SeaClouds Project

D7.5.3 – Collaboration Activities Report

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Table of Contents

List of Tables

Executive Summary

This deliverable reports on the collaboration activities carried out in SeaClouds. It updates the information in the “D7.5.2 Collaboration Activities Report” delivered at M12. It refers to the initial plan provided at M6 in Deliverable D7.5.1 entitled “Collaboration Plan” to detail both the achievements in such collaboration plan and collaboration activities that have taken place in the SeaClouds project between M13 and M30 beyond the initial collaboration plan.

1 Introduction

This deliverable provides a report of the collaboration activities undertaken between M13 and M30 of SeaClouds project. It bases upon the collaboration plan for SeaClouds provided in D7.5.1 [1] at M6 and the intermediate collaboration activities report already provided in D7.5.2 [2] at M12.

The document is organized as follows: Section 2 presents a summary of the collaboration plan and success criteria in [1] and presents a summary of the KPIs in the collaboration plan already fulfilled at M12 [2] to make this deliverable self-contained. Section 3 describes the collaboration activities carried out between M13 and M30. The accomplishment of KPIs according to the success criteria achieved by the collaboration activities is provided in Section 4. Section 5 concludes the report.

1.1 List of Acronyms

Here we list the different acronyms that will be used in this document.

Acronym	Definition
EC	European Commission
IFIP	International Federation for Information Processing
LAMP	Linux, Apache, MySQL and PHP
RDF	Resource Description Framework

Table 1: Acronyms

2 Expected collaboration plan and plan fulfillment at M12

The collaboration plan and collaboration strategy were defined at M6 [1], which proposed the following collaboration intentions for SeaClouds:

1. Participate to the EC initiated conferences, workshops, meetings, info-days related to the Cloud computing topics
2. Participate to the support actions for project dissemination initiated by the projects under same ICT objective
3. Organize scientific meetings and invite other projects to participate
4. Participate to scientific events organized by other projects
5. Promote standards supported also by other projects
6. Produce open-source to be promoted to other projects
7. Participate in the activities under FIA working groups or other service-oriented groups

These collaboration intentions were concretized to the following Collaboration Objectives (**CO**) and success criteria for each CO.

- **CO1: Number of projects and initiatives in contact with**: at least 3 among projects and initiatives (M18)

- **CO2: Number of dissemination events commonly organized:** at least 2 common events (M30)
- **CO4: Number of software packages and concepts that are re-used in the project and coming from other projects and initiatives**: at least 2 (M30)
- **CO5: Number of working groups to which the project members are actively participating**: at least 1 (M18)

In the intermediate Collaboration Activities report [2] at M12, it was proposed an additional CO and success criteria:

- **CO6: Number of promoted standards**: at least 2 (M18)

Table 1 summarizes the fulfillment of collaboration plan at M12, which had been already reported in [2]. This table shows that almost all expected collaborations had already been achieved at M12.

KPI	Target value	Current value
CO1	3 (M18)	5
CO2	2 (M30)	1 (the SeaClouds workshop has been an initiative of the SeaClouds project. However, it has seen the active participation of various other projects. As such, it fulfils the KPI at least partially)
CO4	2 (M30)	2 (Cloud4SOA adapters, Brooklyn)
CO5	1 (M18)	2
CO6	2 (M18)	2

Table 2: Fulfillment of KPI at M12

This early achievement at M12 of collaboration goals devised at M6 has not prevented SeaClouds consortium from continuing establishing new collaborations with other projects and research and development communities. Next section provides a report of the collaborations activities carried out between M13 and M30.

3 Collaboration actions carried out between M13 and M30

During the last year and a half, the SeaClouds consortium has established new collaborations following the strategy stipulated in [1]. The consortium has also continued collaborations started during the first year with different projects.

3.1 Collaboration among EU projects for research management, dissemination, collaboration and exploitation

SeaClouds participates in alliances of EU funded projects that encourage collaboration between research projects. Next paragraphs describe SeaClouds collaboration on Software Engineering Cluster for Services and Applications alliance.

3.1.1 Software Engineering Cluster for Services and Applications (SEC4SA)

SeaClouds is participating to the Cluster on Software Engineering for Services and Applications (https://eucloudclusters.wordpress.com/software-engineering-for-services-and-applications/). The cluster has been created in the late spring 2015 to increase the collaboration between European projects, to facilitate the discussion among the experts in the area to exchange experiences and competences and to identify research directions and challenges as well as common plans to address them. In particular, the specific objectives being pursued by the cluster are:

- identify complementarities and synergies as well as possibilities for collaboration/results adoptions between projects;
- identify new challenges and trends to influence the European research agenda;
- organise common dissemination (publications, training and workshops);
- identify effective go-to-market strategies for the outcomes of research projects.

The cluster is coordinated by one of the SeaClouds partners, Elisabetta Di Nitto, and has promoted initiatives aiming at supporting dissemination (the joint participation to **Cloud Expo Europe** event, whose description is given in Subsection 3.2.3), open discussion among experts (the session at **ICT 2015** event, whose description is detailed in Subsection 3.2.2, and the participation at CloudForward 2015) and it is trying to coordinate activities concerning outreach of standardization committees.

From the point of view of SeaClouds, the participation to the cluster has opened up the possibility to join forces with other projects to participate to **Cloud Expo Europe**. Such participation, which has given a good visibility to the project, would not have been possible otherwise due to its high costs. After the end of the SeaClouds project, the cluster is planning to participate to NetFutures 2016 and CloudForward 2016. Both initiatives will be beneficial for SeaClouds as they will allow the project to remain visible and to have a context in which it will be possible to demonstrate the project results and their future evolutions.

3.2 Collaboration actions in international industrial events

SeaClouds has participated in two industrial events, where it presented the project and established collaborations. The events were the **7th annual Cloud World Forum** and the **Cloud Expo Europe**. Following paragraphs detail each event.

3.2.1 7th annual Cloud World Forum (CWF)

The SeaClouds Consortium chose the **7th annual Cloud World Forum** for the celebration of its First Industrial Workshop. The event took place on June 24th and 25th, 2015 in London, in conjunction for third year in a row, with the **Enterprise Apps World**. This conjunction matched the SeaClouds objectives for this workshop in terms of the size and profile of the audience, with more than 8.000 visitors and 200 exhibitors among we could find several C-level decision makers, CIOs, CTOs, DevOps Team Leaders, Engineers, Software Architects, Developers, Administrators and Tech Entrepreneurs. Thus, CWF was the ideal scenario for the organization of this workshop and for the presentation of the first version of the SeaClouds Integrated Platform.

Among the main outcomes of this event, we can highlight not only the positive feedback provided by the multiple visitors of our stand, but also the connections established during the venue. Enterprises like OrionVM, 365force and Canopy showed their interest on SeaClouds and requested further contacts to develop potential collaborations.

3.2.2 ICT 2015

SeaClouds has participated to ICT 2015, which took place in Lisbon, as part of the **Cluster on Software Engineering for Services and Applications**. In particular the cluster has moderated the session titled Software Engineering and Technologies for Services and Applications https://ec.europa.eu/digital-single-market/events/cf/ict2015/item-display.cfm?id=15722. The session was attended by at least 30 participants and many could not enter given the small size of the room. It included a panel on the vision for future software engineering. The panelists were Andreas Metzger (Paluno, University of Duisburg-Essen), Lutz Schubert (University of Ulm), and Cedric Thomas (OW2). After the panel, the session saw a very lively discussion among the participants.

3.2.3 Cloud Expo Europe (CLOUDExpo)

SeaClouds Consortium chose the framework of the **Cloud Expo Europe**, held on November 10th and 11th, 2015 in Frankfurt, Germany to organize its Second Industrial workshop of SeaClouds project.

The objective of this workshop was to showcase the new version of the SeaClouds platform to a professional audience while obtaining feedback from market experts that help us to keep the last release of the platform aligned with the market trends and needs.

In order to maximize the impact of the workshop and to reach a wider audience, this workshop was organized in conjunction with other four projects (SWITCH, CloudWave, S-CASE and CloudTeams) of the **Cluster on Software Engineering for Cloud Services and Applications**. This collaboration allowed SeaClouds to have not only a bigger stand in a more strategic location (which provided bigger visibility and relevance) but also to organize presentations/demos of each project in a dedicated theatre and to organize a roundtable about cluster-related topics.

The expectation generated was significant, having several visitors (top-level cloud providers like Canopy or smaller telecommunication companies like Iskratel) approaching our booth and requesting more information about the our solution. An interesting outcome was the interest shown by some IBM SoftLayer Sales representatives in Europe, who wanted to dig deeper into SeaClouds in order to determine the feasibility of including it into their marketplace. Recently, IBM Cloud has established a contact with the SeaClouds scientific coordinator. The plan for the collaboration is that they will study internally the possibility to adopt a future stable version of SeaClouds in the IBM MarketPlace (https://www.ibm.com/marketplace/cloud/us/en-us). This collaboration cannot produce an outcome in the immediate term, but SeaClouds partners will continue this collaboration after the ending of the project.

3.3 Collaboration with industrial projects

3.3.1 Canopy Cloud

Canopy Cloud (https://canopy-cloud.com/) has shown interest in incorporating some SeaClouds capabilities into their Canopy Compose offering [3]. Canopy Compose is a service using Brooklyn Application Management Platform to deploy applications using Brooklyn blueprints. The Canopy Compose service has a comprehensive catalog of blueprints, including many of the most popular application services such as Tomcat, MySQL, JBoss, Apache, LAMP stacks. It is also offered a service to customize specific blueprints or enable the teams to write their own blueprints.

ATOS Canopy and ATOS Research&Innovation have started an internal round of conversations (at present M30, two conversations have already taken place) in order to identify the capabilities in which Canopy is interested, and how to integrate them with Canopy Compose. For the moment, Canopy has identified SeaClouds Planner and SLA (including recovery and autoscaling) components as useful for the Compose service, and well as the reutilization of the Matchmaking capability of the Planner as standalone functionality. The current Canopy Compose service needs a blueprint as input (i.e. a text file). This is where SeaClouds is useful for Canopy: the SeaClouds design environment provides way to generate a blueprint in a higher level view.

The benefits of the collaboration with Canopy Cloud are:

- SeaClouds components can be reused at industrial level (i.e., not only users that take advantage of SeaClouds to manage their applications but also cloud industry integrates the functionalities of SeaClouds components to offer their services to users). This collaboration provides very good feedback to the SeaClouds consortium.
- Canopy can integrate already available open-source software to provide its cloud services to its users.

3.4 Collaboration with scientific meetings

3.4.1 SeaClouds workshop at ESOCC 2015 (workshop@ESOCC):

SeaClouds consortium has organized the Second SeaClouds Workshop. The workshop took place in Taormina, Italy on September 15 and it was held in conjunction with ESOCC 2015 (Fourth European Conference on Service-Oriented and Cloud Computing [4]). The program included one invited talk on the self-aware adaptive clouds, four contributed research papers, a round table and a session devoted to presentations of the development and results of ongoing 12 EU research projects. A detailed description of the workshop outcomes has been reported in deliverable D1.7.3 “2nd SeaClouds Scientific Workshop” [5].

3.4.2 Meetings of IFIP WG 6.12:

SeaClouds partners participate in the IFIP working group 6.12 “Service-Oriented Systems” [6]. Two meetings of this working group have taken place between M13 and M30: an official annual meeting ion Taormina (together with ESOCC 2015 conference) and a supplemental meeting in Milan, Italy. Elisabetta di Nitto, Ernesto Pimentel and Antonio Brogi have participated in these meetings, where the working group identifies research topics in the service-oriented software field.

3.4.3 Dissemination at conferences

In order to foster scientific collaboration, SeaClouds objectives and advancements have been published and disseminated in 15 International Conferences and Workshop. For the details on the 15 international scientific meetings where SeaClouds has been disseminated and the description of the concrete action in each meeting, readers are referred to SeaClouds deliverable D1.5.3 “Dissemination Report” [7].

3.5 Collaboration on development with open-source software projects

SeaClouds has started new software development collaborations with the MODAClouds [8] and Alien4Cloud [9] projects. Moreover, it has continued the collaboration with the open-source project Apache Brooklyn [10] started before M12 and reported in [2]. Next paragraphs detail the collaboration with each of the open-source projects.

3.5.1 Collaboration with MODAClouds project

The collaboration between SeaClouds and the MODAClouds FP7 European project takes place by means of the adoption within SeaClouds of two components, specifically the multi-cloud monitoring platform (**Tower4Clouds** [11]) and the **SLA contracting service** [12], both developed in the context of MODAClouds.

Tower4Clouds is a monitoring platform based on C-SPARQL, a stream processing engine over RDF [13] tuples. It is basically composed by a centralized server which processes the incoming streams of monitoring data and by a distributed collection of so called "Data Collectors", which are responsible of collecting data from a specific data source and to send them to the central stream processing server. Each collected metric generates a new stream over which the user can install queries (or monitoring rules), typically executed periodically and over a given time window. Users can then subscribe to the output of specific queries in order to be later on notified each time they are evaluated.

The integration steps carried on within SeaClouds in order to use Tower4Clouds as the SeaClouds's monitoring system, have been done basically along the following two paths:

1. The development of some new data collectors, providing metrics that were needed in SeaClouds, but not provided by those adopted form MODAClouds. In particular a new data collector that pull various information from the SeaClouds Deployer about the running SeaClouds applications and feed Tower4Clouds with metrics derived from such information has been developed, along with a data collector able to monitor the availability of PaaS applications.
2. The development of a Java library responsible to act as a connection between the SeaClouds design time environment and the runtime. In particular this library is able to properly configure SeaClouds applications to be monitored by Tower4Clouds, by taking as input a TOSCA blueprint describing a SeaClouds application and refining it adding the required Tower4Clouds monitoring rules and data collectors, specified respectively by mean of a TOSCA node type and a TOSCA policy defined in the context of SeaClouds.

The benefits of the collaboration with Tower4Clouds are:

- SeaClouds can use the functionality provided by Tower4Clouds
- During the integration of Tower4Clouds in SeaClouds platform, some bugs were found in Tower4Clouds and fixed by SeaClouds team (e.g., an issue with the logging system have been solved). Tower4Clouds also benefited from this collaboration because fixes have been pushed into Tower4Clouds main repository in GitHub.
- During the integration of Tower4Clouds in SeaClouds platform, additional features for Tower4Clouds has been developed by SeaClouds team. This new feature involved the development of a data collector that feed Tower4Clouds with metrics and information coming from Apache Brooklyn. Towe4Clouds benefited from this collaboration because this new developed feature has been pushed into Tower4Clouds repository in GitHub.
- Seaclouds installs ModaClouds Data Collectors automatically, while in MODAClouds this activity requires more manual work from the developer. MODAClouds is studying the approach followed by SeaClouds to automatize the installation of its Data Collectors, which will benefit MODAClouds.

The **SLA Service** was previously implemented by ATOS as a service that could be reused in other projects. The SLA Service relies on external monitoring systems, and each of these needs an adaptor to

retrieve the monitoring data from. Having used in SeaClouds the MODAClouds monitoring system -Tower 4Clouds-, the SeaClouds SLA Service has reused the adaptor developed for MODAClouds.

The benefits of the collaboration with SLA are:

- SeaClouds can use the functionality provided by SLA Service.
- During the collaboration between the two projects, Tower4Clouds changed the API to subscribe to metrics. This change required a modification in the adaptor of the SLA, that was carried out by SeaClouds team. SLA Service in MODAClouds benefited from this collaboration because the modification in the adaptor code has been ported to MODAClouds code repository.

3.5.2 Collaboration with Alien4Cloud project

The collaboration between SeaClouds and Alien4Cloud project takes place by means of the adoption within SeaClouds of the TOSCA Simple Profile spec implementation, TOSCA object model developed by Alien4cloud and the software for parsing and serializing TOSCA specifications developed by Alien4Cloud. In particular, these Alien4Cloud implementations have been adopted inside the SeaClouds Planner (e.g., in the Matchmaker module inside the Planner) and Deployer components.

The benefits of the collaboration with Alien4Cloud are:

- SeaClouds can reuse the functionality for parsing, modifying and serializing TOSCA documents provided by Alien4Cloud.
- During the integration of Alien4Cloud functionalities in SeaClouds platform, the SeaClouds team was able to test it, provide feedbacks and also fix some bugs [14] and [15]. Therefore, SeaClouds has actively collaborated to the development of Alien4cloud. The code developed by SeaClouds members that fixed the found issues was accepted and merged in the main Alien4Cloud repository in Github repository.

3.5.3 Collaboration with Apache Brooklyn project

Collaboration with Apache Brooklyn has been continuous during SeaClouds project. Concretely, between M13 and M30, Cloudsoft has developed a package that provides Apache Brooklyn with support to understand OASIS TOSCA plans. This package also uses the aforementioned Alien4Cloud project. The development of the new package has received considerable support from SeaClouds partners (e.g., user kiuby88 is Jose Carrasco from UMA and his contributions to TOSCA package of Apache Brooklyn can be found in [16]).

4 Fulfillment of KPIs

Each of the collaboration activities carried out between M13 and M30 accomplishes one or more Collaboration Objectives. For instance, SeaClouds presence in **CWF** and **CLOUDExpo** allowed SeaClouds

to increment the **Number of projects and initiatives in contact with (CO1)** and the **Number of dissemination events commonly organized (CO2).** Table 2 reports the CO accomplished by each collaboration activity.

	CO1 Number of projects and initiatives in contact with	**CO2 Number of dissemination events commonly organized**	**CO4 Number of software packages and concepts that are re-used in the project and coming from other projects and initiatives**	**CO5 Number of working groups to which the project members are actively participating**	**CO6 Number of promoted standards**
CWF	✔	✔			
CloudExpo	✔	✔			
workshop@ESOCC	✔	✔			
IFIP				✔	
MODAClouds	✔		✔		
ALien4Cloud	✔		✔		✔[1]
Brooklyn	✔		✔		✔[2]
Canopy	✔		✔[3]		
SEC4SA	✔			✔	
ICT		✔			

Table 3: Fulfillment of KPI of each Collaboration activity

Table 3 reports the resulting fulfillment of KPI of SeaClouds at M30. It adds the CO achieved between M13 and M30 to the CO achievement reported in Table 2. It shows that all COs have been totally fulfilled.

[1] Standards have been promoted within Alien4Cloud in the sense that SeaClouds has collaborated on the
[2] Standards have been promoted within Apache Brooklyn in the sense that SeaClouds has collaborated on the development of features related to TOSCA
[3] The reutilization direction is from SeaClouds packages to Canopy Cloud. It is still under study

KPI	Target value	Current value, calculated as (a)+(b)-(c) where: (a) Previous value at M12 (b) increment between M12 and M30 (c) Collaboration duplicated as it is present in both (a) and (b)
CO1	3 (M18)	5 + 8 - 2 (MODAClouds and Brooklyn are duplicated) = 11
CO2	2 (M30)	1 + 4 = 5
CO4	2 (M30)	2 (Cloud4SOA adapters, Brooklyn) + 4 - 2 (Brooklyn was already considered and Canopy is still under study) = 4
CO5	1 (M18)	2+2 - 0 = 4
CO6	2 (M18)	2+2-2 (TOSCA was already considered at M12 and the collaboration on the promotion of standards between M12 and M30 in Brooklyn and Alien4Cloud refers to the enhancements of their capabilities to support TOSCA standard) = 2

Table 4: Fulfillment of KPI at M30

5 Conclusion

This document describes the collaboration activities carried out by SeaClouds consortium between M13 and M30. It classifies each collaboration activity according to the pursued collaboration objectives and reports the KPI results to evaluate SeaClouds collaboration.

Regarding KPI fulfillment, SeaClouds has accomplished all its objectives, also coming up with results higher than foreseen at M6. A good work on collaboration had already been carried out at M12 since most of the collaboration KPI had been fulfilled. Nevertheless, SeaClouds consortium has not decreased its collaboration efforts and therefore SeaClouds project has doubled the goal value of many of its research Collaboration Objectives.

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