

Automated documentation of Business Domain assignments and cloud application information from an application development pipeline

Master Thesis: Kickoff

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Agenda

1. Motivation

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5. Evaluation environment

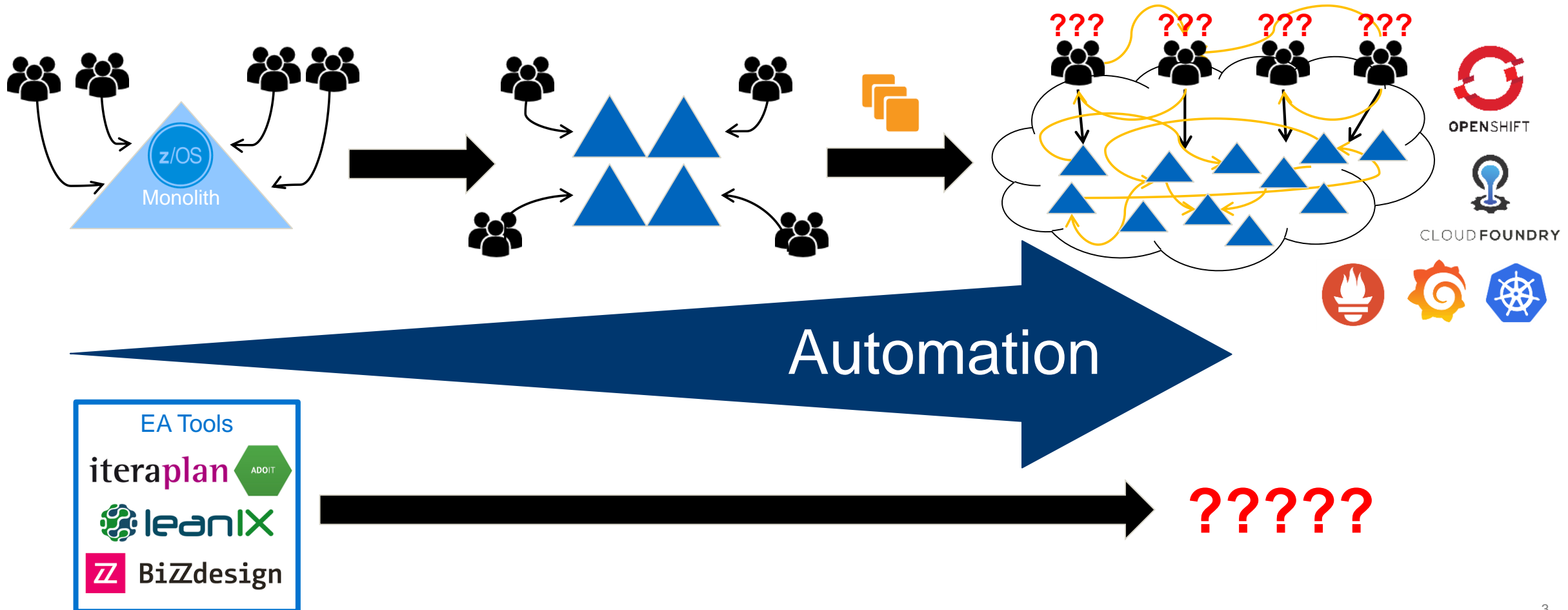
6. Solution

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1. Motivation: Major technology trends that have an impact on EAM

1. **Agile development** and **continuous delivery (CD)** approaches are becoming more important in today's enterprises. CD leads to **short lifecycles** which implies a **quicker update of the EA Tool information**
2. **Cloud migration** reduces infrastructure and maintenance costs. **Cloud reduces transparency** and increases **complexity of EA documentation**
3. **Modularization of legacy systems** into **application components and microservices** causes a **higher number of applications**

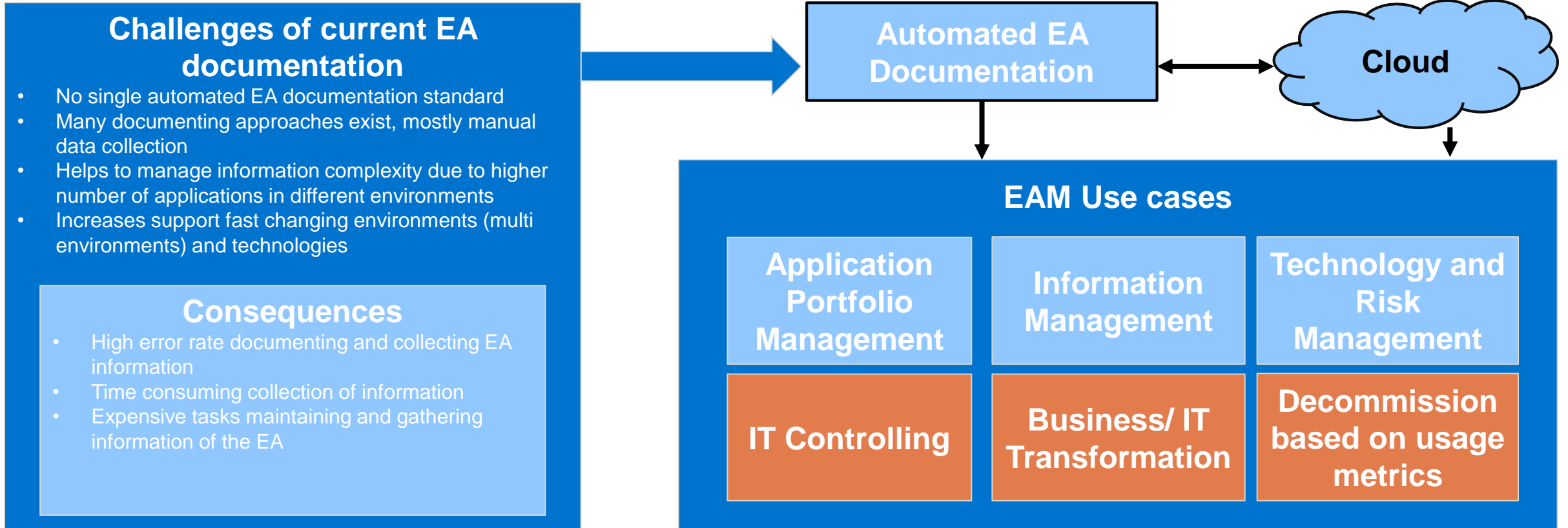


2. Literature review

Year	Author	Title	Outlook	CD	CC	Mod.
2010	Matthias Farwick, Berthold Agreiter, Ruth Breu, Matthias Häring, Karsten Voges, Inge Hanschke	Towards Living Landscape Models: Automated Integration of Infrastructure Cloud in Enterprise Architecture Management	Cloud Integration (PaaS and SaaS)		X	
2012	Buschle, M., Ekstedt, M., Grunow, S., Matheus Hauder, Florian Matthes, Sascha Roth	Automated Enterprise Architecture Documentation using an Enterprise Service Bus	Modeling EA transformations			
2013	Matthias Farwick, Ruth Breu, Matheus Hauder, Sascha Roth, Florian Matthes	Enterprise Architecture Documentation: Empirical Analysis of Information Sources for Automation	Automation opportunities			
2013	Sascha Roth, Matheus Hauder, Felix Michel, Dominik Münch, Florian Matthes	Facilitating Conflict Resolution of Models for Automated Enterprise Architecture Documentation	Combination of approach with other automated EA documentation approaches			
2013	Sascha Roth, Matheus Hauder, Matthias Farwick, Ruth Breu, and Florian Matthes	Enterprise Architecture Documentation: Current Practices and Future Directions	Automation mechanisms to improve EAD			
2018	Jörg Landthaler, Ömer Uludag, Gloria Bondel, Ahmed Elnaggar, Saasha Nair, and Florian Matthes	A Machine Learning Based Approach to Application Landscape Documentation	Research in automated EAD			

Research in automated EA documentation integrating today's Cloud (PaaS and SaaS) is needed

3. Derivation for EAM



Improved EAM use cases can be derived from an automated EA documentation process

4. Research Questions

RQ1

How to obtain EA relevant information from the runtime behaviour of cloud based environments?

RQ2

How to assign the application landscape to business domains?

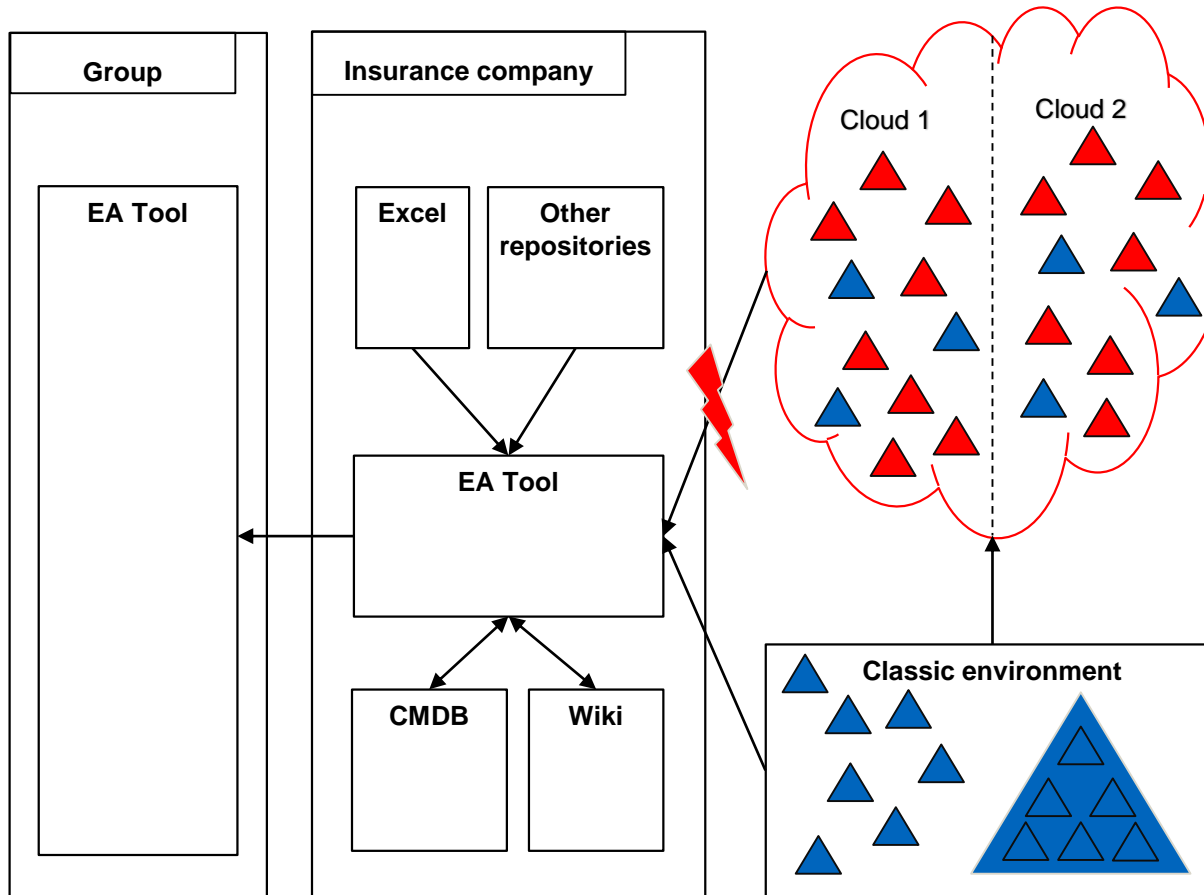
RQ3

How to automate the assignment process with an integrated toolchain?

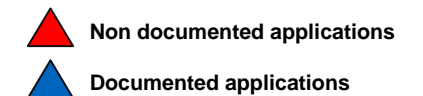
RQ4

How does a prototype implementation of the automated documentation process of cloud applications look like?

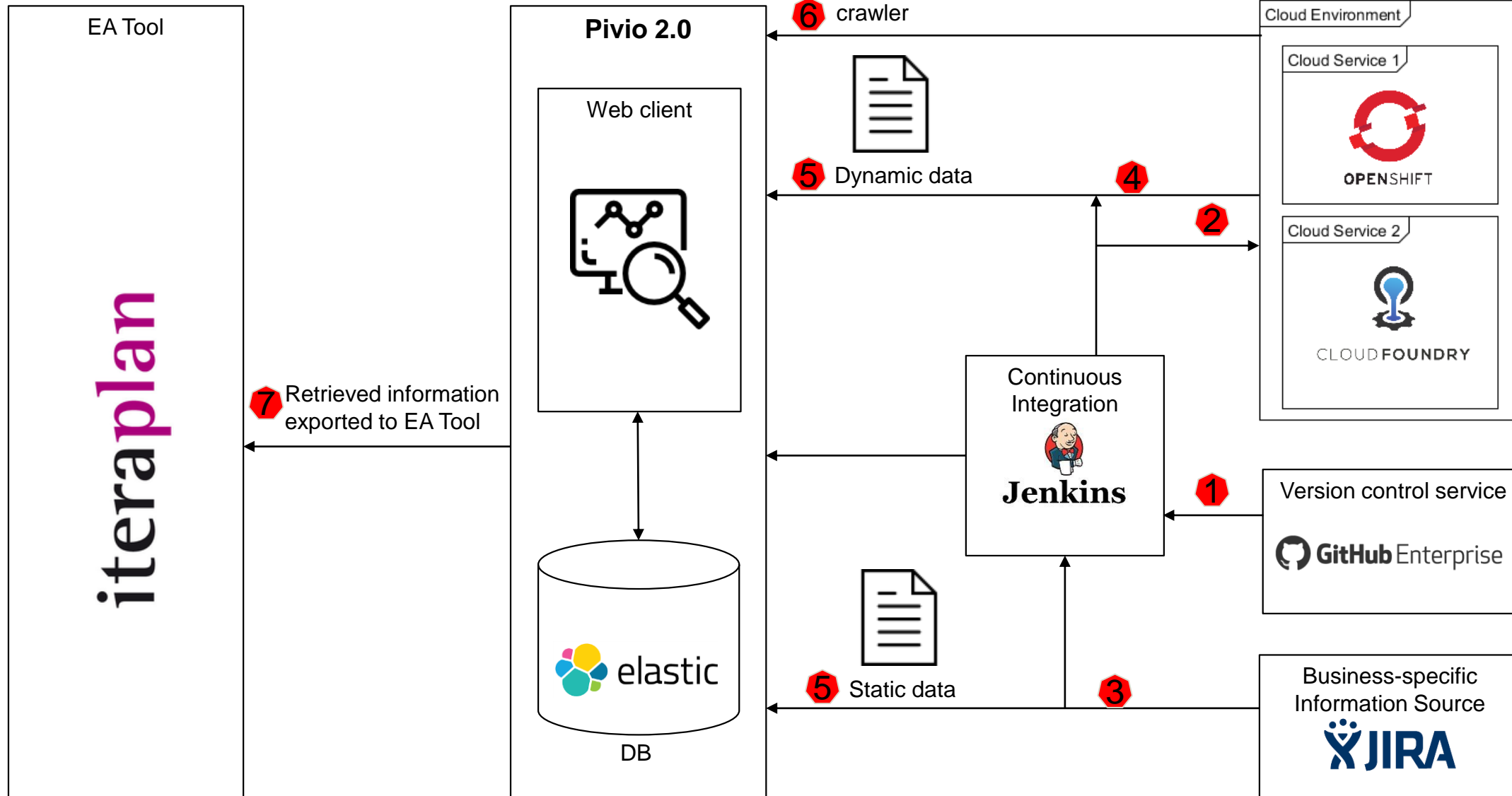
5. Evaluation environment



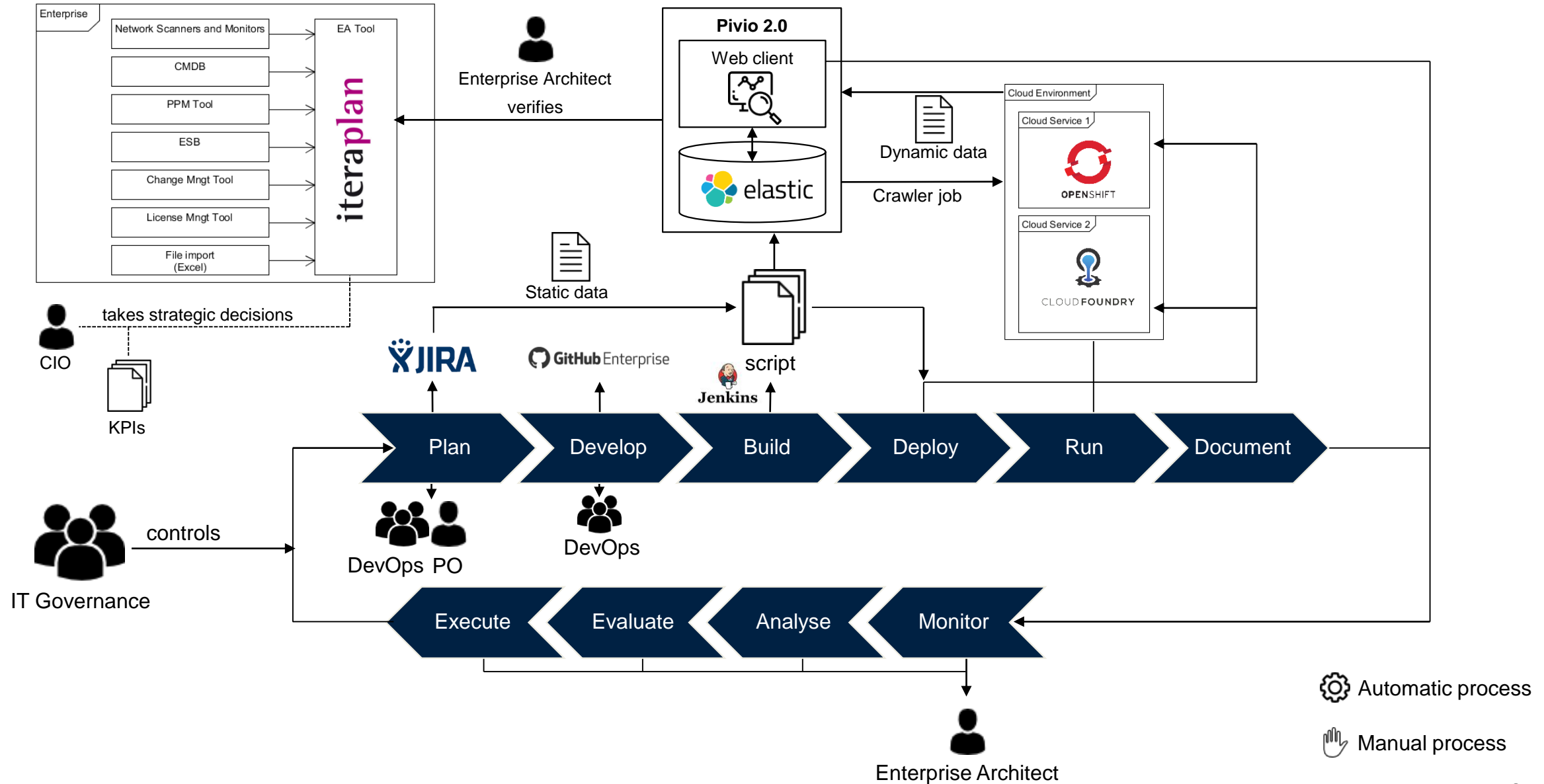
- Manual collection of EA information with Excel
- Integration of other repositories into EA Tool
- Import of Excel into EA Tool
- Federated approach relating EA Tool to other Tools such as a CMDB and a Wiki
- Integration of application inventory to Group EA Tool due to VAIT-regulation (Versicherungsaufsichtliche Anforderungen an die IT)
- No cloud application documentation
- Modularization of legacy systems into application components and microservices
- Migration of application components and microservices to cloud environments



6. Solution: High level architecture



6. Solution: Information collection process

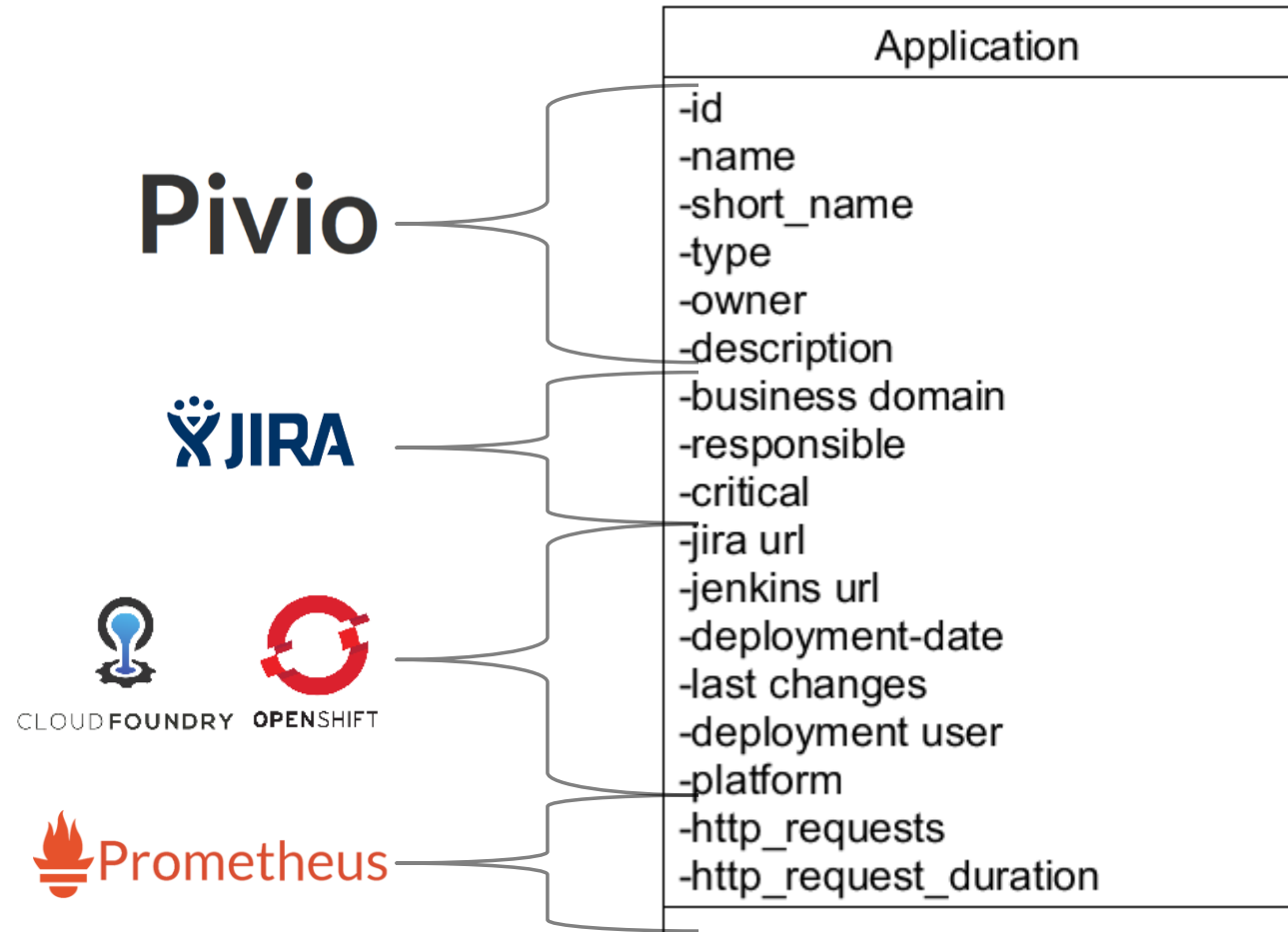


6. Solution: Data model

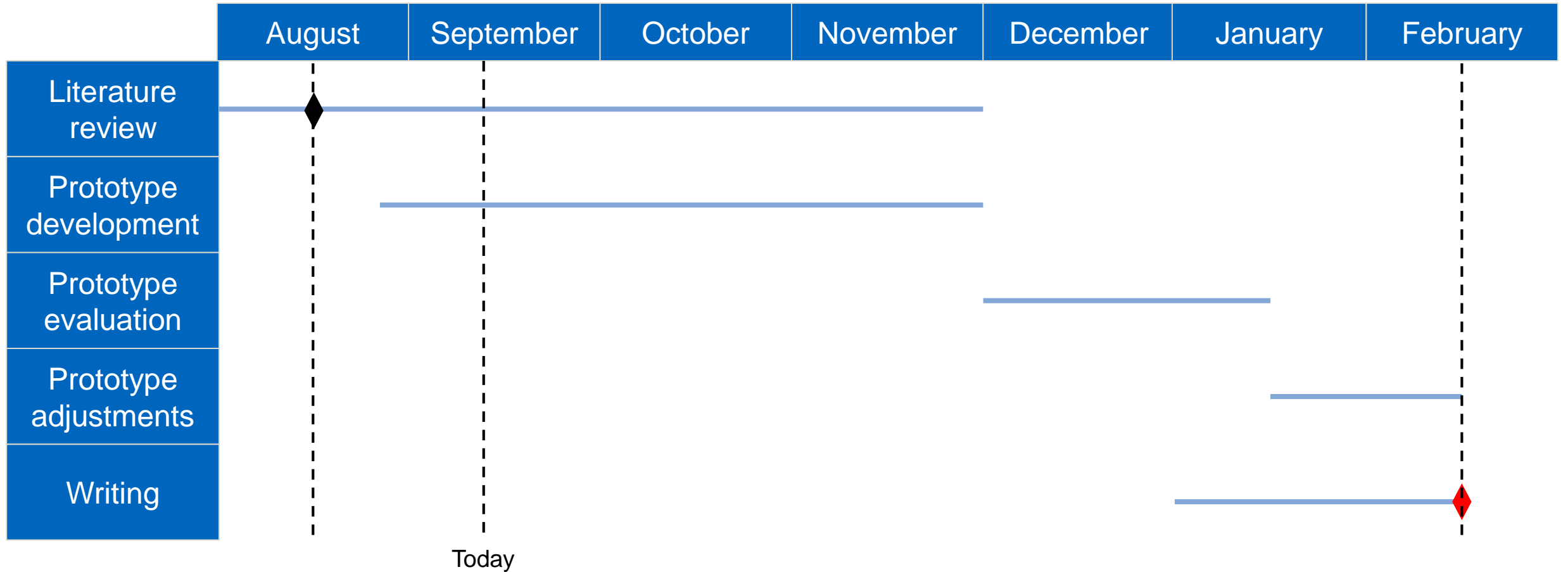
- Attributes structured in 4 parts:
 1. Required fields in Pivio
 2. Business specific information
 3. Technical specifications
 4. Application performance metrics

- 1. Required fields from data model of Pivio
- 2. Business specific information is gathered from JIRA
- 3. Technical information is retrieved from the cloud environments
- 4. Application performance metrics collected from monitoring systems such as Prometheus

- Attributes extend existing “Anwendung-Service (IS)”-object in EA Tool (iteraplan)



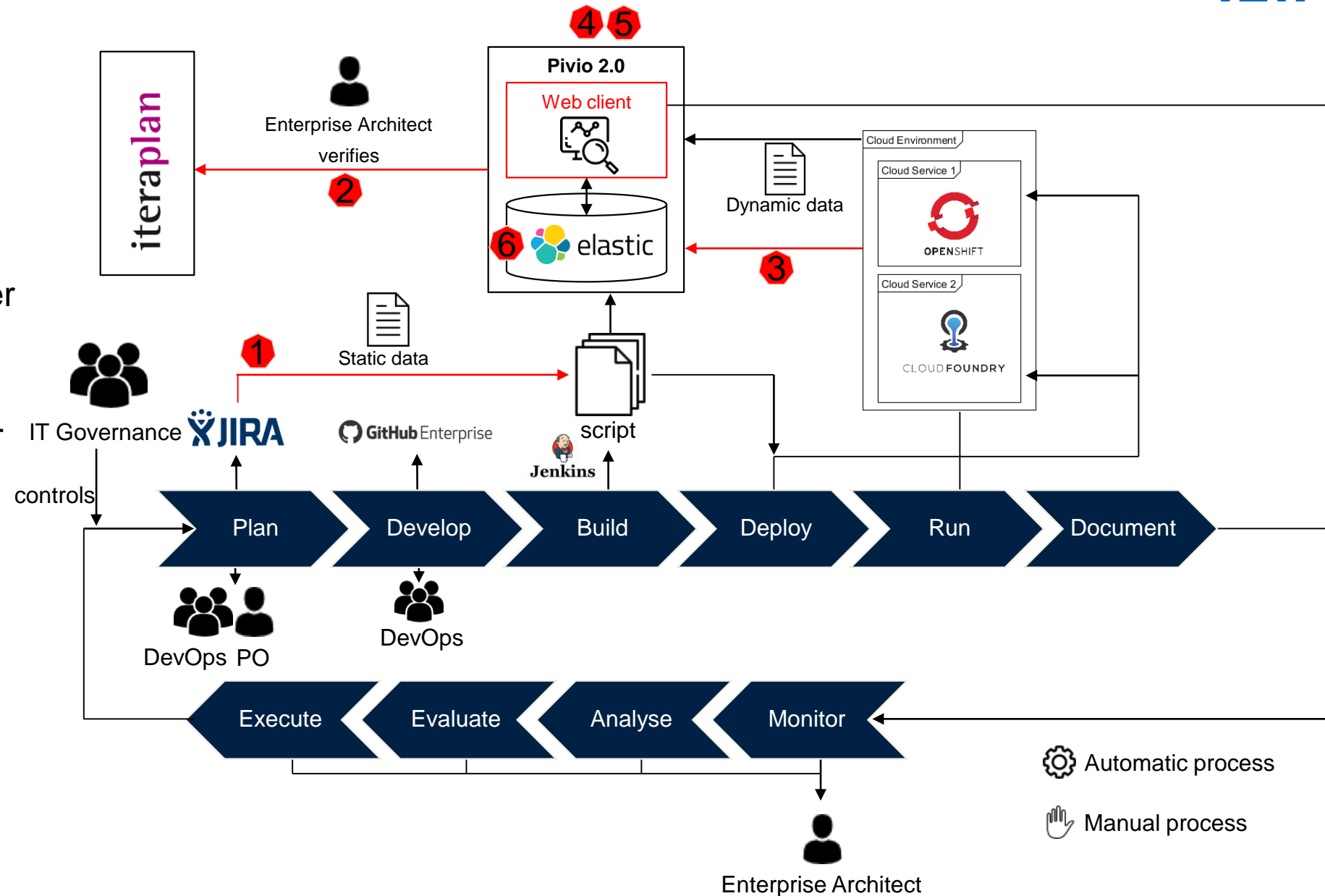
7. Timeline



◆ Registered Date: 15.08.2018
◆ Submission Date: 15.02.2019

8. Next Steps

1. Integration of JIRA as a business specific information source
2. Integration the EA Tool (iteraplan)
3. Implementation of crawler jobs (Cloudfoundry and Openshift)
4. Alignment on Monitoring-KPIs
5. Implementation of additional visualizations (if needed)
6. Extend data model



Live Demo

Sources	Build	Get Jira Information	Deploy	Push Documentation
3s	38s	182ms	2min 4s	553ms
3s	38s	182ms	2min 4s	553ms



pivio Overview Query Feed

Quick Search...

Matching Artifacts (16)

- Awesome Microservice**
lambda
Simple microservice
vor 1 Monat vor 1 Monat
- Demokick**
Miriam
Simple microservice
vor 2 Tagen vor 2 Tagen
- Microservice 1** ms1
Nicolas
bla bla bla
vor 2 Wochen vor 2 Wochen
- Microservice 2** ms2
Nicolas
bla bla bla
vor 2 Wochen vor 2 Wochen



pivio Overview Query Feed

General

Description

Awesome Microservice

Simple microservice

Owner **lambda** Type **service**

Json [Link](#)

Links

2018-08-06T20:38:29.148Z 2018-08-06T20:38:29.148Z

Runtime

RAM CPU Disk Host Network Zone

Actions

Delete Document

Service

Provides

Depends on

Internal

Software Dependencies

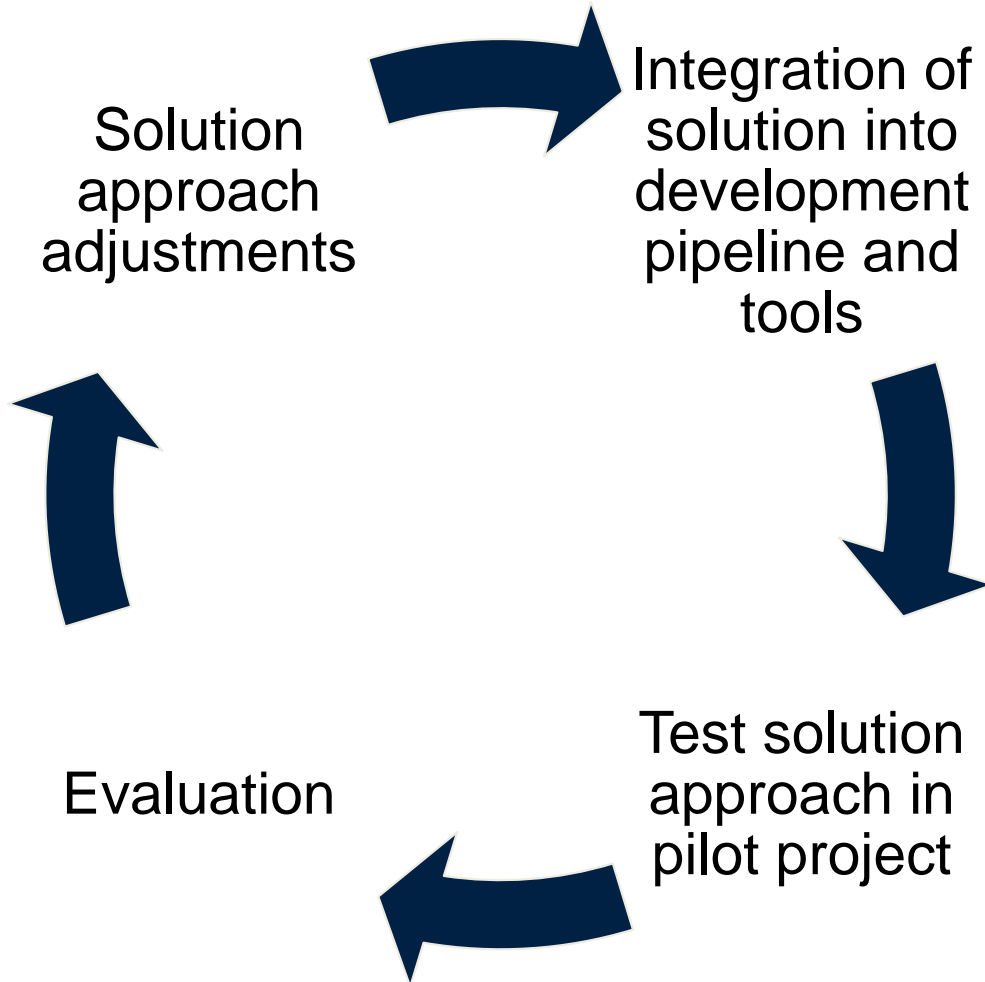
In Use

Licenses

Thank you for your attention!

Do you have any questions?

Backup



- Solution approach will be implemented in an insurance company
- Tools used during the development:
 - Project management: Jira
 - Continuous Delivery: Jenkins
 - EA Tool: iteraplan
 - Monitoring: Pivio 2.0
- Cloud environment: CloudFoundry and Openshift

Monitoring KPIs

- Cloud clustering as additional visualization
- Backlog-items KPI: How many items are missing. Application portfolio purposes
- Status of applications: running, stopped or crashed.
- Number of deployments per time unit: Which applications change frequently?
- Traffic KPI: Decommission purposes
- Traffic heatmaps: Which applications are important. Relevant for planification and costs. Ratio costs maintenance and costs
- LOC: Maintenance vs Complexity (related to maintenance costs)
- Additional KPIs

Groovy script



```
def callPost(String urlString, String queryString) {
    def url = new URL(urlString)
    def connection = url.openConnection()
    connection.setRequestMethod("POST")
    connection.doInput = true
    connection.doOutput = true
    connection.setRequestProperty("content-type", "application/json;charset=UTF-8")

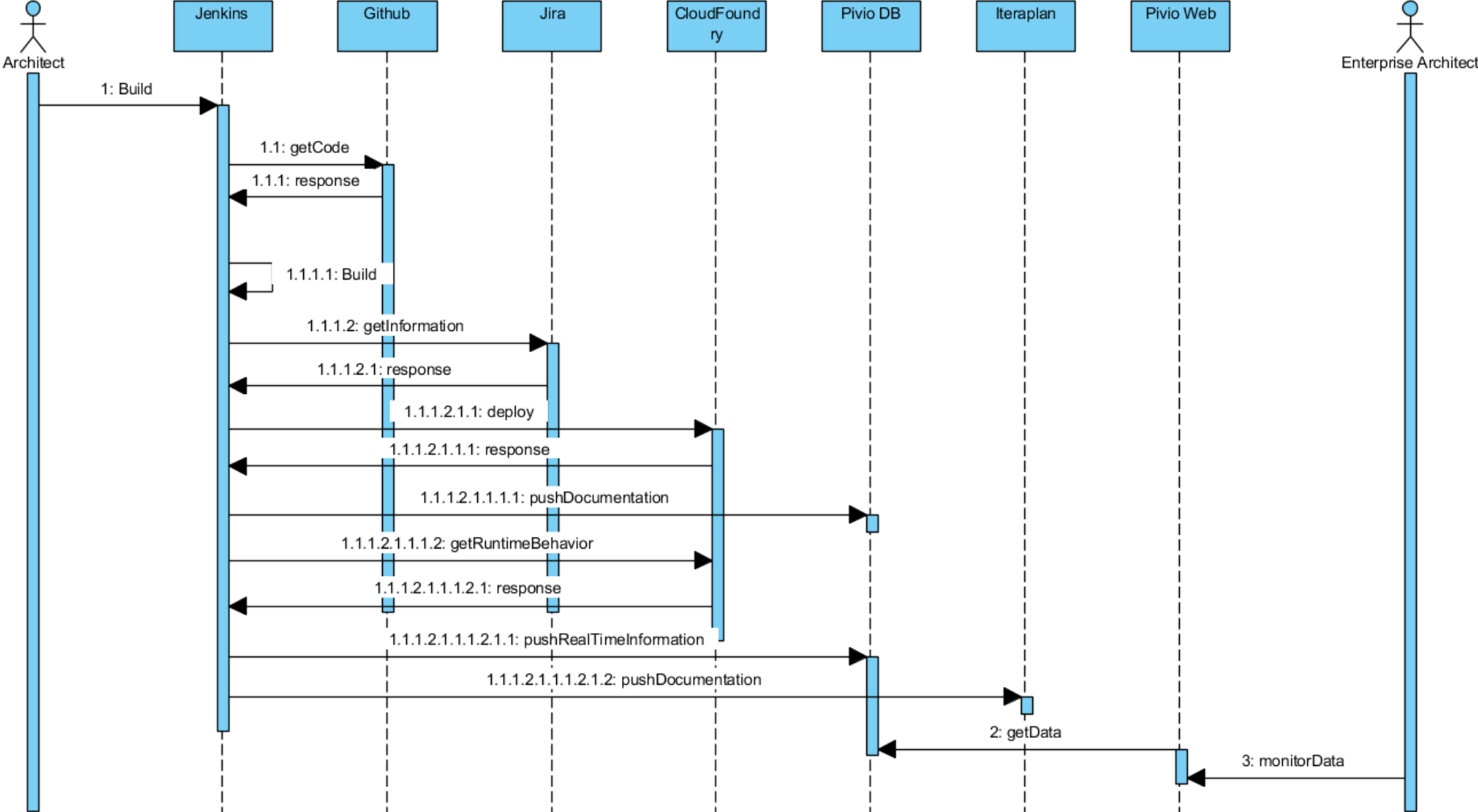
    def writer = new OutputStreamWriter(connection.outputStream)
    writer.write(queryString.toString())
    writer.flush()
    writer.close()
    connection.connect()

    new groovy.json.JsonSlurper().parseText(connection.content.text)
}
node {
    deleteDir()
    stage('Sources') {
        checkout([
            $class      : 'GitSCM',
            branches    : [[name: "refs/heads/master"]],
            extensions  : [[class: 'CleanBeforeCheckout', localBranch: "master"]],
            userRemoteConfigs: [[
                credentialsId: 'cbf178fa-56ee-4394-b782-36eb8932ac64',
                url          : "https://github.com/Nicocovi/MS-Repo"
            ]]
        ])
    }
    dir("") {
        stage("Build"){
            sh "gradle build"
        }
    }
    stage("Get Jira Information"){
        //TODO
    }
}
```

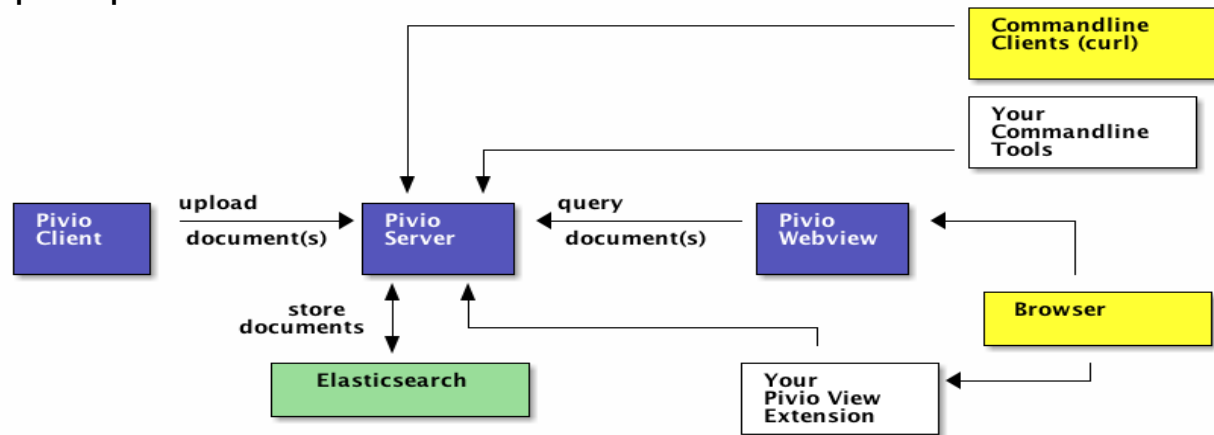
```
stage('Deploy') {
    def branch = ['master']
    def name = "sping-microservice1"
    def path = "build/libs/gs-spring-boot-0.1.0.jar"
    def manifest = "manifest.yml"

    if (manifest == null) {
        throw new RuntimeException('Could not map branch ' + master + ' to a manifest file')
    }
    withCredentials([[
        $class      : 'UsernamePasswordMultiBinding',
        credentialsId : '98c5d653-dbdc-4b52-81ba-50c2ac04e4f1',
        usernameVariable: 'CF_USERNAME',
        passwordVariable: 'CF_PASSWORD'
    ]]) {
        sh 'cf login -a https://api.run.pivotal.io -u $CF_USERNAME -p $CF_PASSWORD --skip-ssl-validation'
        sh 'cf target -o ga72hib-org -s masterarbeit'
        sh 'cf push sping-microservice1 -f '+manifest+' --hostname '+name+' -p '+path
    }
}
stage("Push Documentation"){
    try {
        callPost("http://192.168.99.100:9123/document", "{\"id\": \"0987654321\", \"name\": \"Kick-off-App\", \"owner\": \"Nico\", \"description\": \"bla\", \"short_name\": \"serviceAZ12\", \"type\": \"service\"}") //Include protocol
    } catch(e) {
        // if no try and catch: jenkins prints an error "no content-type" but post request succeeds
    }
}
}
}
```

4. Solution: Sequence diagram



- What is Pivio ?
Pivio is a service registry for humans.
- Why Pivio ?
 - Overview for platforms, especially for microservice environment.
 - Reusability of services
 - A growing number of services means also a challenge not only for developers.
 - Which service runs where? What does it do? Who is responsible for that?
- Concept of pivio:



Legend



Pivio data model

Pivio needs certain mandatory fields:

- **id:** Unique id in pivio.
- **name:** The name of the artefact.
- **short_name:** A very brief name for the service.
- **type:** The type of this artefact. Values could be **service**, **library** or **mobile_app**.
- **owner:** Which team is responsible for this artefact.
- **description:** What does this service do?