla
integration

Case Study - Proposal

Development team
uses **GitHub**



Testing team uses
Bugzilla





Case Study - Goals

- ▣ Replicate the bugs from Bugzilla as issues in GitHub (and viceversa) **automatically**



Case Study - Goals

- Replicate the bugs from Bugzilla as issues in GitHub (and vice versa) **automatically**
- Using **OSLC interfaces** between the services



Case Study - Goals

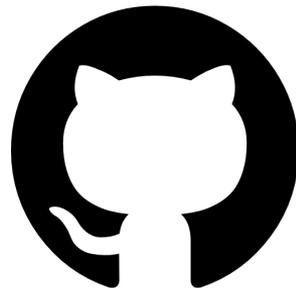
- Replicate the bugs from Bugzilla as issues in GitHub (and viceversa) **automatically**
- Using **OSLC interfaces** between the services
- TAS with **semantic rules** support



Case Study - OSLC Interfaces

Bugzilla

- oslc:ServiceProviders - **Products**
- Resources - **Bugs**
- Domain - **ChangeManagement**

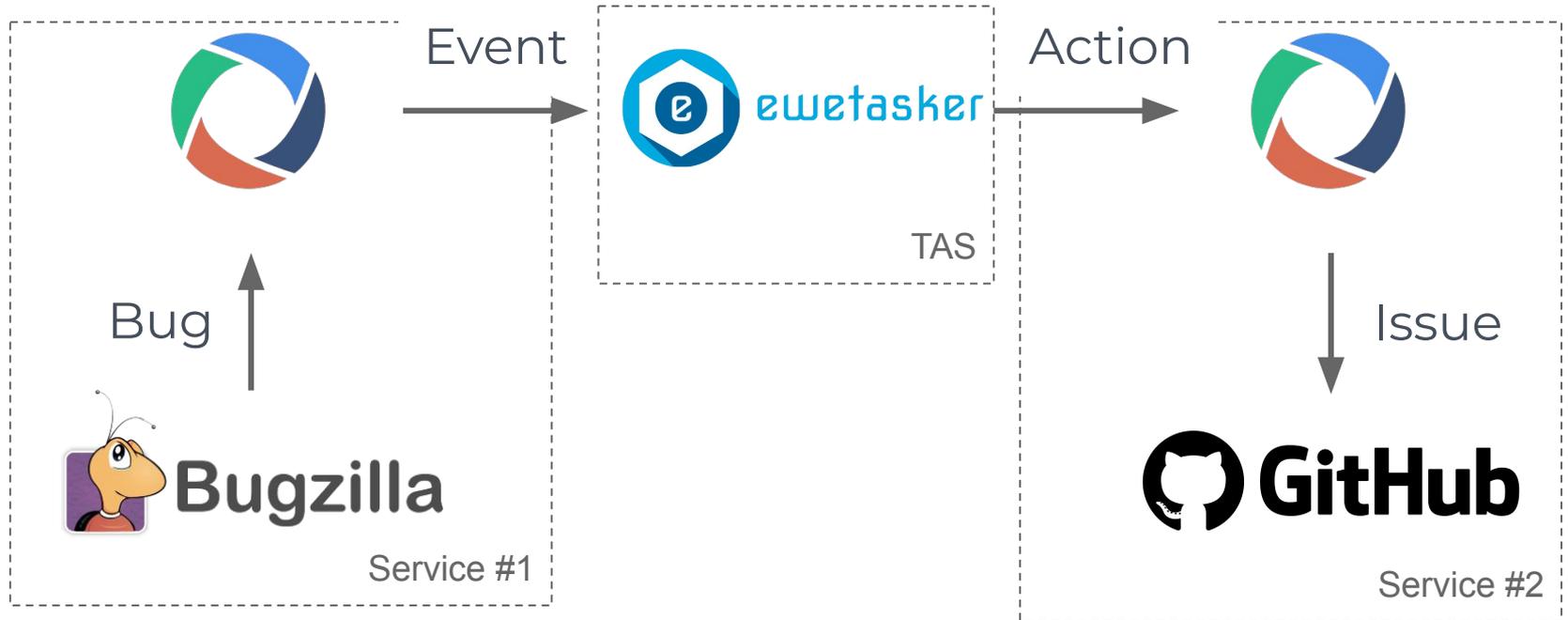


Case Study - OSLC Interfaces

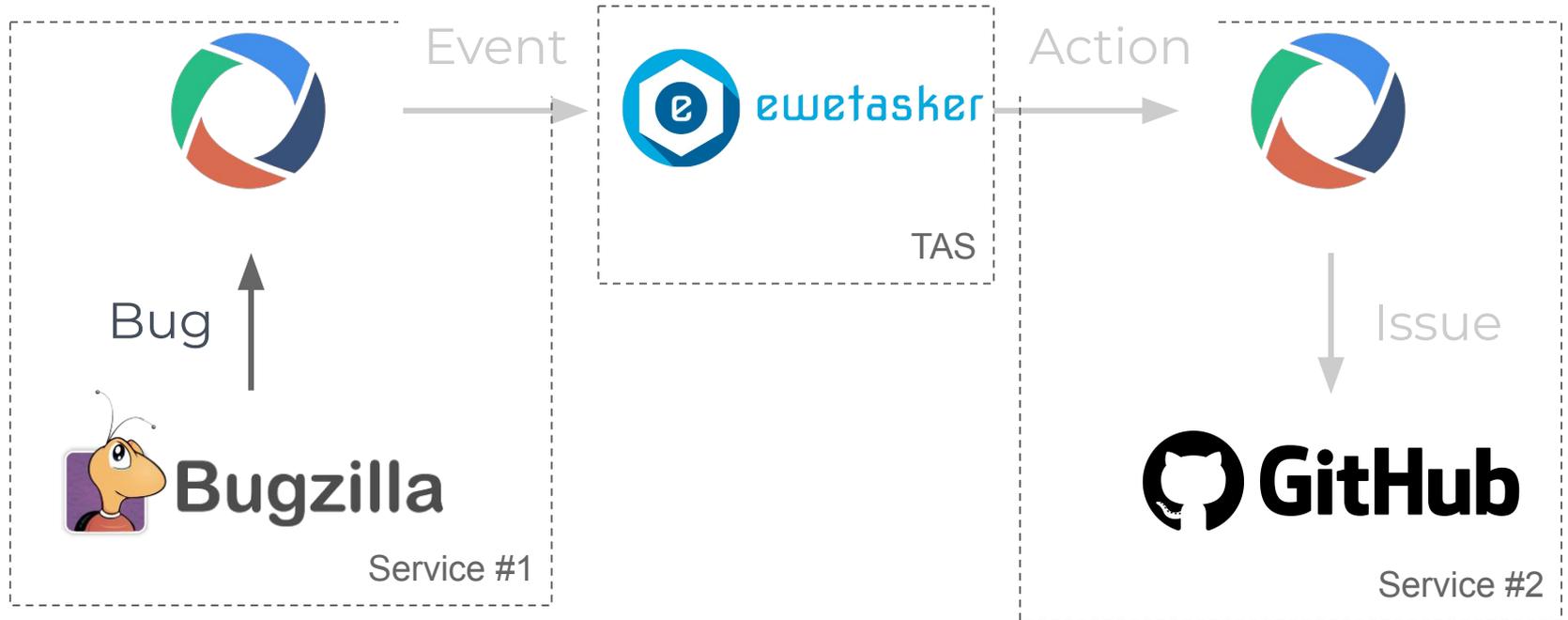
GitHub

- ▣ oslc:ServiceProviders - **Repositories**
- ▣ Resources - **Issues**
- ▣ Domain - **ChangeManagement**

Case Study - Scenario

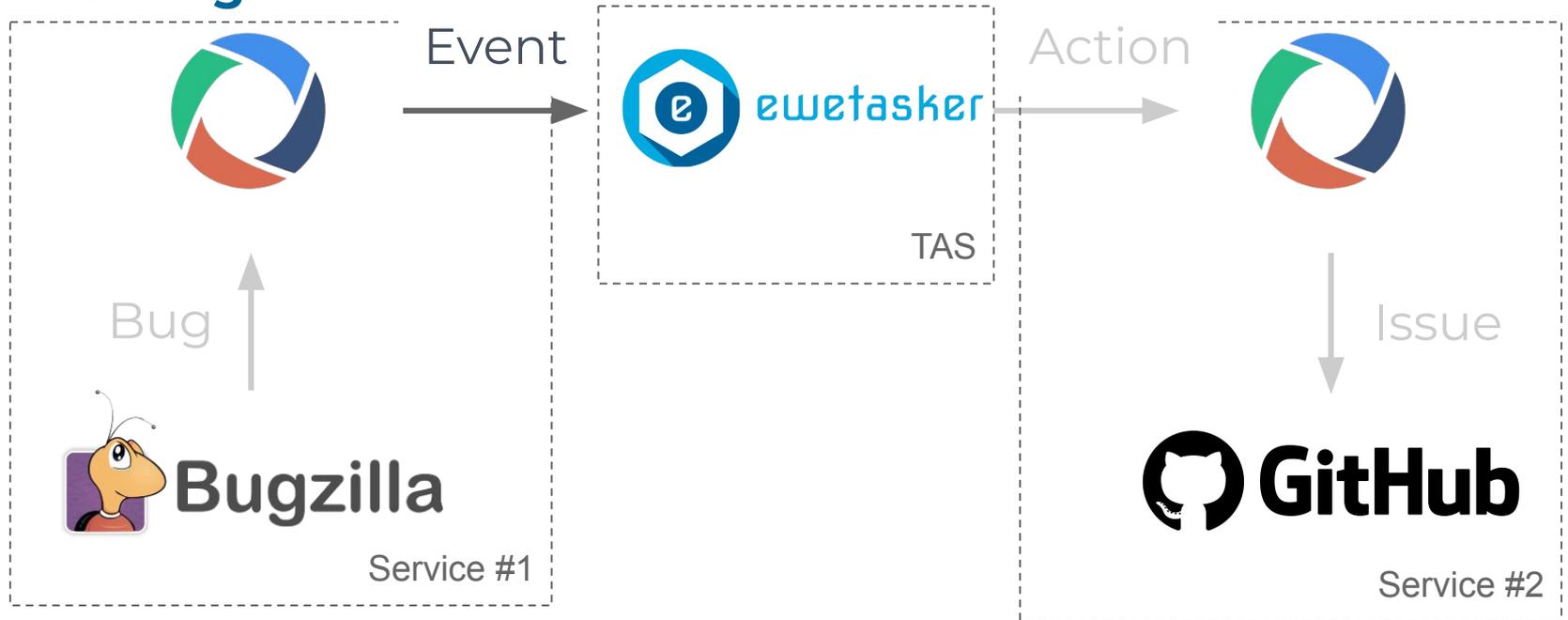


Case Study - Scenario

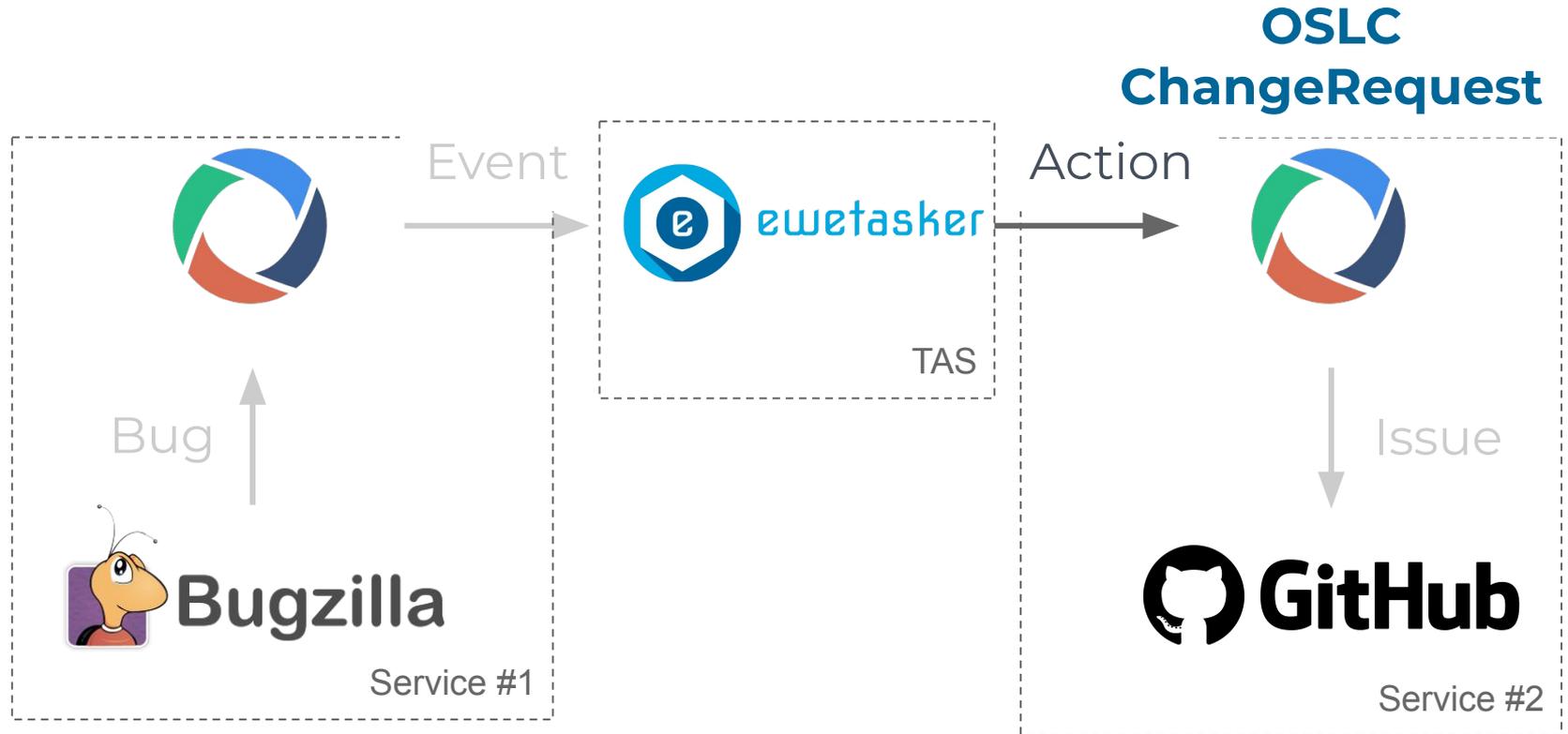


Case Study - Scenario

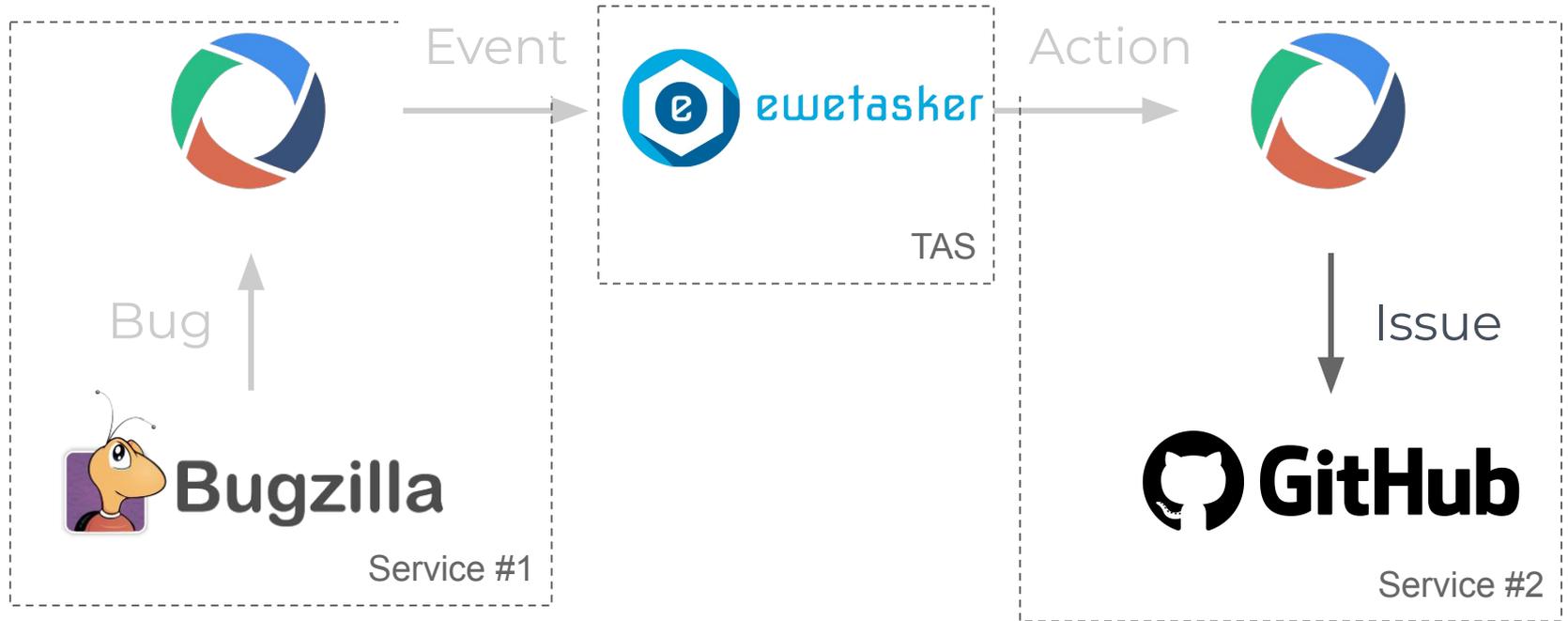
TRS ChangeEvent



Case Study - Scenario



Case Study - Scenario





Case Study - Results

Desired **DevOps** features

- ▣ Supports **microservices architectures**
- ▣ **Fast integration** with new services
- ▣ Provide **automation features**

Case Study - Future Work

- ▣ Extension for **OSLC Automation** covering TAS features
- ▣ **OSLC Events** (new spec?)
- ▣ **OSLC Actions** (reactivate?)

Questions?

GSI contact email - gsi@autolistas.upm.es

Guillermo García-Grao - g.ggrao@upm.es