

DOSSIER-Cloud

DEVOPS-BASED SOFTWARE ENGINEERING FOR THE CLOUD

<http://www.dossier-cloud.eu>



Deliverable D3.2

**DevOps metrics and measurements discussions'
minutes and notes**

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1.0	10/05/17	Andreas Christoforou	Initial document, structure and content
2.0	17/05/17	Andreas Andreou	First review
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5.0	31/05/17	Andreas Andreou	Final review and corrections

Contents

1.	Introduction	4
1.1	Purpose	4
1.2	Definitions, Acronyms, and Abbreviations.....	4
1.3	Overview	4
2.	POLIMI Second Site Visit series (December 11, 2016 – March 4, 2017).....	5
3.	UvT Second Site Visit series (March 29 - April 3, 2017).....	19
4.	CUT Workshop (May 15-17, 2017).....	22
5.	Conclusions	26

1. Introduction

1.1 Purpose

This document quotes minutes and notes from various discussion meetings that took place during the site visits and workshops. In these meetings researchers from University of Tilburg (UvT), Politecnico di Milano (POLIMI) and Cyprus University of Technology (CUT) discussed and exchanged research ideas.

This deliverable is part of Work Package 3 (WP3) that describes the actions to enable a successful transfer of knowledge from the leading institutions to CUT and for luxuriating its knowledge base on technical issues of the Distributed Environment, Cloud Computing Environment, Service Delivery Environemt, Definition of standardized metrics, Server Side Metrics, Client Side Metrics, DevOps oriented Metrics and finally Integration of metrics and measurement activities.

1.2 Definitions, Acronyms, and Abbreviations

CUT: Cyprus University of Technology

UvT: University of Tilburg

POLIMI: Politecnico di Milano

1.3 Overview

The rest of the document is structured as follows: In Section 2 minutes and notes from the second site visit series at the Politecnico di Milano (POLIMI) are quoted, while Section 3 presents minutes and notes from the second site visits series at UvT. Section 4 presents the minutes and notes from the workshop that took place in the premises of CUT and finally, Section 5 concludes the document.

2. POLIMI Second Site Visit series (December 11, 2016 – March 4, 2017)

During the first site visit of the second series of visits, members from the CUT group attended a number of presentations given by the POLIMI group as well as participated in discussions related to the topics of WP3. In particular, the general subject of these presentations and discussions was dealing with research challenges in microservices, containerization of cloud applications and the corresponded metrics, and DevOps strategies with social software engineering.

The most significant notes and minutes that were discussed during these meetings are given below:

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	13/12/2016	Time:	09:00-11:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Discussions on utilizing Ecoware for applying new policies and techniques

2. Attendees

Name	Department/Division	E-mail	Phone
Giovanni Quattrocchi, Phd Candidate	POLIMI / Italy	giovanni.quattrocchi@polimi.it	
Prof. Sotirios Chatzis	CUT / Cyprus	sotirios.chatzis@cut.ac.cy	
Constantinos Stylianou, PhD	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Andreas Christoforou, PhD Candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time

<ul style="list-style-type: none"> ▪ POLIMI members will provide a detailed presentation of Ecoware as well its sourcecode ▪ CUT Suggestions: <ul style="list-style-type: none"> ○ Investigate the possibility to replace control Theory with Machine Learning Techniques ○ Run experiments with various workloads ○ Utilize prediction models (CI/ML) for targeting a better resource allocation 	Andreas Christoforou	
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Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	13/12/2016	Time:	11:30-13:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Round table discussion on the following topics : Ecoware, containerization, metrics

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Luciano Baresi	POLIMI / Italy	luciano.baresi@polimi.it	
Giovanni Quattrocchi, Phd Candidate	POLIMI / Italy	giovanni.quattrocchi@polimi.it	
Prof. Sotirios Chatzis	CUT / Cyprus	sotirios.chatzis@cut.ac.cy	
Constantinos Stylianou, PhD	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Andreas Christoforou, PhD Candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Giovanni described to CUT members a new research work that is currently working. ▪ CUT asked Giovanni to prepare a short presentation on EcoWare to see more specifically how we can utilize it in order to set up experiments regarding alternative resource management policies. ▪ ECoWare code <ul style="list-style-type: none"> ○ https://github.com/deib-polimi/ecoware-planning ○ https://github.com/deib-polimi/ecoware-executor ▪ The metrics supported by EcoWare were also discussed 	Andreas Christoforou	

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	14/12/2016	Time:	14:30-16:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Round Table Discussion / Brainstorming

Identification of common grounds for research work on the topic of interests from CUT and POLIMI: Microservices

2. Attendees

Name	Department/Division	E-mail	Phone
Giovanni Quattrocchi, Phd Candidate	POLIMI / Italy	giovanni.quattrocchi@polimi.it	
Martin Garriga, Post-doctoral student	POLIMI / Italy	martin.garriga@polimi.it	
Prof. Sotirios Chatzis	CUT / Cyprus	sotirios.chatzis@cut.ac.cy	

Constantinos Stylianou, PhD	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Andreas Christoforou, PhD Candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Examine the issue of incorporating non functional aspects of decomposition and also the automation of various parts of this process. ▪ Check WSDLS that was generated from the mashape.com (a market-place of public APIs), and the corresponding JSON specification 	Andreas Christoforou	

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	15/12/2016	Time:	09:00-11:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Investigation on CI optimization and on classification and prediction suitable for organizational structuring and team allocation.

2. Attendees

Name	Department/Division	E-mail	Phone
Damian Andrew Tamburri, Post-doctoral student	POLIMI / Italy	damianandrew.tamburri@polimi.it	
Prof. Sotirios Chatzis	CUT / Cyprus	sotirios.chatzis@cut.ac.cy	

Constantinos Stylianos, PhD	CUT / Cyprus	cstylianos@cs.ucy.ac.cy	
Andreas Christoforou, PhD Candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	

3. Discussion notes		
Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Investigate whether teams alter their community type based on the project that will be undertake. ▪ CUT suggested the possibility of using employee profiles and social interaction history to recommend the best team for a specific project ▪ One of the important issue for us is to be able to have access to the closed data used in our experiments. ▪ Check Yoshi report provided by Damian ▪ Check “Discovering Open-Source Community Types:An Automated Approach” provided by Damian 	Andreas Christoforou, Constantinos Stylianos	

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	16/12/2016	Time:	13:00-14:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description
Schedule next research steps and definition of communication and collaboration methods

2. Attendees			
Name	Department/Division	E-mail	Phone
Prof. Luciano Baresi	POLIMI / Italy	luciano.baresi@polimi.it	

Martin Garriga, Post-doctoral student	POLIMI / Italy	martin.garriga@polimi.it	
Giovanni Quattrocchi, PhD Candidate	POLIMI / Italy	giovanni.quattrocchi@polimi.it	
Prof. Sotirios Chatzis	CUT / Cyprus	sotirios.chatzis@cut.ac.cy	
Constantinos Stylianos, PhD	CUT / Cyprus	cstylianos@cs.ucy.ac.cy	
Andreas Christoforou, PhD Candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	02/27/2017	Time:	14:00-16:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Discussion on Microservices

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Luciano Baresi	POLIMI / Italy	luciano.baresi@polimi.it	
Martin Garriga, PhD candidate	POLIMI / Italy	martin.garriga@polimi.it	
Constantinos Stylianos, PhD	CUT / Cyprus	cstylianos@cs.ucy.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Discussion with Prof. Baresi and Martin Garriga <ul style="list-style-type: none"> ○ Discussion of reviewer comments received from the ICSA submission: (i) service vs microservice, (ii) evaluation issues, and (iii) changes to approach ○ Use of Carina, a container-based solution on hypervisor level, as a way to deploy microservices ○ Lambda functions – functions as a service (FaaS) and serverless computation ○ Microservice adoption using FCMs – how factors affect adoption and evaluation using success cases (specify possible what-if scenarios) 	Constantinos Stylianos	

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	02/28/2017	Time:	09:30-12:00
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Discussion on Social dept and organizational/team structure

2. Attendees

Name	Department/Division	E-mail	Phone
Damian Andrew Tamburri, Post-doctoral student	POLIMI / Italy	damianandrew.tamburri@polimi.it	
Constantinos Stylianos, PhD	CUT / Cyprus	cstylianos@cs.ucy.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Discussion with Damian Tamburri <ul style="list-style-type: none"> ○ Identification of personality types using IBM Insights for team selection ○ Patterns for the detection of organizational structure and team selection ○ How to exploit aggregated data collected/crawled (YOSHI) ○ Community types shift – long term analysis 	Constantinos Stylianou	

Workpackage:	WP3 - Metrics and Measurement activities		
Date: (MM/DD/YYYY)	03/01/2017	Time:	09:30-11:30
Facilitator/Presenter:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Further discussions about social dept and microservieces

2. Attendees

Name	Department/Division	E-mail	Phone
Damian Andrew Tamburri, Post-doctoral student	POLIMI / Italy	damianandrew.tamburri@polimi.it	
Martin Garriga, PhD candidate	POLIMI / Italy	martin.garriga@polimi.it	
Constantinos Stylianou, PhD candidate	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	

3. Discussion notes		
Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ IBM Insights ▪ Host the DB from a VM ▪ Patterns for Detection ▪ Community types shift -> Long term analysis ▪ Agregate data with prof. Sotiris 	Constantinos Stylianou	

3. Discussion notes		
Topic and targets	Introducer	Time
<p style="text-align: center;">Preparing the 2nd site visit to POLIMI</p> <p>People:</p> <ol style="list-style-type: none"> 1. Prof. Andreas Andreou 2. Prof. Sotiris Chatzis 3. Andreas Christoforou (PhD candidate) 4. Constantinos Stylianou (Researcher) 5. Adonis Podinas (MSc student) 6. Dimitris Christodoulou (MSc student) <p>Possible Dates:</p> <p>OPTION 1 (90% THAT THIS WILL BE FOLLOWED)</p> <p>Monday, February 27th – Saturday, March 4th :</p> <ul style="list-style-type: none"> • Dr. Constantinos Stylianou (Senior Researcher) • Adonis Podinas (MSc student) • Dimitris Christodoulou (MSc student) <p>Thursday March 2nd – Saturday, March 4th :</p> <ul style="list-style-type: none"> • Prof. Andreas Andreou • Prof. Sotiris Chatzis [... to be confirmed] • Andreas Christoforou (PhD candidate) <p>OPTION 2 (10% THAT THIS WILL BE FOLLOWED)</p> <p>Monday, February 27th – Saturday, March 4th :</p>	Andreas Christoforou, Constantinos Stylianou	

- Dr. Constantinos Stylianou (Senior Researcher)
- Adonis Podinas (MSc student)
- Dimitris Christodoulou (MSc student)

Thursday February 23rd – Saturday, February 25th :

- Prof. Andreas Andreou
- Prof. Sotiris Chatzis [... to be confirmed]
- Andreas Christoforou (PhD candidate)

Activities:

1. Follow up meetings on two mainly topics
 - a. Team formation and structure based on community smells (Damian and Elisabetta).
 - b. Microservices profiling and automatic synthesis (Martin)
2. Possibly investigate other open issues (like for example resource management with Danilo)
3. Knowledge transfer
 - a. Talks, lectures, discussions:
 A total of 30 hours of talks and another 60 hours of discussions are anticipated in the site visits in WP3 (this is the second visit, the aforementioned visit was the first one in this work-package).
 An approximately 10-12 hours of talks and 18-20 of discussions were covered during the first site visit.
 Around 18-20 hours of talks and 30-40 hours of discussions are left for the second site visit.
 The agenda should be carefully prepared to list activities close to the aforementioned figures. Taking into account the worst scenario then we should plan 20 hours of talks (4 hours a day for 5 days) and 40 hours of discussions, (8 hours per day). In some days (especially Thursday and Friday) the talks/discussions may be divided into parallel sessions: 2-3 groups of people exchanging ideas and brainstorming, (3-4 hours per day).The daily program for CUT will be resulted for 7-8 hours per day.
 - b. Topics → We are currently executing WP3 that is dealing with the Cloud environment in general, the technical infrastructure and the metrics/measurement activities.
 We are mainly focused on:
 - ✓ Distributed environment
 - ✓ Cloud computing environment (technical, software)
 - ✓ Service delivery environment

- ✓ Definition of standardized metrics
- ✓ Server side metrics
- ✓ Client side metrics
- ✓ DevOps oriented metrics
- ✓ Integration of metrics and measurement activities

POLIMI can also suggest any other relevant topic for discussion. In this case CUT members are open and flexible.

- c. People from the IT dept. could introduce, describe and analyse the cloud infrastructure of POLIMI (general Cloud, research Cloud, POLI-Cloud, etc.). The target is to understand the design and setup of POLIMI's Cloud infrastructure and focus on background info, such as: example metrics and tools used to monitor this infrastructure, and/or approaches, methods and tools for managing resources etc. Devising algorithms for automatic monitoring, resource management and reconfiguration of Cloud resources would be useful.

4. Planning of next actions

- a. Upcoming workshop in Cyprus
- b. Dissemination activities for POLIMI

Polimi 2nd Site visit (February)

- Which areas/topics can be addressed for upcoming site visits - in the context of Dossier
 - Microservices (Andreas)
 - Codesmells / Social Debt (Constantinos)
 - Presentations / Knowledge transfer from POLIMI to CUT (Adonis, Demetris)
- Until 1st site visit – Microservices
 - Email Martin for update on his document
 - until 10/2 we should clearly define collaboration topics
- Automatic Service Synthesis
 - Utilizing reinforcement learning (Chatzis) - from a set of services discover and recommend the services that can be synthesised and meet composite service requirements

<ul style="list-style-type: none"> - Service based synthesis framework - EBNF - Automatic search... - Automatic service synthesis based on statistical approach (COMPROFITS) ○ RQs: <ul style="list-style-type: none"> - How a general description can be breakdown to a single function description - Level of decomposition - How can this be decided (depth of decomposition) - Study profile descriptions (EBNF) - Martin proposal <p>Web Crawler for MASHape ()</p>		
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Workpackage:	WP3 – Metrics and Measurement activities		
Date: (MM/DD/YYYY)	03/03/2017	Time:	09:30-12:30
Facilitator:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Further discussions on topics that were performed during the week, such as microservices, edge computing, IoT.

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Luciano Baresi	POLIMI / Italy	luciano.baresi@polimi.it	
Prof. Danilo Ardagna	POLIMI / Italy	danilo.ardagna@polimi.it	
Martin Garriga, Post-doctoral student	POLIMI / Italy	martin.garriga@polimi.it	
Prof. Andreas Andreou	CUT / Cyprus	andreas.andreou@cut.ac.cy	

Andreas Christodorou, PhD Candidate	CUT / Cyprus	ax.christodorou@edu.cut.ac.cy	
Constantinos Stylianou, PhD	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Discussion with Alessandro – Policloud <ul style="list-style-type: none"> ○ Hardware Level ○ Running scripts on every node to monitor several metrics ○ Virtualization Level ○ Silometer agent – Openstack ○ OpenStack plugin - Python scripting ○ How can we setup a workload ? ○ Alessandro will provide some old data in order to help us identify available metrics ▪ Discussion with Martin <ul style="list-style-type: none"> ○ Microservices Migration modeling with ML-FCM <ol style="list-style-type: none"> 1. List of Concepts - based on Martin's work 2. Causalities Identification - Experts/ Literature/Other techniques - Github crawler GenSIN 3. Model Construction 4. Scenario Analysis ○ Microservices Performance / resource management <ul style="list-style-type: none"> ▪ Cost/Performance trade-of ▪ Azure-CLI () ○ Microservices definition - Theory of computation (atomicity) ○ Contact Efi Papatheocharous to get her opinion about microservices. ○ Share dropbox with martin. (gmail) ▪ Edge computing - Self Organization (Danilo) 	Andreas Christodorou	

<ul style="list-style-type: none"> ○ Possible collaboration - Ideas ○ Give dropbox access to Danillo (email) ○ CUT should deliver a list of ideas - related topics of interest ○ IoT and 5G networks (Saeed) 		
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Workpackage:	WP3 – Metrics and Measurement activities		
Date: (MM/DD/YYYY)	03/03/2017	Time:	14:30-15:30
Facilitator:	POLIMI	Location:	POLIMI, III floor, building 22, via Golgi, 42, Milan

1. Subject / Short Description

Project organization and future planning

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Luciano Baresi	POLIMI / Italy	luciano.baresi@polimi.it	
Prof. Andreas Andreou	CUT / Cyprus	andreas.andreou@cut.ac.cy	
Andreas Christohorou, PhD Candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	
Constantinos Stylianos, PhD	CUT / Cyprus	cstylianos@cs.ucy.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none"> ▪ Project Financial Issues ▪ DevOps Survey ▪ Upcoming workshop in CUT ▪ Periodic Reports ▪ Review Meeting (Brussels – June 2017) 	Andreas Andreou, Andreas Christoforou	

3. UvT Second Site Visit series (March 29 - April 3, 2017)

Researchers from the CUT group participated in the second site visit series in UvT. During these visits a number of lectures were given by the UvT group members. The lectures covered a wide range of aspects and research topics on cloud distributed systems, such as data science and intelligence sharing, big data and analytics.

Workpackage:	WP3 – Metrics and Measurement activities		
Date: (MM/DD/YYYY)	03/29/2016	Time:	15:00-17:30
Facilitator/Presenter:	UvT	Location:	Koopmans (K) building room K1011A Warandelaan 2, 5037 AB Tilburg

1. Subject / Short Description

Discussion on the covered lectures/presentations

Project planning

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Mike Papazoglou	UvT / The Netherlands	mikep@uvt.nl	

Prof.Andreas Andreou	CUT / Cyprus	andreas.andreou@cut.ac.cy	
Constantinos Stylianou, PhD	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Andreas Christoforou, PhD candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	
Maria Papachristodoulou, MSc student	CUT / Cyprus	mk.papachristodoulou@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	

3. Discussion notes		
Topic and targets	Introducer	Time
<p>Round Table discussion</p> <ul style="list-style-type: none"> • CSIRO - Dr Chi-Hung Chi <ul style="list-style-type: none"> ○ Threat intelligence sharing platform ○ Possible collaboration in agriculture • K. Magoutis Uol <ul style="list-style-type: none"> ○ PaaSage ○ Model-Driven cloud engineering ○ Cloud-driven processing of IoT streams (Compose platform) ○ Prediction in No-Sql databases ○ Performance prediction (throughput, response time) MongoDB ○ Node-Workload-Datastore 	Andreas Christoforou	

Workpackage:	WP3 – Metrics and Measurement activities		
Date: (MM/DD/YYYY)	03/30/2017	Time:	16:30-19:00
Facilitator/Presenter:	UvT	Location:	Jheronimus Academy of Data Science Sint Janssingel 92 5211 DA 's-Hertogenbosch

1. Subject / Short Description

Meeting with local companies (PHILIPS, Booking.com) and the Municipality of 's-Hertogenbosch (Den Bosch)

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Mike Papazoglou	UvT / The Netherlands	mikep@uvt.nl	
Prof. Andreas Andreou	CUT / Cyprus	andreas.andreou@cut.ac.cy	
Constantinos Stylianou, PhD	CUT / Cyprus	cstylianou@cs.ucy.ac.cy	
Andreas Christoforou, PhD candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	
Maria Papachristodoulou, MSc student	CUT / Cyprus	mk.papachristodoulou@edu.cut.ac.cy	
Dimitris Christodoulou, MSc student	CUT / Cyprus	dc.christodoulou@edu.cut.ac.cy	
Adonis Podinas, MSc student	CUT / Cyprus	ak.podinas@edu.cut.ac.cy	

3. Discussion notes

Topic and targets	Introducer	Time
<ul style="list-style-type: none">• Interest for exploiting smart data processing in farming• The North Brabant region is interested in becoming a European and global hub• Services and tools/algorithms may be offered through this hub• Entrepreneurship will be promoted• Startups and ideas will be facilitated and encouraged through this initiative• The hub will join together universities / researchers with stakeholders and companies in order to build synergies• Ideas can be hosted and incubated either from the sector that wishes to solve a problem or by the innovator or originator of a novel idea	Andreas Andreou	

4. CUT Workshop (May 15-17, 2017)

Representatives from all project partners participated in the second workshop organized at the CUT premises in Limassol. During this 3-day workshop members from POLIMI and UvT delivered lectures and presentations to members of the CUT group, as well as to other researchers and students. Also, a project management meeting was conducted during which partners' members discussed the progress of the project, lessons learned so far, the steps for preparing the review report, the representation of each partner in Brussels, as well as the weaknesses and obstacles encountered so far.

On the last day of the workshop the 2nd Stakeholders Meeting and Workshop on Cloud Computing, Software Services and Smart Data Processing was organized. Members from the CUT and UvT presented the DOSSIER-Cloud project and part of its work to a group of targeted local stakeholders and finally a discussion for collaboration between the DOSSIER-Cloud members and the local stakeholders followed.

Workpackage:	WP3 – Metrics and Measurement activities		
Date: (MM/DD/YYYY)	15/05/2017	Time:	19:00-20:00
Facilitator/Presenter:	CUT	Location:	EE-CEID, 39, Saripolou & Socratous, Limassol

1. Subject / Short Description

Project Management Meeting

Summary of the last series of site visits, delays and actions.

Periodic Report preparation, travelling and coordination.

Schedule of next steps (Organize next site visits, Organize workshops) .

2. Attendees

Name	Department/Division	E-mail	Phone
Prof. Luciano Baresi	POLIMI / Italy	luciano.baresi@polimi.it	
Prof. Mike P. Papazoglou	Tillburg / The The Netherlands	m.p.papazoglou@uvt.nl	
Prof. Andreas Andreou	CUT / Cyprus	andreas.andreou@cut.ac.cy	

Andreas Christoforou, PhD candidate	CUT / Cyprus	ax.christoforou@edu.cut.ac.cy	
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3. Discussion notes		
Topic and targets	Introducer	Time
<ul style="list-style-type: none"> • Dossier-Cloud Review Meeting in Brussels 27th June 2017 <ul style="list-style-type: none"> ○ Monday 26/6 around 7pm - Preparation meeting (Luciano-Mike-Andreas) • Polimi - Tilburg should provide all talks of Workshop • WP4 <ul style="list-style-type: none"> ○ December – Polimi ○ Andreas should prepare a timetable for site visits - Partners should agree on that <p>Collaborations</p> <ol style="list-style-type: none"> 1. Collaboration with Clement Quinton (POLIMI) <ol style="list-style-type: none"> a. Describe Cloud features using same way as SPL model b. Perform automatic reconfiguration of cloud infrastructure and resources based on the SPL feature model, rules, etc. and the dynamic reconfiguration. c. Concentrate on VMs and physical servers, storage and bandwidth. d. Workload can be also part of the features (at least some characteristics) e. Check literature to see whether such attempts have been made in the past 2. Collaboration with Damian Tamburri (POLIMI) <ol style="list-style-type: none"> a. Focus on the work of DICE b. Study the material and deliverables of DICE c. Big data and analytics is the future of distributed Cloud applications and services d. We can move a step further and test things in practice with stakeholders. Cyprus can be used as a good case study due to its small size, the controllable size in terms of resources and demands is more 3. Collaboration with Willem-Jan van den Heuvel (UvT) <ol style="list-style-type: none"> a. Data pipelines 	<p>Andreas Andreou,</p> <p>Andreas Christoforou</p>	

<ul style="list-style-type: none"> b. Conformance with law and regulations → Adaptable and flexible schemes c. Use microservices that could possibly reconfigure dynamically 		
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Workpackage:	WP3 – Metrics and Measurement activities		
Date: (MM/DD/YYYY)	17/05/2017	Time:	11:30-12:45
Facilitator/Presenter:	CUT	Location:	Amphitheater Pefkios Georgiades, Andreas Themistocleous Building Athinon Str.

1. Subject / Short Description

Opportunities for Collaboration - Discussion

2. Attendees

Name	Department/Division	E-mail	Phone
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3. Discussion notes

Topic and targets	Introducer	Time
1. The main axes of discussion were: Distribution of data, big data, smart data. All these require services and analytics (predictive or not) in order to facilitate decision making		

<ol style="list-style-type: none"> 2. Figures from the presentation show remarkable savings for freight (rail). The same result is expected also in other forms of transportation like shipping. 3. Monitoring a patient for 24 hours is the same procedure like monitoring the global financial markets such as stocks or forex, thus the same principles for processing and real-time feeding can be applied in other domains 4. Safety and security concern every business domain. The infrastructure is also essential in every market sector in order to work synergistically with processes. 		
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5. Conclusions

In the context of Workpackage 3, a series of actions and activities were organized and performed; their aim was to transfer the scientific knowledge to CUT members in the area of DevOps metrics and measurements. At first, CUT members participated in two site visits in Milan, researches from POLIMI delivered lectures related to research challenges in microservices, containerization of cloud applications and the corresponded metrics, and DevOps strategies with social software engineering. A new series of visits was followed in the Netherlands. Researches from CUT attended various lectures given by UvT members that included data science and intelligence sharing, big data and analytics.

A Workshop that summarized the second site visits series was organized in Cyprus at the CUT’s premises. The Workshop included project meetings, lectures by senior researches from POLIMI and UvT and a Stakeholders meeting. During the project meetings, members from all partners discussed the progress of the project, lessons learned so far, as well the weaknesses and obstacles found thus far. Partners elaborated on the organisation of the upcoming steps of the project, examined research opportunities and applications, and also discussed possible collaborations and focused their effort for submitting joint proposals to H2020 calls in order to attract further funding. During the stakeholders’ meeting, members from the CUT and UvT presented the DOSSIER-Cloud project and part of its work to a group of targeted stakeholders and finally a discussion for collaboration between the DOSSIER-Cloud members and the local stakeholders followed.

During the Workpackage 3 activities, various project management and discussion meetings were organized. The present document quoted minutes and notes from all those meetings and the relevant discussions on the project’s progress and future steps, as well as possible future research collaborations and submission of joint proposals for further funding under EU or national calls.