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## **Deliverable D2.2**

### **Detailed Requirements Specification v2**

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<b>Abstract:</b>	This document will contain an update on the technical functional, non-functional and technical requirements of DECIDE DevOps Framework and all the components to be developed in the context of WP3, WP4 and WP5. This update will be done based on the feedback received from the different stakeholders (end-users, technology providers, interest groups) with respect to the first versions of the components/tools/frameworks.
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## Document Description

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### Document Revision History

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V1.0	31/10/2018	Ready for submission	TECNALIA

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## Terms and abbreviations

(MC)SLA	(MultiCloud) Service Level Agreement
ACSml	Advanced Cloud Service (meta-) intermediary
API	Application Program Interface
CCDL	Common Development and Distribution License
CSLA	Composite Cloud Service Level Agreement
CSP	Cloud Service Provider
DoA	Description of the Action
EC	European Commission
EMS	Enterprise System Management
FW	Framework
GPL	GNU General Public License
GUI	Graphical User Interface
HTTP(S)	Hypertext Transfer Protocol (Secure)
IaaS	Infrastructure as a Service
IDE	Integrated Development Environment
IT	Information Technology
JVM	Java Virtual Machine
KPI	Key Performance Indicator
KR	Key Result
NFP	Non-functional Property
NFR	Non-functional Requirement
PaaS	Platform as a Service
QoS	Quality of Service
RCP	Rich Client Platform
REST	Representational State Transfer
SDK	Software Development Kit
SDLC	Systems Development Life Cycle
SLO	Service Level Objective
SOLC	Systems Operation Life Cycle
UI	User Interface
WP	Work Package
WTP	Web Tool Platform

## Executive Summary

This document revises and provides a status update on the requirements of DECIDE. This version of the deliverable covers the requirements elicitation of all the Key Results of DECIDE. These requirements were elicited at the beginning of the project and are documented in D2.1 [1]. A complete, updated list of requirements is presented in this document, along with their current status. The list includes newly identified requirements, and modifies some of the original ones, to reflect the current understanding of the project. The requirements imposed by the use cases are also listed in this deliverable, together with their level of fulfilment. Besides, the business KPIs that detail the operational benefits that DECIDE is expected to bring are also presented here. This deliverable sets the basis for the development of the second versions of the DECIDE tools, that will be delivered by M24.

The document also details the sensitive data that each component has to handle, such as user credentials to access the DevOps Framework, or the Git URL and token where the code for the project that is being developed is located, which cannot be shared using the currently used sharing mechanisms (Application Description and API invocations) and require a more secure sharing mechanism.

Lastly, the deliverable describes how the integration of the Key Results' graphical interfaces has taken place. There are two levels of GUI integration: on one hand, the DevOps Framework Dashboard provides an overview of the most relevant information of each KR and code quality metrics from Jenkins and SonarQube. For example, ARCHITECT's selected patterns, or the result of the OPTIMUS' simulations are shown. The Dashboard's interface is built by invoking the corresponding tool's API. On the other hand, the tools GUI can be accessed from a tab within the DevOps Framework. This second type of integration has been done following two different methods: iframe, which consists in embedding the whole GUI of the tool in the tab; and through API calls, as in the Dashboard.



## 1 Introduction

This document corresponds to the second version of the deliverable D2.1 Detailed Requirements Specification v1 [1], delivered on M6 of the project.

The requirements for all Key Results, which were elicited and documented in the Work Packages that correspond to each Key Result (namely WP3 – WP5), are compiled now here in a single document, along with their status at month 23. Some new needs have been identified since the beginning of the project, giving rise to new requirements, and some of the original ones have been modified to reflect the current understanding of the project. All these changes are properly documented in the requirements revision.

Besides, the requirements that are imposed by the use cases are also listed, indicating their level of fulfilment in this stage. These requirements are sourced from D6.2 [2], demonstrating the link between the tool owners' identified functionalities and the use cases' needs.

The second part of the document is devoted to the sensitive data needs of the DECIDE components and to the integration of the graphical interfaces of said components. The sensitive data are variables that cannot be exchanged amongst KRs using the common data exchange mechanisms (Application Description and API calls) and need a more secure strategy. Within this section, the methods used to integrate the GUIs of the DECIDE tools are described.

The document is structured as follows:

Section 2 presents the methodology followed to elicit the requirements in DECIDE, an updated overview list of requirements, covering all Key Results. It also includes the requirements imposed by the use cases and the business KPIs. The details of the requirements are provided in the Appendix.

Section 3 contains the integration strategy, which includes the sensitive data needs for each component and the GUI integration approach.

Lastly, section 4 corresponds to the conclusions.

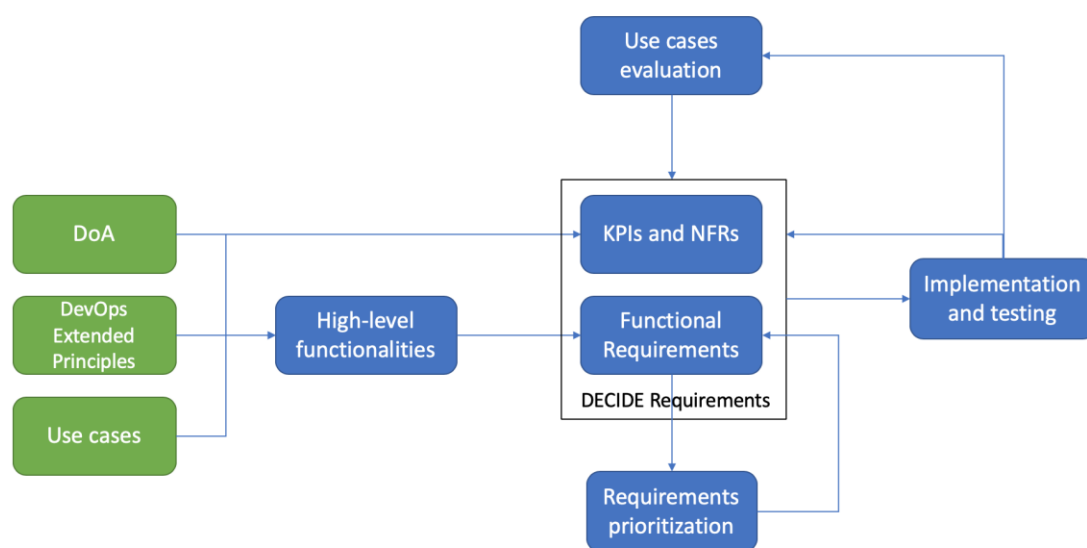
The Appendix lists all the requirements in their detailed form.

## 2 Requirements revision

### 2.1 Requirements gathering and prioritization

The following figure depicts the process followed in the DECIDE Project to obtain and prioritize requirements. The starting point was the analysis of the Description of Action, a State of the Art study on the principles of DevOps, and the necessities of the use cases. From there, a list of high-level functionalities was obtained, that was later distilled into requirements specific for each KR. This analysis also served to obtain the NFRs for DECIDE and the KPIs that will measure the level of success.

This first list was prioritized according to the needs of the use cases and the expertise of the tool owners. Following the implementation of the first version of the tools and the first phase of the use cases validation, the requirements were revised to account for new identified needs and the better understanding of the Project. This process is depicted in the next figure.



**Figure 1.** Requirements elicitation and update process

The updated list of requirements is shown below, along with the use cases requirements and business KPIs.

### 2.2 Functional requirements

This section provides an overview of the functional requirements' status for all KRs of the project. These requirements were elicited during the first six months of the project, and are listed in the Key Results dedicated deliverables (D3.1, D3.4, D3.7, D3.10, D4.1, D5.1).

In this section, an overview with the update for each of these requirements is shown, indicating their expected implementation deadline (according to the prioritization carried out in D2.3 [3]), their status at M23 and their version (v1 indicates that the requirement is unchanged, while v2 indicates that the requirement has been modified). Some new requirements have been listed (KR1-REQ22 and KR1-REQ23, marked in bold in the table), due to newly identified needs and some other have been deemed out of scope or have been reassigned to a different component. For this reason, the requirements' ID are, in some cases, not correlative. The complete list of the revised requirements, as well as their full details, can be found in the Appendix.

**Table 1.** Compendium of DECIDE Functional requirements and their status at M23

	Req. ID	Due date	Status	Priority	Version
DevOps FW	KR1-REQ1	M15	Finished	High	V1
	KR1-REQ2	M15	Finished	High	V1
	KR1-REQ3	M15	Finished	High	V1
	KR1-REQ4	M15	Finished	High	V1
	KR1-REQ5	M15	Finished	High	V1
	KR1-REQ6	M15	Finished	High	V1
	KR1-REQ7	M27	Finished	High	V1
	KR1-REQ8	M27	Finished	Medium	V1
	KR1-REQ9	M27	Finished	Medium	V1
	KR1-REQ10	M27	Finished	Medium	V1
	KR1-REQ11	M27	Finished	Medium	V1
	KR1-REQ12	M33	Work in progress	Low	V1
	KR1-REQ13	M33	Work in progress	Low	V1
	KR1-REQ14	M33	Work in progress	Low	V1
	KR1-REQ15	M33	Work in progress	Low	V1
	KR1-REQ16	M33	Work in progress	Low	V1
	KR1-REQ17	M12	Finished	High	V1
	KR1-REQ18	M24	Work in progress	Medium	V1
	KR1-REQ19	M30	Work in progress	Low	V1
	KR1-REQ20	M15	Finished	High	V1
	KR1-REQ21	M33	Work in progress	Low	V1
	DEVOPS-REQ1	M33	Work in progress	Low	V1
	DEVOPS-REQ2	M27	Work in progress	High	V1
	DEVOPS-REQ3	M15	Finished	High	V1
	DEVOPS-REQ4	M15	Finished	High	V1
	DEVOPS-REQ5	M33	Finished	Low	V1
	DEVOPS-REQ10	M33	Work in progress	Low	V1
	DEVOPS-REQ11	M33	Work in progress	Low	V1
	DEVOPS-REQ13	M33	Work in progress	Low	V1
	KR1-REQ22	M24	Work in progress	High	V1
	KR1-REQ23	M24	Work in progress	High	V1
App. Controller	WP3-CONTR-REQ1	M12	Finished	High	V1
	WP3-CONTR-REQ2	M24	Finished	High	V1
	WP3-CONTR-REQ9	M12	Finished	High	V1
	WP3-CONTR-REQ10	M30	Rejected	-	V1
	WP3-CONTR-REQ12	M15	Finished	High	V1
MCSLA editor	WP3-CSLA-REQ1	M30	Work in progress	High	V1
	WP3-CSLA-REQ6	M30	Work in progress	High	V1
	WP3-CSLA-REQ7	M12	Finished	Medium	V1
	WP3-CSLA-REQ8	M24	Finished	High	V1

	Req. ID	Due date	Status	Priority	Version
	WP3-CSLA-REQ9	M24	Finished	High	V1
	WP3-CSLA-REQ10	M24	Work in progress	Medium	V1
	WP3-CSLA-REQ11	M24	Work in progress	Low	V1
ARCHITECT	WP3-ARCHI-REQ1	M24	Work in progress	High	V1
	WP3-ARCHI-REQ3	M30	Work in progress	High	V1
	WP3-ARCHI-REQ6	M12	Finished	Medium	V1
	WP3-ARCHI-REQ7	M24	Finished	Medium	V1
	WP3-ARCHI-REQ8	M30	Work in progress	Medium	V1
	WP3-ARCHI-REQ9	M12	Finished	Medium	V1
	WP3-ARCHI-REQ10	M15	Finished	High	V1
OPTIMUS	WP3-PROFI-REQ1	M12	Finished	Medium	V1
	WP3-PROFI-REQ2	M30	Delayed	High	V1
	WP3-PROFI-REQ3	M24	Work in progress	Medium	V1
	WP3-PROFI-REQ4	M12	Finished	Medium	V1
	WP3-PROFI-REQ5	M30	Work in progress	Low	V1
	WP3-OPTI-REQ1	M12	Finished	Medium	V1
	WP3-OPTI-REQ2	M12	Finished	Medium	V1
	WP3-OPTI-REQ3	M24	Work in progress	High	V1
	WP3-OPTI-REQ4	M30	Delayed	High	V2
	WP3-OPTI-REQ5	M30	Work in progress	Medium	V2
	WP3-OPTI-REQ6	M30	Work in progress	High	V1
	WP3-OPTI-REQ7	M30	Delayed	Medium	V2
	WP3-OPTI-REQ8	M30	Delayed	Medium	V1
	WP3-OPTI-REQ9	M30	Work in progress	Medium	V1
	WP3-OPTI-REQ10	M24	Rejected	-	V1
ACSml Discovery	WP5-DIS01	M24	Work in progress	High	V2
	WP5-DIS02	M24	Finished	High	V2
	WP5-DIS03	M12	Finished	High	V1
	WP5-DIS05	M24	Work in progress	High	V1
	WP5-DIS06	M24	Work in progress	High	V2
	WP5-DIS07	M24	Work in progress	High	V1
	WP5-DIS08	M24	Work in progress	High	V1
	WP5-DIS09	M30	Work in progress	Medium	V1
ACSml Contracting	WP5-BUS02	M24	Work in progress	High	V1
	WP5-BUS07	M24	Work in progress	High	V2
	WP5-BUS08	M24	Work in progress	High	V2
	WP5-BUS09	M24	Work in progress	High	V2
ACSml Monitoring	WP5-MON01	M30	Work in progress	Low	V1
	WP5-MON02	M24	Rejected	Low	V1
	WP5-MON03	M24	Work in progress	High	V2
	WP5-MON04	M24	Work in progress	High	V2

	Req. ID	Due date	Status	Priority	Version
	WP5-MON05	M24	Rejected	High	V1
	WP5-MON06	M30	Work in progress	High	V2
	WP5-MON07	M30	Work in progress	Low	V2
	WP5-MON08	M24	Work in progress	High	V1
	WP5-MON09	M24	Work in progress	High	V1
	WP5-MON10	M24	Work in progress	Low	V1
ACSml Billing	WP5-BUS01	M30	Delayed	High	V1
	WP5-BUS03	M30	Delayed	High	V1
	WP5-BUS04	M30	Delayed	High	V1
	WP5-BUS05	M30	Delayed	High	V1
	WP5-BUS06	M30	Delayed	High	V1
ACSml Legal	WP5-LEG01	M24	Work in progress	High	V1
ACSml Security	WP5-SEC01	M24	Work in progress	High	V2
	WP5-SEC02	M24	Rejected	High	V2
	WP5-SEC03	M24	Rejected	High	V2
	WP5-SEC04	M30	Rejected	Low	V1
	WP5-SEC05	M30	Rejected	Low	V1
	WP5-SEC06	M30	Work in progress	Low	V1
	WP5-SEC07	M30	Rejected	Low	V1
	WP5-SEC08	M30	Rejected	Low	V1
ADAPT	WP4-MR1	M24	Work in progress	High	V2
	WP4-MR2	M24	Work in progress	High	V1
	WP4-MR3	M12	Work in progress	High	V2
	WP4-MR4	M12	Finished	High	V1
	WP4-MR5	M12	Finished	High	V1
	WP4-MR6	M30	Work in progress	Medium	V2
	WP4-MR7	M12	Finished	Medium	V1
	WP4-MR8	M24	Work in progress	High	V1
	WP4-MR9	M30	Work in progress	High	V2
	WP4-MR10	M24	Work in progress	High	V1
	WP4-MR11	M24	Work in progress	High	V2
	WP4-MR12	M12	Finished	Medium	V1
	WP4-MR13	M12	Finished	High	V1
	WP4-MR14	M30	Work in progress	Medium	V1
	WP4-MR15	M24	Work in progress	Medium	V1
	WP4-MR16	M24	Work in progress	Medium	V1
	WP4-MR17	M24	Work in progress	Medium	V1

## 2.3 Use cases requirements

This section summarizes the requirements that the use cases impose to the different Key Results. These requirements have been elicited in deliverable D6.1 [4] and revised in deliverable D6.2 [2]. The level of fulfilment (from 0, not implemented, to 10, fully implemented) of each requirement is indicated as reported in deliverable D6.5 [5]. A more in-depth analysis can be found in said deliverable.

### 2.3.1 AIMS

Business requirements	Description	Linked KR	Fulfilment
AMR01 Recommendation of Architecture based upon Security as the principle driver	ARCHITECTURE/Recommendations use security of CSP provision as the principal criterion.	ACSml, OPTIMUS	2
AMR02 Display of CSP Accreditations	Inventory of CSP Accreditations presented (Access via dashboard)	ACSml	2
AMR03 Management of Deployed Cloud Environments	Management of Cloud infrastructure, including networks, through dashboard(s)	DevOps Framework, ADAPT	1
AMR04 Deployment of Software from repository	Ability to designate software repository and have DECIDE deploy it directly from that repository	ADAPT	8
AMR05 Notification of MCSLA Violation	Dashboard to notify service owner of MCSLA via text, screen prompt, email	ACSml	3
AMR06 Retrieval of Data	Ability to Retrieve/Re-assign Data if the service is redeployed to another CSP following CSP violation or renegotiation. Retention of Contract with CSP post redeployment.	ACSml	10

### 2.3.2 ARSYS

Business requirements	Description	Linked KR	Fulfilment
ARR01 Evolution to Micro-services Architecture	ARCHITECT will provide patterns showing how to dissect the application into microservices.	ARCHITECT	8
ARR02 Stateful Applications Support	ARCHITECT will allow stateful applications and suggest patterns to allow this.	ARCHITECT	2
ARR04 Programming Languages	ARCHITECT will propose patterns that will provide support to applications developed in PHP.	ARCHITECT	3

Business requirements	Description	Linked KR	Fulfilment
ARR05 Communication Protocols	Cloud platforms suggested by ACSml to support SQL TCP, HTTP TCP and SMTP TCP.	ACSml	0
ARR06 Monitoring and Re-deployment Services	<p>OPTIMUS will support the provision of new possible topologies when a violation occurs, triggering the redeployment process. OPTIMUS will consider past deployment configurations in order to develop and to propose the new ones.</p> <p>ACSml will be able to monitor the CSPs (SLAs) and in case of a violation of the SLA, will inform to ADAPT. ADAPT will confirm if a new redeployment is required.</p>	OPTIMUS ACSml ADAPT	1
ARR07 Main NFRs	<p>Metrics to be monitored should be elicited through the MCSLA editor.</p> <p>ACSml will define the parameters (i.e. downtime or uptime) to allow the developer to select the cloud service based on this information. ACSml also will provide means to monitor the CSPs to check if the parameters agreed in the SLA are violated or not.</p>	MCSLA Editor, ACSml, ADAPT	2
ARR08 Objective Measures of Performance in Multi-cloud	<p>ACSml monitoring will define the metric/parameters to be monitored for each NFR. ACSml monitoring will monitor these parameters in the CSPs and will send an alert to ADAPT (violation handler) in case any of the measured metrics do not fulfil the agreed SLA. The metrics will be defined in the next months of the project</p> <p>Minimum measures to be provided: Average availability, service downtime, number of re-deployments, time spent for each re-deployment, SLA improvement after each redeployment and time between re-deployments</p>	ACSml, ADAPT	2

Business requirements	Description	Linked KR	Fulfilment
ARR09 Automatic deployment tools	ADAPT should include tools based on the container technology in order to automate all the deployments.	ADAPT	2

### 2.3.3 EXPERIS

Business requirements	Description	Linked KR	Fulfilment
EXPR01 Requirements tracking	Take into account the client's requirements during the project's lifecycle so developers can respond to them efficiently.	DevOps Framework, ARCHITECT, OPTIMUS, ADAPT	7
EXPR02 Deployment configurations	Reduce deployment time and costs by easing the deployment of applications in multi-cloud environments.	ADAPT	2
EXPR03 Environment replication	Replicate the production environment easily to allow the execution of tests on real data without huge hardware costs.	ADAPT	2
EXPR05 Maintenance	Do maintenance tasks without shutting down the whole system.	ADAPT	4
EXPR06 Service monitoring	React quickly to errors in the application by monitoring microservices and managing alerts.	ACSml, ADAPT	1
EXPR07 Unsupervised operation	Have the applications to be reconfigured automatically in case of violations of the NFRs so that the client receives a better service.	ADAPT	1
EXPR08 Patterns	Obtain implementation, deployment and optimization patterns to reduce development time and costs.	DevOps Framework, ARCHITECT	8
EXPR09 Code monitoring	Improve agility in development by having a centralized point to	DevOps Framework	8



Business requirements	Description	Linked KR	Fulfilment
	monitor code quality and access build tools.		

### 2.3.4 Business requirements

The different use cases aim at obtaining a series of operational benefits by using DECIDE. These benefits are listed as business KPIs in the DoA and repeated here. Their fulfillment will be analyzed in the second version of the use cases evaluation deliverable (D6.6).

KPI	Description
KPI EI1.1	Reduce time-to market by 20%, both before the application is deployed and when the application is running and needs to be re-configured and re-adapted.
KPI EI2.1	Increase architecting and development productivity by 20% thanks to the DECIDE ARCHITECT.
KPI EI2.3	Increase deployment and operation productivity by 25%, thanks to ACSml and DECIDE OPTIMUS.
KPI EI2.4	Decrease the time needed to contract cloud services, thanks to the ACSml by 70%.
KPI EI2.5	Decrease the re- deployment time needed when an application cannot be automatically self-adapted and redeployed by 30% by providing the operator with the cause of malfunctioning or violation of the MCSLA of the application through DECIDE ADAPT.

### 3 Integration Analysis

This section aims to describe the integration mechanisms used in DECIDE. As explained before, there are two levels of integration in DECIDE: at information level, by means of the Application Description, and at a GUI level.

The **Application Description** is the main mechanism for sharing information amongst KRs: it consists of a structured JSON file that contains all the information about the current status of the multi-cloud application, that is, the information that is important for the different DECIDE Key Results, tools and components to work properly. Some of the data contained in this file is provided by the user from the DevOps Framework, by means of various wizards that request the necessary information when it is needed, while some other is included in the Application Description by the Key Results themselves, without user intervention. The Application Description is described in depth in deliverable D2.5 [6].

Some of the data required by the DECIDE tools is considered sensitive data, such as user credentials or billing information. The application description is a public document and as such is not suitable for storing this type of information. For those cases, when KRs need to obtain a certain piece of sensitive information, a secret sharing system will be implemented. This system will be described in detail in deliverable D2.7 Intermediate DECIDE DevOps Framework Integration, but this section will also detail the sensitive data needs of each tool.

At a **GUI** level, all the KR's graphical interfaces are integrated in the DevOps Framework. On one hand, the Dashboard gives an overview of the code quality metrics from Jenkins and SonarQube and of each KR's most relevant information, such as ARCHITECT's selected patterns, or the result of the OPTIMUS simulations. On the other hand, for some of the tools, the DevOps Framework builds their GUI in their corresponding tab with the information obtained calling the tool's API. For some others, the tool provides an iframe that is embedded straight in the DevOps Framework. The selection of one strategy or the other depended mostly on the complexity and level of maturity of the particular tool, tending to use API invocation for the least complex tools. This section will describe the GUI integration strategy for the DECIDE Key Results, which is summarized in the following table:

**Table 2.** GUI integration strategy for the DECIDE tools

Tool	Iframe-based GUI integration	API-based GUI integration
Dashboard		x
ARCHITECT		x
OPTIMUS		x
ACSml Discovery	x	
ACSml contracting	x	
ADAPT		x

#### 3.1 Key Result 1 – DevOps Framework

##### 3.1.1 Sensitive data

The DevOps Framework is in charge of managing users and their applications, so it needs to handle user credentials.

It also needs access to the Git repository where the code is located, so it requires the Git URL and token (alternatively Git username and password).

**Table 3.** DevOps Framework's sensitive data

Field		Type	Description
<i>username</i>		String	Name of the user accessing DECIDE
<i>password</i>		String	Password for accessing DECIDE
<i>decideProjects</i>			
	<i>gitRef</i>	String	URL of Git where project is located
	<i>token</i>	String	Git token
	<i>username</i>	String	Git username
	<i>password</i>	String	Git password

### 3.1.2 GUI Integration

The DevOps Framework includes, on one hand, a Dashboard that shows relevant information from all KRs in a unified view. This view also includes information from Jenkins and SonarQube. This section will describe this integration.

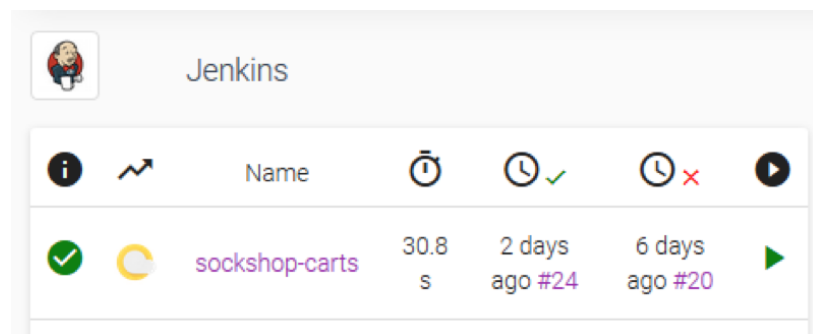
On the other hand, it integrates the GUI of each KR in their corresponding tab. These integrations will be described in the *GUI integration* subsection of the following sections.

#### Jenkins

Jenkins provides access to a series of variables through its API, which are listed below:

- Name
- URL
- Health report
- State
- Last build
- Last successful build
- Last failed build
- Builds

These variables are then displayed in the Dashboard as shown by the following figure:

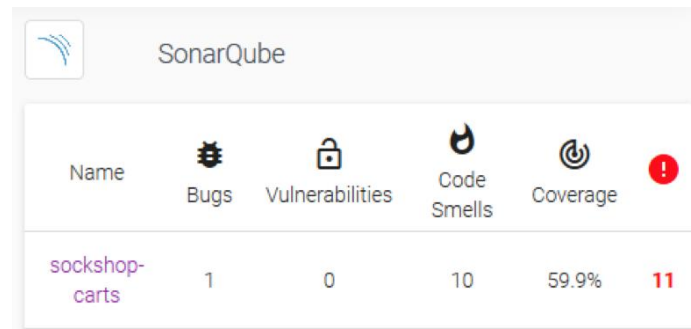
**Figure 2.** Jenkins integration in the DevOps Dashboard

### **SonarQube**

SonarQube provides the following variables:

- Bugs
- Vulnerabilities
- Code smells
- Coverage
- Violations

These variables are displayed in the Dashboard as shown by the following figure:



**Figure 3.** SonarQube integration in the DevOps Dashboard

### **ARCHITECT**

For ARCHITECT, the following information is displayed:

- Selected NFRs
- Selected patterns

### **OPTIMUS**

OPTIMUS provides the following variables:

- Microservice ID and associated tag
- Simulation schema

### **ADAPT**

For ADAPT, information relative to the deployment of the application is shown:

- Monitoring ID
- Status of the deployment

The following figure shows how the aforementioned variables are displayed in the Dashboard:

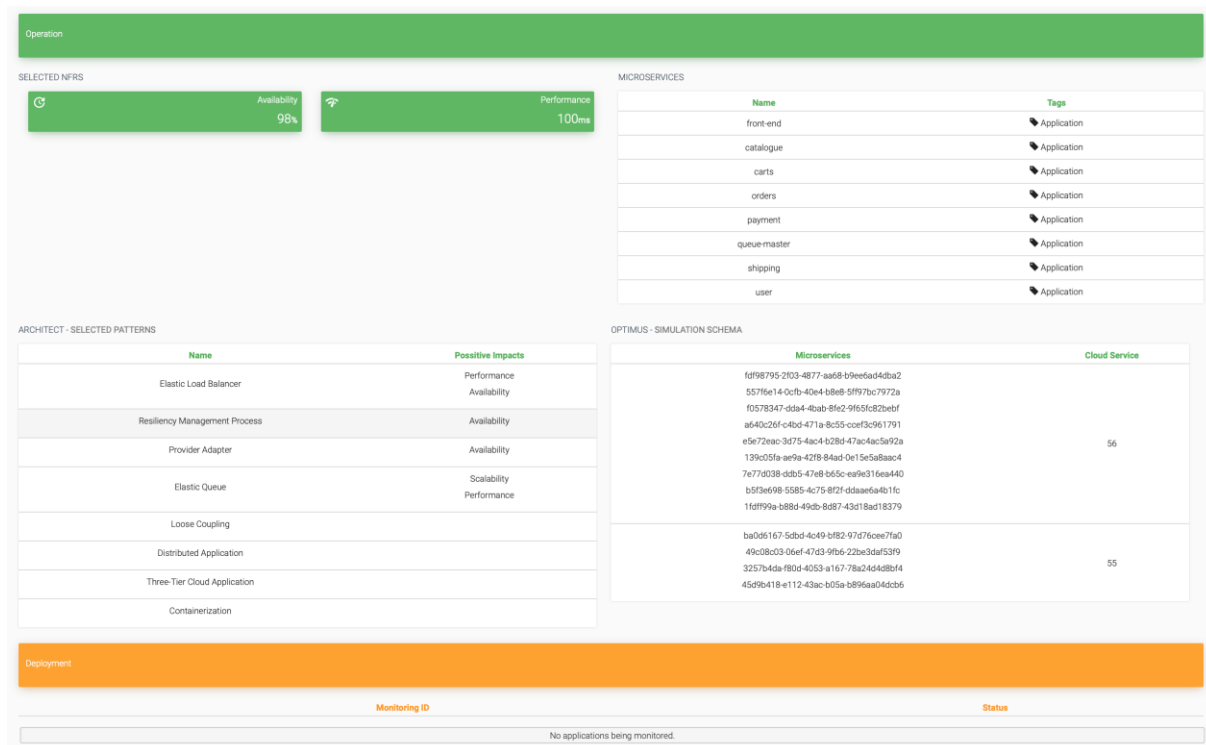


Figure 4. Overview of Key Results data on the DevOps Framework Dashboard

## 3.2 Key Result 2 - ARCHITECT

### 3.2.1 Sensitive data

The Cloud Patterns Compendium [7], which is the backend service for ARCHITECT and contains the list of patterns and the recommendation engine, does not need access to the application description. The Dashboard can use the ARCHITECT tool functionality in a stateless manner. Therefore, no sensitive data is required to operate.

### 3.2.2 GUI Integration

The GUI of the ARCHITECT tab in the DevOps Framework is implemented directly from the Dashboard. The Dashboard is also responsible for managing the application description. The Cloud Patterns Compendium, which is main representative of ARCHITECT, provides the complete logic and functionality of the pattern recommendation. The Dashboard integrates the following functionalities:

1. Display the current recommended and basic patterns for the currently selected DECIDE project.
2. Display the relations to NFRs.
3. Display the selection of patterns.
4. Allow selection and deselection of recommended and basic patterns.
5. Display details of a pattern.

The Cloud Patterns Compendium provides a REST interface for point 1 and 5. The recommendation function returns information for Point 2. The Dashboard handles Point 3 and 4 as this requires access to the application description.

The following figure shows a screenshot of ARCHITECT's GUI:

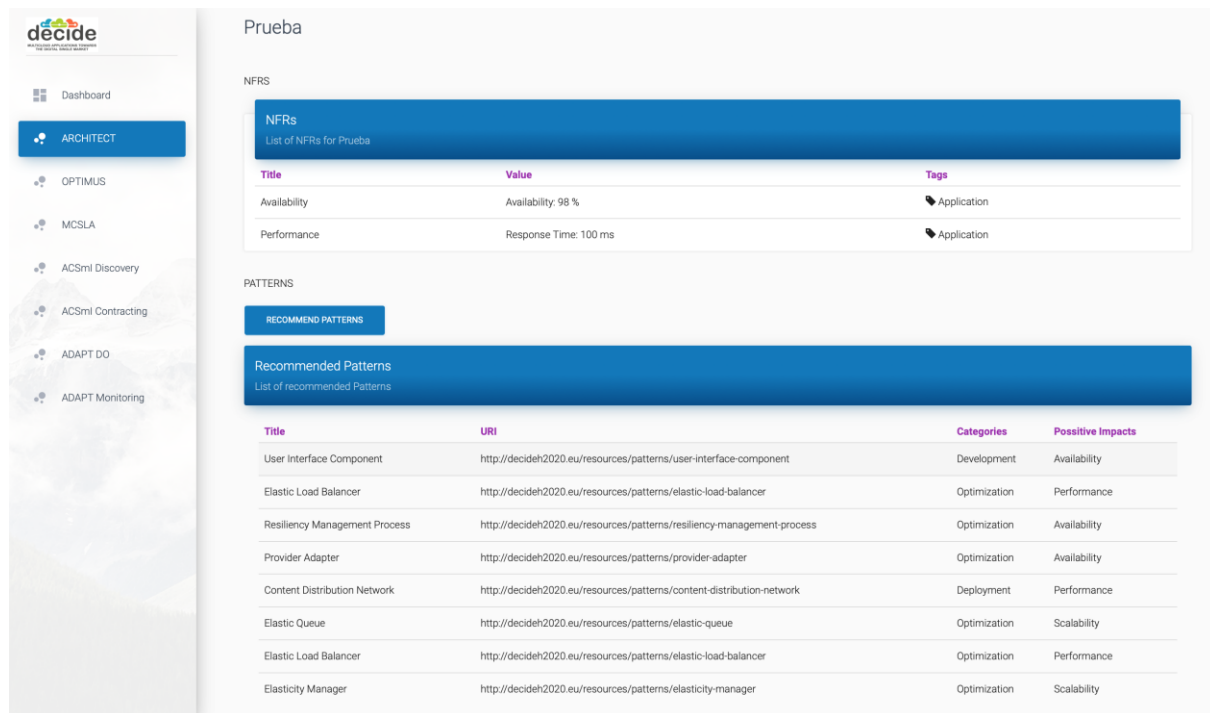


Figure 5. ARCHITECT's GUI

### 3.3 Key Result 3 - OPTIMUS

#### 3.3.1 Sensitive data

OPTIMUS needs the user's credentials for accessing the Application Description JSON file:

Table 4. OPTIMUS' sensitive data

Field	Type	Description
<i>username</i>	String	Username of the git where the Application Description JSON file is stored.
<i>password</i>	String	The password corresponding to the user of Git repo.

#### 3.3.2 GUI Integration

The OPTIMUS tool is developed as an eclipse plugin to be downloaded by the developer to use it locally. The details about the method for that installation will be placed in the DevOps Framework in the area related to OPTIMUS.

Moreover, the OPTIMUS tab in the DevOps framework shows the number of simulations launched as it is described in Figure 6. That information is obtained for the DevOps framework invoking to a service provided by the API REST of OPTIMUS.

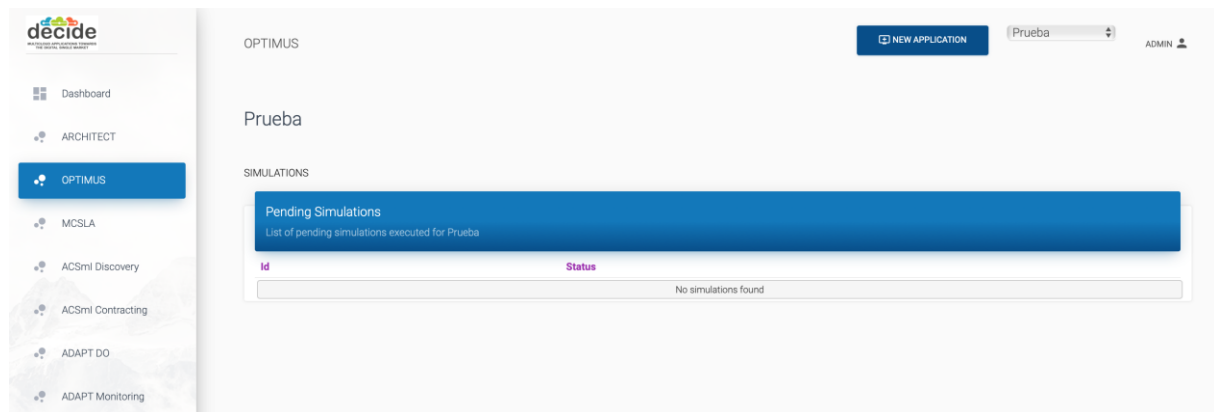


Figure 6. OPTIMUS tab in DevOps Framework

## 3.4 Key Result 4 - ACSmI

### 3.4.1 ACSmI Discovery

#### 3.4.1.1 Sensitive data

ACSmI Discovery requires user credentials to be accessed:

Table 5. ACSmI Discovery's sensitive data

Field	Type	Description
<i>username</i>	String	Username of the account registered in ACSmI Discovery
<i>password</i>	String	The password corresponding to the account registered in ACSmI Discovery

#### 3.4.1.2 GUI Integration

ACSmI discovery has its own GUI. In the ACSmI discovery tab in the DevOps Framework, an iframe with the ACSmI Discover GUI component is integrated. The URL to be accessed by the iframe is the one where the ACSmI Discovery front-end component is deployed.

The following figure shows the ACSmI Discovery's GUI integrated in the DevOps Framework

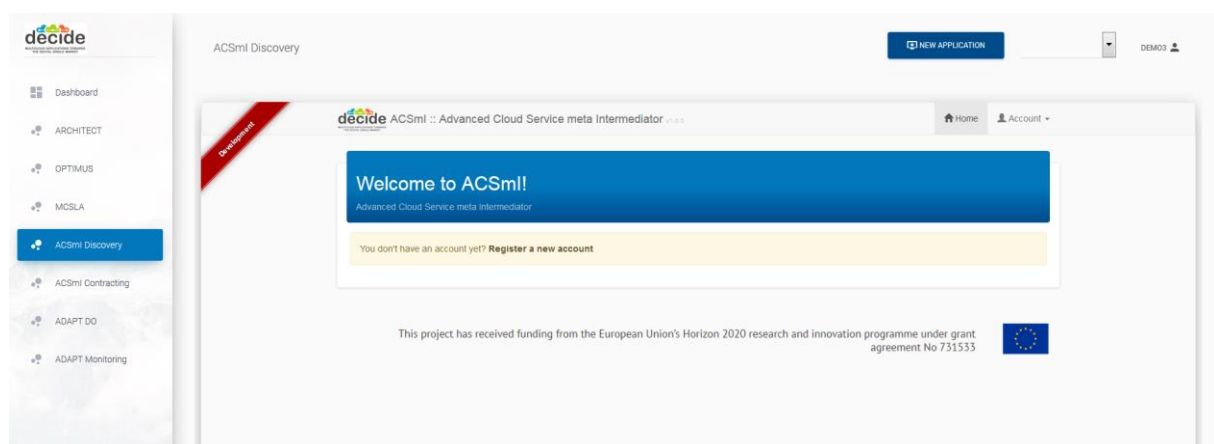


Figure 7. ACSmI discovery tab in DevOps Framework

### 3.4.2 ACSmI Contracting

#### 3.4.2.1 Sensitive data

The following table shows the sensitive data required by ACSmI contracting:

**Table 6.** ACSmI Contracting's sensitive data

Field		Type	Description
User information for contracting		List	
	<i>email</i>	String	Email to be used for contracting as well as for the account creation within ACSmI
	<i>password</i>	String	Password of the ACSmI user account
	<i>full_name</i>	String	User's full name to be used for contracting
	<i>organization</i>	String	Name of the organization user belongs to
	<i>address</i>	String	Address of the user or his/her organization
Contracting result		List	
	<i>cloudbroker_url</i>	String	URL pointing to the installation of the CloudBroker Platform (CBP) to be used
	<i>cloudbroker_email</i>		Email of the user account on the CBP that was registered during contracting
	<i>cloudbroker_password</i>		Email of the user account on the CBP that was registered during contracting
	<i>own_credentials</i>		Credentials to access cloud resource provided by user
DECIDE git repo		List	
	<i>gitRef</i>	String	URL of the repository containing the application description
	<i>token</i>	String	Token for accessing the Git repository

#### 3.4.2.2 GUI integration

ACSmI Contracting's GUI is embedded in the DevOps Framework UI using an iframe, as shown in the figure below:



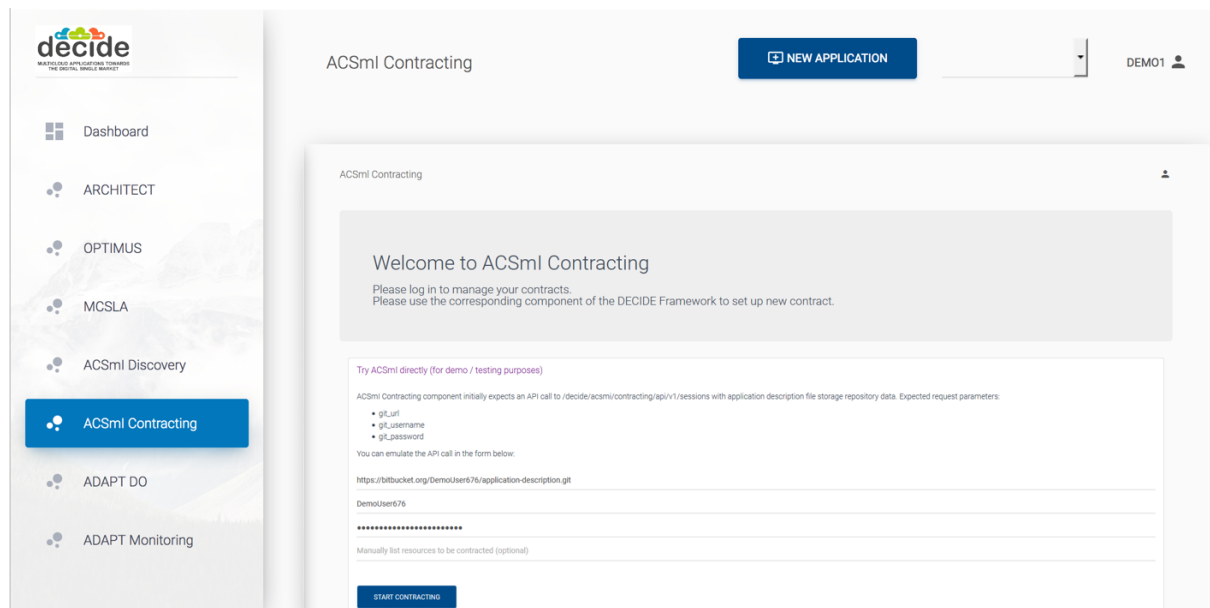


Figure 8. ACSmI Contracting tab in DevOps Framework

## 3.5 Key Result 5 - ADAPT

### 3.5.1 Sensitive data

ADAPT needs access to the following sensitive variables:

Table 7. ADAPT's sensitive data

Field		Type	Description
<i>username</i>		String	Username of the account registered in the DevOps framework
<i>password</i>		String	Password of the account registered in the DevOps Framework
<i>cloudbroker_username</i>		String	Username to access the cloud broker platform APIs
<i>cloudbroker_password</i>		String	Pwd to access the cloudbroker platform APIs
<i>cloudbroker_keypairs</i>		List	
	publicKey	String	Public key stored in the cloud broker user profile, injected in the vms started on the cloudbroker-managed clouds
	privateKey		Private key which allow ssh access to the vms
	keypair-id		An identifier specific to the cloudbroker platform, which maps a keypair. It is needed by ADAPT DO as input parameter to pass to the cloudbroker APIs during the VM provisioning
<i>decideProjects</i>		List	List of the DECIDE projects created by the logged user

Field		Type	Description
	<i>name</i>	String	Name of the DECIDE project
	<i>gitRef</i>	String	URL of the repository containing the application description
	<i>password</i>	String	Password for accessing the Git repository
dockerRegistries		List	List of the private Docker registries required to run an application. In principle, I think it should be a List within the decideProjects (every DECIDE project may have to access [0..n] private registries)
	<i>username</i>		
	<i>password</i>		
	<i>docker_registry_ip</i>		
	<i>certificate</i>	Cert file	Certificate required to access the repo

### 3.5.2 GUI Integration

ADAPT is composed of two main sub components:

- ADAPT Deployment Orchestrator (DO), which is responsible for starting the runtime infrastructure.
- ADAPT Monitoring Manager (MM), which displays monitoring data.

ADAPT DO is a backend component which is invoked automatically by the other components (e.g. the DevOps framework). It does not require a dedicated GUI for executing the deployment, but just a dashboard that allows to see what the status of the deployment actions performed is. Anyway, as an intermediate version facilitating the integration testing, ADAPT DO currently also provides buttons and form fields to be filled up to manually trigger actions.

We document in the following such extended version.

ADAPT DO GUI can be accessed from a dedicated tab in the DevOps framework. The GUI displays, in the upper side of the layout, a set of forms and buttons which must be filled in or pressed in order to invoke the ADAPT DO REST API. Such fields, together with the buttons, will be automatically filled in/pressed by the DevOps framework and hidden from the interface in the final scenario.

**Figure 9** depicts such area of the GUI, where all the forms representing the input data required by ADAPT DO are shown. After filling in the forms, the “submit preparation step” button can be pressed, to let ADAPT DO create preparation data and environment for the next operations.

Preparing environment

ADAPT endpoint

IP: 178.22.69.102 PORT: 8473

Application

APPLICATION NAME: Socks-shop

CloudBroker

ENDPOINT: https://decide-prototype.cloudbroker.com

USERNAME: decide@decide.eu PASSWORD: \*\*\*\*\*

Git

URL: https://git.code.tecnalia.com/decide/adapt-do-demo.git

USERNAME: [FILL WITH YOUR GIT/DECIDE-USER] PASSWORD: \*\*\*\*\*

REVISION: HEAD FILEPATH: Socks-shop/application-descriptor.json

MONITORING HOST: 85.91.40.245 MONITORING PORT: 8088

[SUBMIT PREPARATION STEP](#)

Deployment steps

DECIDE D2.2 Det...doc

Show all

**Figure 9.** Input section for the ADAPT DO GUI

The bottom part of the GUI (cf. **Figure 10**), instead, provides a set of buttons to invoke the ADAPT DO endpoints and verify the operation status. Some of the ADAPT DO operations are time consuming (e.g. the deployment of new virtual machines on cloud providers, or the installation of software on them); therefore, once a button is pressed, a status icon representing the progress of the current operation is displayed on the GUI, together with a list of textual data which shows IDs of the operations, target environments and the status itself.

Deployment steps

1. INIT INFRASTRUCTURE

id: operation: init  
environment: infrastructure  
status: off

2. PLAN INFRASTRUCTURE

id: operation: init  
environment: infrastructure  
status: off

3. APPLY INFRASTRUCTURE

id: operation: init  
environment: infrastructure  
status: off

4. INIT SERVICES

id: operation: init  
environment: services  
status: off

5. PLAN SERVICES

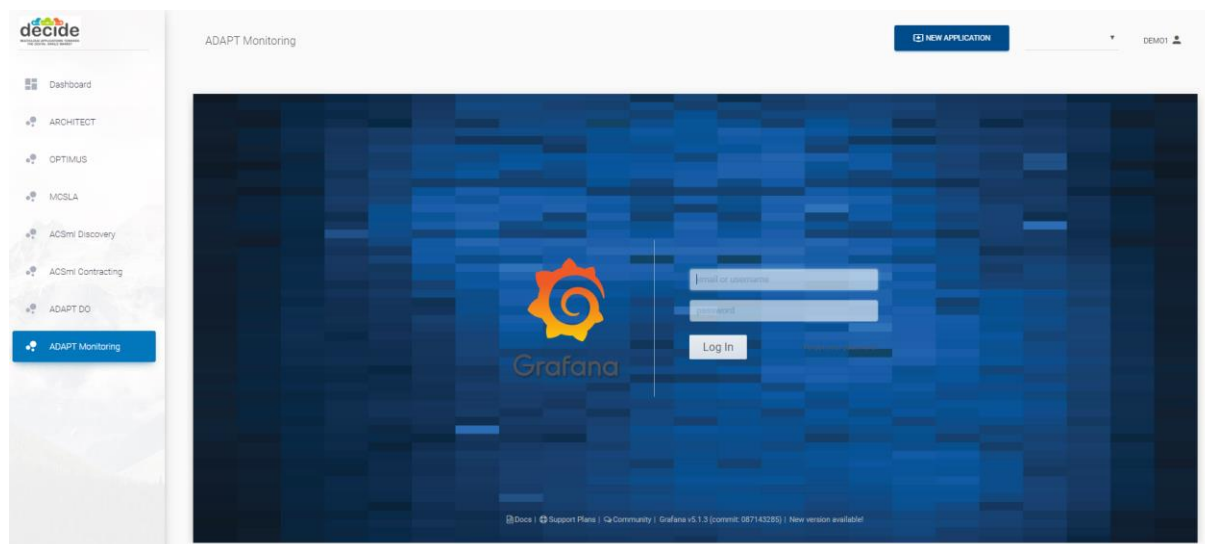
id: operation: init  
environment: services  
status: off

6. APPLY SERVICES

id: operation: init  
environment: services  
status: off

**Figure 10.** Area of the GUI dedicated to the buttons for triggering operations

The ADAPT MM GUI can be as well accessed by a dedicated tab on the DevOps framework sidebar. By pressing such tab, we land on the Login page of the Monitoring framework, as shown in **Figure 11**. After logging in, the user lands to the set of pages dedicated to the monitoring of the deployed application, whose details are documented in deliverable “D4.7 – Initial multi-cloud application monitoring” [8].



**Figure 11.** Login page for the ADAPT Monitoring Manager

## 4 Conclusions

This deliverable has provided an update on the status of the requirements of the different DECIDE tools.

As the project progressed, following the first implementation of the tools and the preliminary evaluation of the use cases, the functionalities and scope of the Key Results became clearer for all partners at this stage, so a revision of the requirements in terms of expected delivery date, scope and responsible components for them was conducted, according to the requirements elicitation process. New needs were also identified and some of the original requirements were assigned a different responsible component to reflect the current status of the project. All these changes are reflected in the deliverable.

The degree of progress is as expected, and the requirements that had to be implemented by this version are already available, with some exceptions that are properly justified.

The sensitive data that each Key Result has to handle have also been detailed, since they will be shared amongst the KRs using a secure mechanism.

Finally, the document has described how the graphical interfaces of the DECIDE components are integrated in the DevOps Framework, both in the Dashboard and in their respective tabs.

This updated list of requirements will serve as the basis for the implementation of the second and final versions of the DECIDE tools, which will be delivered on M24 and M30, with integrated versions scheduled in M27 and M33.

## 5 References

- [1] DECIDE Consortium, DECIDE D2.1 Detailed Requirements Specification v1, 2017.
- [2] DECIDE Consortium, DECIDE D6.2 Final use case requirements capture, 2018.
- [3] DECIDE Consortium, DECIDE D2.3 Integration and validation strategy, 2017.
- [4] DECIDE Consortium, DECIDE D6.1 Initial use case requirements capture, 2017.
- [5] DECIDE Consortium, DECIDE D6.5 Use cases evaluation v1, 2018.
- [6] DECIDE Consortium, DECIDE. D2.5 Detailed architecture v2, 2018.
- [7] DECIDE Consortium,, “DECIDE D3.1 Initial architectural patterns for implementation deployment and optimization,” 2017.
- [8] DECIDE Consortium, DECIDE D4.7 Initial multi-cloud application monitoring, 2017.
- [9] DECIDE Consortium, “DECIDE D4.2 Intermediate DECIDE ADAPT Architecture,” 2018.

## Appendix. Revised functional requirements

This section presents the updated requirements list. *Source* indicates the origin of the requirement, those that have been identified during the second revision have been marked as “New identified need”. Version indicates whether the requirement has been modified (tagged as V2) or remains as it was elicited (tagged as V1). The field *Priority* can have the values *Low*, *Medium* and *High*, according to the prioritization carried out in deliverable D2.3 [3]. *Status* can be *Finished* (if the requirement has been implemented), *Work in progress*, *Delayed* or *Rejected*. Finally, the comment sections at the end of each requirement explains the reasons for its modification.

### 5.1.1 Key Result 1

#### 5.1.1.1 DevOps Framework

<b>Req. ID</b>	KR1-REQ1
<b>Req. Short Title</b>	Entry point
<b>Req. Description</b>	The system must provide the user with an entry point to DECIDE
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Integration
<b>Supported Functionality of the DevOps FW</b>	Integration
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	-

<b>Req. ID</b>	KR1-REQ2
<b>Req. Short Title</b>	UI unification
<b>Req. Description</b>	The system must unify transparently the UIs from the different KRs
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Integration
<b>Supported Functionality of the DevOps FW</b>	Integration
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	The current version of the tools' GUI has been integrated, although the tools will evolve making it necessary to update the GUI integration. The M15 deadline referred to integrating the M12 versions of the tools. Since said tools are evolving and their new GUIs will have to be integrated, the requirement is considered as “Work in progress”.

<b>Req. ID</b>	KR1-REQ3
<b>Req. Short Title</b>	Generic UI

<b>Req. Description</b>	The system must provide a generic DECIDE UI
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	The DevOps Framework includes a dashboard that unifies information from all tools.

<b>Req. ID</b>	KR1-REQ4
<b>Req. Short Title</b>	Patterns reception
<b>Req. Description</b>	The system must receive ARCHITECT's patterns
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	-

<b>Req. ID</b>	KR1-REQ5
<b>Req. Short Title</b>	Development environment-Patterns
<b>Req. Description</b>	The developer must have access to a development environment with the received patterns
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Rejected
<b>Comment</b>	The patterns provided by ARCHITECT do not include code snippets that can be received by a development environment.

<b>Req. ID</b>	KR1-REQ6
<b>Req. Short Title</b>	Development environment-Configurations
<b>Req. Description</b>	The developer must have access to a development environment with preloaded DECIDE configurations.
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development



<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	DECIDE platform will allow its users to import Application Description files, which would load a certain DECIDE configuration.

<b>Req. ID</b>	KR1-REQ7
<b>Req. Short Title</b>	Code submission
<b>Req. Description</b>	The system must allow the developer to submit their code
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	Medium
<b>Priority</b>	High
<b>Deadline</b>	M27
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	This functionality is provided by Eclipse

<b>Req. ID</b>	KR1-REQ8
<b>Req. Short Title</b>	Code versioning
<b>Req. Description</b>	The system must be able to version the code submitted by the developer
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M27
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Provided by Git

<b>Req. ID</b>	KR1-REQ9
<b>Req. Short Title</b>	Dependencies
<b>Req. Description</b>	The system must be able to resolve the dependencies of the submitted code
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Integration
<b>Supported Functionality of the DevOps FW</b>	Integration
<b>Source</b>	DoA

<b>Priority</b>	Medium
<b>Deadline</b>	M27
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Provided by Eclipse/Git

<b>Req. ID</b>	KR1-REQ10
<b>Req. Short Title</b>	Compilation
<b>Req. Description</b>	The system must compile the code without errors
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M27
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Provided by Jenkins

<b>Req. ID</b>	KR1-REQ11
<b>Req. Short Title</b>	Testing preparation
<b>Req. Description</b>	The system must receive the testing activities that have to be performed on the code
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Testing
<b>Supported Functionality of the DevOps FW</b>	Testing
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M27
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Provided by SonarQube

<b>Req. ID</b>	KR1-REQ12
<b>Req. Short Title</b>	Testing activities
<b>Req. Description</b>	The system must be able to perform the received testing activities
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Testing
<b>Supported Functionality of the DevOps FW</b>	Testing
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ13
<b>Req. Short Title</b>	Testing results
<b>Req. Description</b>	The system must present the results from the testing activities
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Testing
<b>Supported Functionality of the DevOps FW</b>	Testing
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ14
<b>Req. Short Title</b>	Code continuity
<b>Req. Description</b>	The system must guarantee the continuity of the code within DECIDE's workflow
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Integration
<b>Supported Functionality of the DevOps FW</b>	Integration
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ15
<b>Req. Short Title</b>	Code availability
<b>Req. Description</b>	The system must make the code available for DECIDE
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ16
<b>Req. Short Title</b>	Pattern fulfilment
<b>Req. Description</b>	The system must guarantee the fulfilment of DECIDE's patterns by the developer

<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ17
<b>Req. Short Title</b>	NFR gathering
<b>Req. Description</b>	DECIDE DevOps framework must provide support for NFR gathering
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Design
<b>Supported Functionality of the DevOps FW</b>	NFR specification
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ18
<b>Req. Short Title</b>	Qualitative NFP
<b>Req. Description</b>	The system must support developers establishing qualitative NFP that the application must comply with (i.e. security, location, financial, low/high technological risk)
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Design
<b>Supported Functionality of the DevOps FW</b>	NFR specification
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ19
<b>Req. Short Title</b>	Quantitative NFP
<b>Req. Description</b>	The system must support developers establishing quantitative NFP that the application must comply with (i.e. MBTF, availability, response time, lag, cost, throughout))

<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Design
<b>Supported Functionality of the DevOps FW</b>	NFR specification
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ20
<b>Req. Short Title</b>	(MC)SLA editor
<b>Req. Description</b>	The system must include a (MC)SLA editor
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Design (pre-deployment)
<b>Supported Functionality of the DevOps FW</b>	(MC)SLA monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ21
<b>Req. Short Title</b>	Application controller
<b>Req. Description</b>	The system must include an Application Controller
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Current deployment configuration and history
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ1
<b>Req. Short Title</b>	DECIDE framework must facilitate small and frequent updates of the code
<b>Req. Description</b>	Frequent updates
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Implementation
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DevOps Principles #1
<b>Priority</b>	Low

<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ2
<b>Req. Short Title</b>	Development infrastructure
<b>Req. Description</b>	DECIDE framework must support the automatic deployment of the infrastructure required for the development
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Development
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	DevOps Principles #6
<b>Priority</b>	High
<b>Deadline</b>	M27
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ4
<b>Req. Short Title</b>	Microservices
<b>Req. Description</b>	DECIDE framework must use microservices
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Does not apply
<b>Supported Functionality of the DevOps FW</b>	Does not apply
<b>Source</b>	DevOps Principles #2
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ5
<b>Req. Short Title</b>	Continuous integration
<b>Req. Description</b>	DECIDE framework must support the continuous integration of the developed apps
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Integration
<b>Supported Functionality of the DevOps FW</b>	Integration
<b>Source</b>	DevOps Principles #3
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ10
<b>Req. Short Title</b>	Communication
<b>Req. Description</b>	DECIDE framework must provide a way for team members to communicate with each other.
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Does not apply
<b>Supported Functionality of the DevOps FW</b>	Does not apply
<b>Source</b>	DevOps Principles #8
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ11
<b>Req. Short Title</b>	Planning
<b>Req. Description</b>	DECIDE framework must provide a way for team members to plan the development process
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Does not apply
<b>Supported Functionality of the DevOps FW</b>	Does not apply
<b>Source</b>	DevOps Principles #9
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	DEVOPS-REQ13
<b>Req. Short Title</b>	Design principles
<b>Req. Description</b>	DECIDE framework must support the application of best practices and design principles during the first phases of the development
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Development phase/Implementation
<b>Supported Functionality of the DevOps FW</b>	Development
<b>Source</b>	Extended DevOps #1
<b>Priority</b>	Low
<b>Deadline</b>	M33
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	KR1-REQ22
<b>Req. Short Title</b>	Secrets sharing

<b>Req. Description</b>	DECIDE framework must provide a way to securely share sensitive information amongst the different Key Results
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Does not apply
<b>Supported Functionality of the DevOps FW</b>	Development/Operations
<b>Source</b>	New identified need
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	It has been noticed that DECIDE must provide infrastructure for sharing sensitive data, since the application description is not suitable for this task.

<b>Req. ID</b>	KR1-REQ23
<b>Req. Short Title</b>	User management
<b>Req. Description</b>	DECIDE framework must provide a way to manage its users and the projects that these users can access
<b>Phase of Cloud service life cycle</b>	Does not apply
<b>Phase/subphase of the DevOps FW</b>	Does not apply
<b>Supported Functionality of the DevOps FW</b>	Development/Operations
<b>Source</b>	New identified need
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	If different users use the platform to work in different projects, it is necessary to provide a way to manage said user access and the projects that they have access to.

### 5.1.1.2 AppController

<b>Req. ID</b>	WP3-CONTR-REQ1
<b>Req. Short Title</b>	App Controller integration into DevOps Framework
<b>Req. Description</b>	The multi-cloud native application controller shall be integrated in the DECIDE DevOps Framework [KR1].
<b>Phase of Cloud service life cycle</b>	All
<b>Phase/subphase of the DevOps FW</b>	All
<b>Supported Functionality of the DevOps FW</b>	Shared functionality
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	It is implemented as a java library that is used by the Dashboard (and by others).



<b>Req. ID</b>	WP3-CONTR-REQ2
<b>Req. Short Title</b>	Deployment History
<b>Req. Description</b>	The multi-cloud native application controller shall hold the intelligence of the different deployment configurations that the multi-cloud application has had in its operation time. Storing these deployment configurations will allow avoiding those configurations that resulted problematic in terms of security, performance or legal awareness.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment simulation
<b>Supported Functionality of the DevOps FW</b>	OPTIMUS Backend
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	This was postponed from M12 to M24. A first implementation is available. This functionality is especially for OPTIMUS.

<b>Req. ID</b>	WP3-CONTR-REQ9
<b>Req. Short Title</b>	OPTIMUS Integration
<b>Req. Description</b>	The App Controller should maintain an interface to OPTIMUS in order to receive the chosen deployment configuration.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment simulation
<b>Supported Functionality of the DevOps FW</b>	OPTIMUS Backend
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Done and released in M12, implemented as a Java Library to be integrated into OPTIMUS.

<b>Req. ID</b>	WP3-CONTR-REQ10
<b>Req. Short Title</b>	Jenkins Integration
<b>Req. Description</b>	The App Controller must be capable of triggering other tools in the workflow. This trigger mechanism should be built into Jenkins as a plugin.
<b>Phase of Cloud service life cycle</b>	Pre-deployment and deployment
<b>Phase/subphase of the DevOps FW</b>	All

<b>Supported Functionality of the DevOps FW</b>	Workflow controlling
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Rejected
<b>Comment</b>	This was rejected, because the Dashboard itself is responsible for controlling the workflow and integrate Jenkins or other comparable tools.

<b>Req. ID</b>	WP3-CONTR-REQ12
<b>Req. Short Title</b>	Git encapsulation
<b>Req. Description</b>	The App Controller must be able to communicate via the git protocols.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	All
<b>Supported Functionality of the DevOps FW</b>	Backend
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	The java library encapsulates completely the git repository handling.

### 5.1.1.3 MCSLA Editor

<b>Req. ID</b>	WP3-CSLA-REQ1
<b>Req. Short Title</b>	Metrics
<b>Req. Description</b>	DECIDE Multi-cloud native applications definition component/tool will support the definition of the composite MCSLAs (Multi Cloud Service Level Agreement) and the corresponding SLOs (service level objectives) of the application and the dependencies and needs on the underlying (combination of) cloud services in a machine-readable format for the representation.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work In Progress
<b>Comment</b>	

<b>Req. ID</b>	WP3-CSLA-REQ6
<b>Req. Short Title</b>	Formats
<b>Req. Description</b>	The resulting CSLA shall be in machine readable format as well as a human readable format (to be shared with the end-users, i.e. customers)
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work In Progress
<b>Comment</b>	

<b>Req. ID</b>	WP3-CSLA-REQ7
<b>Req. Short Title</b>	Standard support
<b>Req. Description</b>	The representation of the CSLA will be in machine-readable format based on well-known standards especially ISO 19086.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	An adaptation of the ISO/IEC 19086 Standard is used.

<b>Req. ID</b>	WP3-CSLA-REQ8
<b>Req. Short Title</b>	MCSLA
<b>Req. Description</b>	The tool shall provide means for the app developer to set SLAs that pertain to the application and that go beyond infrastructural SLAs in order to provide it to the end-user as an MCSLA.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15
<b>Version</b>	V1
<b>Status</b>	Finished

<b>Comment</b>	When first used the tool provides an application SLA with service objectives based on the provided application level defined NFRs. The developer modifies or removes these service objectives, or add new ones. The developer can define them manually or as an aggregation of the cloud service SLAs as part of the current selected deployment scenario.
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<b>Req. ID</b>	WP3-CSLA-REQ9
<b>Req. Short Title</b>	Dashboard integration
<b>Req. Description</b>	The DevOps Framework will provide a UI for creating CSLAs/MCSLA.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	The MCSLA-Editor is integrated as an iFrame into the dashboard.

<b>Req. ID</b>	WP3-CSLA-REQ10
<b>Req. Short Title</b>	Graphical user interface
<b>Req. Description</b>	The MCSLA tool must have a GUI in order to edit the MCSLA and CSLA.
<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work In Progress
<b>Comment</b>	The MCSLA Editor is implemented in two separate components. A microservice providing a REST interface, and a web based front-end as single page application utilizing this interface. This web app can either be used in standalone mode or as a reduced (no header and navigation) variant to be used in an iFrame.

<b>Req. ID</b>	WP3-CSLA-REQ11
<b>Req. Short Title</b>	Grouping SLAs
<b>Req. Description</b>	The GUI shall offer the SLO/SLQ in a grouping manner for the purpose of clarity.

<b>Phase of Cloud service life cycle</b>	Pre-deployment
<b>Phase/subphase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	MCSLA Editor
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work In Progress
<b>Comment</b>	The GUI differentiate between non-modifiable static SLAs from the cloud services and the SLA for the end customer of the application (MCSLA). The MCSLA is displayed separated from them. Each SLA contains a list of service objectives. The GUI should provide some possibilities to change the order (by name or type).

## 5.1.2 Key Result 2

### 5.1.2.1 ARCHITECT

<b>Req. ID</b>	WP3-ARCHI-REQ1
<b>Req. Short Title</b>	Set of Multi-Cloud Patterns
<b>Req. Description</b>	
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Display a list of basic and recommended patterns.
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	In Progress
<b>Comment</b>	A first set of patterns is defined. They are described and provided through the implemented Java library. The intermediate deliverable will contain the extended set of patterns.

<b>Req. ID</b>	WP3-ARCHI-REQ3
<b>Req. Short Title</b>	Pattern recommendation
<b>Req. Description</b>	DECIDE SHALL suggest/recommend to the user (i.e. developer) architectural patterns based on his/her prioritized NFRs additional information (supplied by the user), with guidelines on how to apply them, to which component this need be applied and in which order.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Recommending patterns based on the defined NFRs.

<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	In Progress
<b>Comment</b>	An intermediate workable implementation will already be provided for M24.

<b>Req. ID</b>	WP3-ARCHI-REQ6
<b>Req. Short Title</b>	Project Wizard
<b>Req. Description</b>	The DEDICE ARCHITECT shall provide a wizard (questionnaire) to the user in order to collect information regarding the app properties.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Initialization
<b>Supported Functionality of the DevOps FW</b>	New project creation.
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	WP3-ARCHI-REQ7
<b>Req. Short Title</b>	Dashboard and Eclipse Front-end
<b>Req. Description</b>	The DECIDE ARCHITECT shall provide a UI and be integrated into the DevOps Framework. The wizard should be part of the project creation in the IDE and have an eclipse UI for subsequent changes etc.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Initialization
<b>Supported Functionality of the DevOps FW</b>	Project information gathering.
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	This is almost done. A sufficient interface is exposed that can be used by the dashboard. The dashboard still needs to complete the integration.

<b>Req. ID</b>	WP3-ARCHI-REQ8
<b>Req. Short Title</b>	Change detection
<b>Req. Description</b>	ARCHITECT needs a trigger function to be called when changes that are relevant for the pattern

	recommendation take place. For instance, application description, NFRs, etc.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Pattern recommendation
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	In Progress
<b>Comment</b>	Actually pattern recommendation is automatically applied by the user interface in place (Dashboard or eclipse plugin) when a relevant input is received.

<b>Req. ID</b>	WP3-ARCHI-REQ9
<b>Req. Short Title</b>	Selection from a list of Patterns
<b>Req. Description</b>	ARCHITECT should provide a list of patterns for the user to select from
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Pattern selection
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	The list is implemented in a Java library. It provides an interface that is used by the Eclipse GUI to recommend a list of patterns, which the user is able to select. Recommended and selected patterns are stored in the application description. A microservice wrapper is implemented which exposes a REST interface. The DevOps framework uses this interface to offer the same functionality in the dashboard as the eclipse plugin.

<b>Req. ID</b>	WP3-ARCHI-REQ10
<b>Req. Short Title</b>	Pattern repository
<b>Req. Description</b>	ARCHITECT should have a repository with the list of patterns stored in it.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Pattern repository
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M15

<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

### 5.1.3 Key Result 3

#### 5.1.3.1 OPTIMUS

<b>Req. ID</b>	WP3-PROFI-REQ1
<b>Req. Short Title</b>	Classification input
<b>Req. Description</b>	Load/read information about the application (components).
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Application (nodes and communication included) profiling/classification
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	WP3-PROFI-REQ2
<b>Req. Short Title</b>	Classify the application
<b>Req. Description</b>	Classify the application, based on the "stereotypes of the components" that we defined in the design phase of the profiling tool, and comparing it with the information about the (component) application.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Application (nodes and communication included) profiling/classification
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	Analyzing the current version and improving this classification depending on the source of the information.  Delayed because the classification could change depending on the information we decide to handle about the app and the CSs. It is an incremental requirement.

<b>Req. ID</b>	WP3-PROFI-REQ3
<b>Req. Short Title</b>	Confirm the classification
<b>Req. Description</b>	Ask the developer to confirm the classification
<b>Phase of Cloud service life cycle</b>	Development phase



<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Application (nodes and communication included) profiling/classification
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	Analyze if this Will be an action or it Will be encapsulated when the developer launches the simulation with the assigned classification

<b>Req. ID</b>	WP3-PROFI-REQ4
<b>Req. Short Title</b>	Store classification
<b>Req. Description</b>	Store the information about classification made.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	CSP modeling
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	WP3-PROFI-REQ5
<b>Req. Short Title</b>	Stereotypes updating
<b>Req. Description</b>	Mechanisms for update the "stereotypes of the components" information
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	CSP modeling
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	
<b>Req. ID</b>	WP3-OPTI-REQ1
<b>Req. Short Title</b>	Reading NFRs
<b>Req. Description</b>	The OPTIMUS tool shall be capable of reading the non-functional characteristics of the app from NFR DB
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA

<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	WP3-OPTI-REQ2
<b>Req. Short Title</b>	Reading classification
<b>Req. Description</b>	The OPTIMUS tool shall be capable of reading the classification of the app (or its componentes)
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	WP3-OPTI-REQ3
<b>Req. Short Title</b>	Building ACSml Request
<b>Req. Description</b>	OPTIMUS will analyze the app NFR and the classification (FR) in order to ask ACSml for information about cloud services that cover the requirements (F/NF) of the multi-cloud application.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	Improving the work made for the review. Working on a basic algorithm.

<b>Req. ID</b>	WP3-OPTI-REQ4
<b>Req. Short Title</b>	simulation
<b>Req. Description</b>	For each component of the multi cloud application, OPTIMUS engine builds the theoretical composition of services needed to the best possible deployment topology
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)

<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	Delayed
<b>Comment</b>	<p>V1 was: For each component of the multicloud application, OPTIMUS engine builds the theoretical composition of services needed and prepares the process (various configuration parameters and deployment topology) to simulate (normal &amp; stressful conditions) the behaviour of the component.</p> <p>Eliminated information in brackets because OPTIMUS simulates different deployment schemas and choose the five best of them, based on the information that providers give and the malfunctioning (if any) of some of the cloud services already used.</p> <p>Improving the work made for the review.</p> <p>Working on a basic algorithm, delayed because the input information could change.</p>

<b>Req. ID</b>	WP3-OPTI-REQ5
<b>Req. Short Title</b>	Ranking
<b>Req. Description</b>	Once OPTIMUS engine runs the simulations for each component of the multi cloud application, each of them will be ranked
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	<p>V1 was: OPTIMUS engine runs the simulations for each component of the multicloud application and ranks each of them</p> <p>Changed because the ranking process correspond to another requirement, not to this one.</p> <p>Improving the work made for the review, working on a basic algorithm.</p>

<b>Req. ID</b>	WP3-OPTI-REQ6
<b>Req. Short Title</b>	Algorithm
<b>Req. Description</b>	OPTIMUS shall use algorithms such as genetic algorithms, Harmony search, or Dandelion codes to provide a set of potential combinations of cloud services that fulfil the established user

	requirements. This process will go after the theoretical deployment generation and will combine the results of each of the possibilities.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP3-OPTI-REQ7
<b>Req. Short Title</b>	Showing schemas
<b>Req. Description</b>	OPTIMUS shall provide the developer with the information about the proposed deployment schema (those with the highest rank) for the application to cover the required NFR and FR, <del>and the technological risk that each of these configurations imply.</del> This will show in the UI and will require confirmation from the developer.
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	Delayed
<b>Comment</b>	V1 was: OPTIMUS shall provide the developer with the information about the proposed deployment schema (those with the highest rank) for the application to cover the required NFR and FR, and the technological risk that each of these configurations imply, i.e moving from an IaaS to a PaaS, or move from one PaaS to another. This will show in the UI and will require confirmation from the developer.  Changed because it is not the scope of the best schemas to inform about the technological risks associated to its deployment.  Delayed because it is an incremental requirement and it is being improved since the input information could change.

<b>Req. ID</b>	WP3-OPTI-REQ8
<b>Req. Short Title</b>	Alternative workflow

<b>Req. Description</b>	OPTIMUS tool can define new schema from developer side (proactively) and from results coming from ADAPT (reactively) to set up a new deployment schema, if a malfunctioning of a deployed multi-cloud application occurs
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	Improving how launch Simulation process to be invoked for ADAPT. Delayed because this part of the flow is still under discussion.

<b>Req. ID</b>	WP3-OPTI-REQ9
<b>Req. Short Title</b>	NFRs aggregation
<b>Req. Description</b>	OPTIMUS shall provide a forecast on some important system characteristics such as performance, cost, or security that can motivate an optimization decision
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP3-OPTI-REQ10
<b>Req. Short Title</b>	simulation
<b>Req. Description</b>	DECIDE OPTIMUS [...] will provide [...] automation of the provisioning resources and deployment schemas for multi-cloud native applications
<b>Phase of Cloud service life cycle</b>	Development phase
<b>Phase/subphase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Theoretical deployment generation Simulation (deployment)
<b>Source</b>	DoA
<b>Priority</b>	-
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Rejected

<b>Comment</b>	Rejected because it is already included in WP3-OPTI-REQ4, WP3-OPTI-REQ5 AND WP3-OPTI-REQ7
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## 5.1.4 Key Result 4

### 5.1.4.1 ACSmI Discovery

<b>Req. ID</b>	WP5-DIS01
<b>Req. Short Title</b>	Endorse services
<b>Req. Description</b>	CSPs or the ACSmI administrator (for Large CSPs) register(s) one of its services or large CSP's services in the service registry. The registry of each service shall cover the different terms defined in the modelling of the CSPs and their services. This will allow the discovery of the services from the registry.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Pre- deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Create and update the service registry into the ACSmI
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	The modelling of the Cloud service offerings has been changed during the project. The terms covered in M24 are more complete than the one covered in M12.

<b>Req. ID</b>	WP5-DIS02
<b>Req. Short Title</b>	Specify a set of (non-)functional requirements to discover the services.
<b>Req. Description</b>	The (non-functional) requirements of the multi-cloud application shall be collected by OPTIMUS and passed to the ACSmI so that services from the service registry fulfilling such requirements can be discovered. The requirements will be specified following the different terms defined for the modelling of the CSPs and their services. This allows an automatic comparison of the requirements with the services stored in the registry. The communication with OPTIMUS will be done through an API provided by OPTIMUS
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Cloud services discovery
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Finished

<b>Comment</b>	The interface with OPTIMUS is provided by ACSml through an API.
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<b>Req. ID</b>	WP5- DIS03
<b>Req. Short Title</b>	Discover Services
<b>Req. Description</b>	The objective is to provide a list of services from the services registry that fulfil (totally or partially) the requirements specified by the DECIDE operator.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Cloud services discovery
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	

<b>Req. ID</b>	WP5-DIS05
<b>Req. Short Title</b>	Benchmark of services
<b>Req. Description</b>	The discovered services (WP5-DIS03) shall be prioritized. Depending on the level of fulfilment of the NFRs expressed by the DECIDE operator, the discovered services will be sent back to DECIDE operator in the form of a sorted list, indicating the degree of fulfilment.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Cloud service discovery
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	Percentage of the fulfilment and details on which are the search conditions are fulfilled.

<b>Req. ID</b>	WP5-DIS06
<b>Req. Short Title</b>	User management.
<b>Req. Description</b>	The objective is to provide means to create, read, update and delete (CRUD) the users' registry. When creating a new user, a role shall be assigned to him, and based on this role, the allowed activities to be performed shall be associated to this user.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	User management

<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	The management of the user with the role of developer or-multicloud application owner is going to be carried out by the DECIDE Framework. ACSmI will take care the management of the CSPs users.

<b>Req. ID</b>	WP5-DIS07
<b>Req. Short Title</b>	Service registry management
<b>Req. Description</b>	The registry shall record not only information provided by the CSPs, but also other information such as which multi-cloud application is using the service, SLAs violations, legal compliance and so on.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Pre-deployment
<b>Supported Functionality of the DevOps FW</b>	Cloud service discovery
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-DIS08
<b>Req. Short Title</b>	Dashboard management
<b>Req. Description</b>	The objective is to handle the dashboard that shall be personalised depending on the role of the ACSmI users. ACSmI shall customise the dashboard to show users only the allowed tasks to be performed.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Dashboard management
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-DIS09
<b>Req. Short Title</b>	Service withdrawal
<b>Req. Description</b>	The objective is to remove a service from the service registry so that it cannot be used any more in the discovery process. To remove a service from the registry, the multi cloud applications using those services have to



	be considered, in order to alert them of the withdrawal of the service and to provide them with an alternative solution.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation Application monitoring
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

#### 5.1.4.2 ACSmI Contracting

<b>Req. ID</b>	WP5-BUS02
<b>Req. Short Title</b>	Implement the procedures to get access to a service
<b>Req. Description</b>	The objective is to implement the features that facilitate the multi-cloud application operator to get access to the service. ACSmI shall provide the multi-cloud application operator with details of how the access can be obtained. It is (often) impossible to get instant access to some resources. The CSP may request detailed information from the multi-cloud application operator. After the CSP checks the information and decides that the multi-cloud application operator can be allowed to the service, the multi-cloud application operator gets appropriate access.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud services contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-BUS07
<b>Req. Short Title</b>	Contract a cloud service in the ACSmI
<b>Req. Description</b>	This requirement shall allow contracting a service or services in the ACSmI for a certain multi-cloud application owner. And ACSmI when receives the contract from the multi-cloud application owner, it contracts this service to the proper CSP.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation

<b>Supported Functionality of the DevOps FW</b>	Cloud services contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	For the release of M24, advanced contracting procedures are going to be defined and implemented. In the release of M12 a simple contracted procedure was defined.

<b>Req. ID</b>	WP5-BUS08
<b>Req. Short Title</b>	Contract a cloud service in the ACSml
<b>Req. Description</b>	This requirement shall allow developer to contract a service or services directly with the CSP. ACSml will require the information for the contracted services (SLAs) to be included in the registry and to be monitored.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud services contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	The number of CSPs for contracting services will be increased in this release. At least, AWS, Cloud Sigma and ARSYS

<b>Req. ID</b>	WP5-BUS09
<b>Req. Short Title</b>	Manage connectors
<b>Req. Description</b>	This requirement shall generate the APIs required to contract the services and monitor them in different CSPs. This requirement is closely related to the BUS02 requirement.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	The number of CSPs for contracting services will be increased in this release. At least, AWS, Cloud Sigma and ARSYS

**5.1.4.3 ACSmI Monitoring**

<b>Req. ID</b>	WP5-MON01
<b>Req. Short Title</b>	Define the firewall port (Standard open ports)
<b>Req. Description</b>	The objective is to define a default firewall policy to be established before every deployment to cover the needs of open and closed ports necessary to ensure the correct application running once deployed in the multi-cloud environment.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	Other
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-MON02
<b>Req. Short Title</b>	Define the monitoring method
<b>Req. Description</b>	<p>The objective is to offer the "push" and "pull" monitoring methods.</p> <ul style="list-style-type: none"> <li>• “Push Monitoring” means: Clean monitoring. No additional facilities or agents required. As it does not need additional software installation, the monitoring activities will not impact the performance.</li> <li>• “Pull Monitoring” means: Full monitoring. Depending on the technology used by the CSP, it shall be necessary to install different types of software / agents on the cloud server where the application is deployed.</li> </ul> <p>This method allows monitoring any aspect/parameter/process of both the application and the Cloud Server. It is more accurate than the Push Monitoring</p>
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	Other
<b>Priority</b>	Low
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Rejected
<b>Comment</b>	According to the approach following in ACSmI, only the push monitoring method is going to be used, so it is not needed to define the monitoring method because just

	push one is implemented. This requirement is substituted by WP5-MON10
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<b>Req. ID</b>	WP5-MON03
<b>Req. Short Title</b>	Define the monitoring parameters
<b>Req. Description</b>	The objective of this requirement is to relate the different SLA terms and NFRs, to the parameters to be monitored by ACSml. This shall generate a generic list of parameters to be monitored for each NFR and SLA term.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	In M12, the NFRs taken into account to derive the associated parameters was: <ul style="list-style-type: none"> <li>Availability of the Cloud service</li> </ul> For M24, the associated parameters for the rest of the NFRs have been defined performance and locatio

<b>Req. ID</b>	WP5-MON04
<b>Req. Short Title</b>	Manage the list of parameters to be monitored
<b>Req. Description</b>	Based on the SLA contracted and the NFRs, the list of parameters to be monitored shall be selected from the generic list of parameters (MON03)
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	ADAPT will launch the Cloud services monitoring telling ACSml which services of the ACSml service should be monitored. ACSml is responsible to consult the type of the services and the parameters to be monitored.

<b>Req. ID</b>	WP5-MON05
<b>Req. Short Title</b>	Check MCSLA from the DECIDE DevOps Framework
<b>Req. Description</b>	The objective is to gain access to the composite MCSLA created by the DECIDE DevOps framework in order to parse the parameters to be monitored.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring

<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Rejected
<b>Comment</b>	Due to the approach followed, now it is not required to access to the MCSLA. ADAPT monitoring launches the cloud offering monitoring providing the services to be monitored

<b>Req. ID</b>	WP5-MON06
<b>Req. Short Title</b>	Alert of an SLA violation
<b>Req. Description</b>	If a SLA parameter is violated, means to alert the operator (ADAPT VH) about which parameters have been violated in order to create a new deployment configuration shall be put in place. This shall ensure a more reliable service.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	For M24, it has been agreed that ACSmI alerts to ADAPT VH about the violations. And ADAPT VH is responsible to take care of all the activities that this violation required .The parameters associated are availability, performance and location.

<b>Req. ID</b>	WP5-MON07
<b>Req. Short Title</b>	Get monitored values for a given parameter
<b>Req. Description</b>	The objective of this requirement is to provide the ACSmI user with the current and historical values of the parameters that are being monitored according to the SLA terms.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	Work in progress

<b>Comment</b>	Postponed to M30 to validate if this requirement is useful for the user
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<b>Req. ID</b>	WP5-MON08
<b>Req. Short Title</b>	Assess the CSP's SLA
<b>Req. Description</b>	A SLA Assessment has to take place as it provides insight on whether the CSPs will fulfil the SLA in its entirety or whether it needs to be re-evaluated, amended or undergo through changes.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-MON09
<b>Req. Short Title</b>	Get log of violations
<b>Req. Description</b>	All violations shall be logged and the log shall be obtainable by the users. The log shall hold the following parameters and values: <ul style="list-style-type: none"> <li>• CSP Id/info</li> <li>• Violated parameters</li> <li>• Value of violated parameters</li> <li>• Time and date of parameters</li> </ul> The log should be read only, hashed and signed by ACSml
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-MON10
<b>Req. Short Title</b>	Support push monitoring method
<b>Req. Description</b>	"Push Monitoring" means that no facilities or agents required. As it does not need additional software installation, the monitoring activities will not impact the performance.
<b>Phase of Cloud service life cycle</b>	Operation
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring

<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	Other
<b>Priority</b>	Low
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	New
<b>Comment</b>	According to the approach followed in ACSmI, only the push monitoring method is going to be used, so it is not needed to define the monitoring method because just push one is implemented. This requirement overwrites WP5-MON02

#### 5.1.4.4 ACSmI Billing

<b>Req. ID</b>	WP5-BUS01
<b>Req. Short Title</b>	Monitor and control the service status.
<b>Req. Description</b>	The objective is to check the service status via the ACSmI (e.g. if the service is operational or not).
<b>Phase of Cloud service life cycle</b>	
<b>Phase/subphrase of the DevOps FW</b>	Operation/Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	CSP Monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	This requirement has been delayed to the M30 release.

<b>Req. ID</b>	WP5-BUS03
<b>Req. Short Title</b>	Charge a user in the background for service usage.
<b>Req. Description</b>	Each user shall be charged for service usage if there are specific prices for this service. To ensure this, a reasonable billing mechanism shall be available. It shall be possible to charge user in a background while the service is being used.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	This requirement has been delayed to the M30 release.

<b>Req. ID</b>	WP5-BUS04
<b>Req. Short Title</b>	Provide a user with usage reports.

<b>Req. Description</b>	Since the user is charged on actual service consumption basis, detailed reports related to the resources consumed shall be provided to the user. A user shall be able to see how many services and when they have been used.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	This requirement has been delayed to the M30 release.

<b>Req. ID</b>	WP5-BUS05
<b>Req. Short Title</b>	Provide a user with periodical invoices.
<b>Req. Description</b>	The objective is to enable a regular invoicing. Since a user is charged for service consumption, it would be very convenient to bill the user on periodical basis. It shall allow the user to get an official billing document as well as ACSml and CSPs to get the user payments regularly.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	This requirement has been delayed to the M30 release.

<b>Req. ID</b>	WP5-BUS06
<b>Req. Short Title</b>	Provide a user with billing details.
<b>Req. Description</b>	Since the user is charged on actual resource consumption basis, it is important to provide a user with detailed reports related to the resources consumed and costs related to this consumption. A user should be able to see how much money, why and when he or she spent. It shall be possible to see estimated prices for different operations, as well as the casts produced.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30



<b>Version</b>	V1
<b>Status</b>	Delayed
<b>Comment</b>	This requirement has been delayed to the M30 release.

#### 5.1.4.5 ACSmI Legal

<b>Req. ID</b>	WP5-LEG01
<b>Req. Short Title</b>	Attach a legal level characteristic to each Cloud resource
<b>Req. Description</b>	<p>ACSmI shall be able to show legally relevant aspects when initiating a service through displaying a legal level attached to each Cloud Service. This will function as an NFR in DECIDE. Application developers will have been informed through an assurance policy what aspects the legal level covers, how it is determined and what organizations are recommended to take what legal level for the Cloud resources they use to deploy their applications.</p> <p>The legal level's function is thus to facilitate the legal assessment and choice of the application developer to authorize cloud resources that are suited to the compliance and legal needs of the target organization(s) the developer is developing for.</p> <p>Therefore, ACSmI needs to attach this characteristic (a legal level) to each resource.</p>
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Cloud service contracting
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

#### 5.1.4.6 ACSmI Security

<b>Req. ID</b>	WP5-SEC01
<b>Req. Short Title</b>	Roles management
<b>Req. Description</b>	The objective is to provide means to create, delete and modify roles in the ACSmI to be assigned to the users (WP5-DIS06). The main roles envisioned are: CSP, multi-cloud application operator, multi-cloud application owner, ACSmI operator and ACSmI administrator.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	User management
<b>Source</b>	DoA

<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	This requirement only affects to the CSPs role. The multi-cloud application operator and multi-cloud application owner will be managed by DECIDE Framework

<b>Req. ID</b>	WP5-SEC02
<b>Req. Short Title</b>	Security Policy management
<b>Req. Description</b>	The objective is to provide means to create, delete and modify policies in the ACSml to be assigned to the roles. These policies are activities and rules that shall be accomplished by ACSml.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	User management
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Rejected
<b>Comment</b>	The approach followed to manage users is not now based on policies.

<b>Req. ID</b>	WP5-SEC03
<b>Req. Short Title</b>	Authentication & Authorization
<b>Req. Description</b>	The objective is to authenticate a user based on the user credentials as well as to provide access to allowed actions considering its role.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	User management
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	Rejected – Done in the WP2
<b>Comment</b>	This requirement is covered by the DECIDE Framework using VAULT

<b>Req. ID</b>	WP5-SEC04
<b>Req. Short Title</b>	Communication layer security
<b>Req. Description</b>	Communication layer security using SSL transport layer encryption both between the client and the platform and between the platform and the cloud infrastructures.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation

<b>Supported Functionality of the DevOps FW</b>	Security
<b>Source</b>	other
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Rejected
<b>Comment</b>	The Network and communication aspects are out of scope of the DECIDE project

<b>Req. ID</b>	WP5-SEC05
<b>Req. Short Title</b>	Data encryption
<b>Req. Description</b>	Users shall be able to store their data encrypted in a cloud storage service. This feature will be optional: a user can select either to encrypt the data stored or to leave them unencrypted.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Security
<b>Source</b>	other
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Rejected
<b>Comment</b>	It is out of Scope

<b>Req. ID</b>	WP5-SEC06
<b>Req. Short Title</b>	Secure API access in ACSml
<b>Req. Description</b>	The objective of this requirement is to allow ACSml users to setup the configuration for their account in the following way: all the items available under the particular user account (e.g. software, resources) will be reachable via API from predefined IPs only. For example, only users who access ACSml from predefined IPs only can use particular resource via API. The feature is configurable: if a user would like to allow access from any other IP - it will be possible to do so; however, it will be possible to restrict the access as well.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Security
<b>Source</b>	Other
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Work in progress
<b>Comment</b>	

<b>Req. ID</b>	WP5-SEC07
<b>Req. Short Title</b>	Client data backup and archiving
<b>Req. Description</b>	This feature will allow to backup and archive ACSml users' data so that in case of need or emergency, they could be easily recovered. This will ensure ACSml's data integrity and safety.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Security
<b>Source</b>	Other
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Rejected. Done in WP2
<b>Comment</b>	This requirement is covered by the DECIDE Framework because WP2 is the responsible of the user management

<b>Req. ID</b>	WP5-SEC08
<b>Req. Short Title</b>	Implement specific security requirements for each use case
<b>Req. Description</b>	The objective is to implement the security requirement for particular use case. ACSml should cover all the security aspects required by the use cases.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Deployment preparation
<b>Supported Functionality of the DevOps FW</b>	Security
<b>Source</b>	Other
<b>Priority</b>	Low
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Rejected. Done in WP2
<b>Comment</b>	This requirement is covered by the DECIDE Framework

## 5.1.5 Key Result 5

### 5.1.5.1 ADAPT

DECIDE ADAPT requirements have been further classified and analysed in Year 2. This classification and analysis, detailed in deliverable D4.2 [9], also included work aimed at merging requirements concerning the same functionality. This work finally led to a smaller set of 17 requirements, greatly reduced from the initial 51. The merged requirements are listed in the following tables. In each table the field "Y1 Req." has been added, for traceability purposes, to indicate which original requirements have been merged to result in the described one. More detailed information of ADAPT requirements' classification and merging can be found in deliverable D4.2 [9].

<b>Req. ID</b>	WP4-MR1
<b>Req. Short Title</b>	Semi-automatic adaptation and redeployment
<b>Req. Description</b>	DECIDE ADAPT will support the semi-automatic adaptation and dynamic re-deployment of (parts of)

	multi-cloud applications when certain conditions are not met, by changing the configuration and topology of services at operational time based on continuous monitoring of both the conditions of the application and the CSPs where the application is deployed on.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Adaptation
<b>Supported Functionality of the DevOps FW</b>	Application adaptation Application re-deployment (Deployment) Configuration management Application MCSLA monitoring NFR monitoring CSP monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V2
<b>Status</b>	work in progress
<b>Comment</b>	Related components: DO, MM, VH
<b>Y1 Req.</b>	WP4-REQ1, WP4-REQ3, WP4-REQ8, WP4-REQ10, DEVOPS-REQF16

<b>Req. ID</b>	WP4-MR2
<b>Req. Short Title</b>	Violations from MCSLA or CSPs
<b>Req. Description</b>	A violation is raised when the defined composite multi-cloud application SLA is not being fulfilled, the application is not performing as established or the cloud service providers (CSPs) are violating the contracted SLAs.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	Application MCSLA monitoring NFR monitoring CSP monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	work in progress
<b>Comment</b>	Related components: MM
<b>Y1 Req.</b>	WP4-REQ2

<b>Req. ID</b>	WP4-MR3
<b>Req. Short Title</b>	Monitors application components metrics and gathers CSP metrics from ACSml

<b>Req. Description</b>	ADAPT will assess the metrics indicated in the MCSLA, monitoring the metrics related to the application components (micro-services) and gathering the run-time information related to the CSPs monitoring from other components (ACSml)
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	Application MCSLA monitoring NFR monitoring CSP monitoring
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V2
<b>Status</b>	work in progress
<b>Comment</b>	Related components: MM
<b>Y1 Req.</b>	WP4-REQ4, WP4-REQ18, DEVOPS-REQF3, DEVOPS-REQF15, DEVOPS-REQF17

<b>Req. ID</b>	WP4-MR4
<b>Req. Short Title</b>	Automated dynamic deployment
<b>Req. Description</b>	DECIDE ADAPT will support automated dynamic deployment of service components
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	Deployment
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ9

<b>Req. ID</b>	WP4-MR5
<b>Req. Short Title</b>	Script generation
<b>Req. Description</b>	DECIDE ADAPT will generate scripts for automating both resource provisioning and deployment for multi-cloud native applications
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	Deployment
<b>Source</b>	DoA
<b>Priority</b>	High

<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ12

<b>Req. ID</b>	WP4-MR6
<b>Req. Short Title</b>	Viewing deployment configuration
<b>Req. Description</b>	ADAPT will support manual checking of the deployment configuration and scripts
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	Deployment (Deployment) Configuration management
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	Work in progress
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ14, WP4-REQ23

<b>Req. ID</b>	WP4-MR7
<b>Req. Short Title</b>	ADAPT keeps the current deployment configuration
<b>Req. Description</b>	ADAPT will maintain the current deployment configuration situation; other tools will maintain the history of the previous deployment configurations, so that they can be checked in the re-deployment phase
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	(Deployment) Configuration management
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ15

<b>Req. ID</b>	WP4-MR8
<b>Req. Short Title</b>	Low technological risk = automatic redeployment
<b>Req. Description</b>	In case the technological risk for the application has been defined as low, the multi-cloud application will be redeployed automatically, following a new

	deployment configuration [provided by triggering OPTIMUS].
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Adaptation
<b>Supported Functionality of the DevOps FW</b>	Application re-deployment
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	work in progress
<b>Comment</b>	Related components: VH, DO
<b>Y1 Req.</b>	WP4-REQ21

<b>Req. ID</b>	WP4-MR9
<b>Req. Short Title</b>	High technological risk = alert operator and trigger OPTIMUS
<b>Req. Description</b>	In case the technological risk for the application has been defined as high, once ADAPT has identified the violation(s) that are affecting the malfunctioning of the application, it will both alert the operator and trigger OPTIMUS, sending it the identified violation(s), to simulate a new deployment configuration that could avoid the same problem.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Adaptation
<b>Supported Functionality of the DevOps FW</b>	Application re-deployment
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M30
<b>Version</b>	V2
<b>Status</b>	Accepted
<b>Comment</b>	Related components: VH
<b>Y1 Req.</b>	WP4-REQ22, WP4-REQ43

<b>Req. ID</b>	WP4-MR10
<b>Req. Short Title</b>	Violation report to the operator
<b>Req. Description</b>	In case of a violation, ADAPT will report to the operator the NFP (SLO) that are not being fulfilled
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	Application MCSLA monitoring NFR monitoring
<b>Source</b>	DoA
<b>Priority</b>	High



<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	work in progress
<b>Comment</b>	Related components: MM, VH
<b>Y1 Req.</b>	WP4-REQ27

<b>Req. ID</b>	WP4-MR11
<b>Req. Short Title</b>	Application Description drives ADAPT behavior
<b>Req. Description</b>	ADAPT functionalities (deployment, monitoring and adaptation) rely on information about the multi-cloud application obtained from the Application Description
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	N/A
<b>Supported Functionality of the DevOps FW</b>	Deployment Application MCSLA monitoring Application adaptation
<b>Source</b>	DoA
<b>Priority</b>	High
<b>Deadline</b>	M12 - M24
<b>Version</b>	V2
<b>Status</b>	work in progress
<b>Comment</b>	Related components: DO, MM, VH DO satisfies it at M12, MM and VH at M24
<b>Y1 Req.</b>	WP4-REQ34, WP4-REQ37

<b>Req. ID</b>	WP4-MR12
<b>Req. Short Title</b>	ADAPT supports applications composed by stateless services
<b>Req. Description</b>	ADAPT will support applications based on composition of stateless (possibly micro) services
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	Deployment
<b>Source</b>	Literature
<b>Priority</b>	Medium
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ35

<b>Req. ID</b>	WP4-MR13
<b>Req. Short Title</b>	ADAPT supports container-based applications

<b>Req. Description</b>	ADAPT will support composable applications where each composition unit is a containerized service
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	Deployment
<b>Source</b>	Literature
<b>Priority</b>	High
<b>Deadline</b>	M12
<b>Version</b>	V1
<b>Status</b>	Finished
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ36

<b>Req. ID</b>	WP4-MR14
<b>Req. Short Title</b>	ADAPT monitoring can be extended to support more NFPs
<b>Req. Description</b>	DECIDE (and ADAPT in particular) will support extensions to add more NFPs that need to be measured.
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	Application MCSLA monitoring NFR monitoring
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M30
<b>Version</b>	V1
<b>Status</b>	Accepted
<b>Comment</b>	Related components: MM
<b>Y1 Req.</b>	WP4-REQ41

<b>Req. ID</b>	WP4-MR15
<b>Req. Short Title</b>	Business continuity
<b>Req. Description</b>	Users will perceive relevant improvements in the business continuity since as soon as there is a problem (i.e. lack of resource due to a peak of requests) the software is automatically re-adapted and re-deployed
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Adaptation
<b>Supported Functionality of the DevOps FW</b>	Application adaptation Application re-deployment
<b>Source</b>	DoA
<b>Priority</b>	Medium
<b>Deadline</b>	M24

<b>Version</b>	V1
<b>Status</b>	work in progress
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	WP4-REQ44

<b>Req. ID</b>	WP4-MR16
<b>Req. Short Title</b>	Continuous deployment
<b>Req. Description</b>	DECIDE ADAPT will support the continuous deployment of the developed apps
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Deployment
<b>Supported Functionality of the DevOps FW</b>	Application re-deployment
<b>Source</b>	DevOps Principles
<b>Priority</b>	Medium
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	work in progress
<b>Comment</b>	Related components: DO
<b>Y1 Req.</b>	DEVOPS-REQF6

<b>Req. ID</b>	WP4-MR17
<b>Req. Short Title</b>	Violation history
<b>Req. Description</b>	DECIDE will maintain and store a history of the violations occurred for a deployed application
<b>Phase of Cloud service life cycle</b>	Operation phase
<b>Phase/subphrase of the DevOps FW</b>	Application Monitoring
<b>Supported Functionality of the DevOps FW</b>	Application MCSLA monitoring NFR monitoring
<b>Source</b>	DevOps Principles
<b>Priority</b>	Medium
<b>Deadline</b>	M24
<b>Version</b>	V1
<b>Status</b>	work in progress
<b>Comment</b>	Related components: MM
<b>Y1 Req.</b>	DEVOPS-REQF9