Large Scale Choreographies for the Future Internet

ICT IP Project

Deliverable D9.9.1

CHOReOS collaboration plan

http://www.choreos.eu

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Abstract

This deliverable is the plan covering the liaison and co-operation activities with the EC Collaboration Working Groups and other ICT projects.

Keyword list

Plan, Collaboration, Collaboration Working Groups

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Glossary, acronyms & abbreviations

Item	Description
CA	Consortium Agreement
CWG	Collaboration Working Groups
DL	Deliverable Leader
DOW	Description of Work
IAC	Industrial Advisory Committee
MST	Management Support Team
OSS	Open Source Software
PL	Project Leader
PMC	Project Management Committee
PO	Project Officer
PTC	Project Technical Committee
SL	Scientific Leader
SOM	Service-Oriented Middleware
WP	Work Package
WPL	Work Package Leader

Table of Contents

1. Introduction

The collaboration plan described in this report covers the liaison and co-operation activities of the CHOReOS project with other ICT projects under the WP2009/2010 Objective "*Internet of Services, Software and Virtualisation*" ("*Internet of Services*", IoS, for short). The cooperation aims at exploiting synergies between the projects and increasing the impact of the ICT initiative.

This plan covers the specific activities for collaboration with other ICT projects, i.e., as defined in Task 9.5 of the DoW:

- Exploitation of synergies / technical dialogue: participation to workshops, contribution to some of the Collaboration Working Groups;
- Joint activities for exchange, dissemination and training towards the professional community;
- Production of dissemination material that can be used for communication towards the general public;
- Participation in a working group on best practices in the use of open source repositories/forges;
- Co-ordination of standardisation efforts among multiple projects.

Other deliverables cover the other transfer activities:

- Dissemination activities (D9.3.1 to D9.3.3);
- Open source community building (D9.7.1 to D9.7.3);
- Exploitation activities (D10.1.1 to D10.1.4); and
- Standardisation (D10.5.1 to D10.5.3).

More specifically, this deliverable presents the CHOReOS plan for collaboration, including the specific working groups this project will participate to. It will be followed by yearly deliverables, detailing the activities done and updating the plans for the next period.

CHOReOS seeks cooperation with other ICT *Internet of Services* projects in organizing workshops during upcoming industrial and academic conferences as listed in Tasks 9.2 and 9.4 of the DoW, in order to increase the exchange of ideas and achieved results among related projects and attract wider audience to the sessions. Besides, it will take an active role in some of the Collaboration Working Groups (CWG).

This deliverable in organized as follow:

- Section 2 delivers the main foreseen areas of collaboration;
- Section 3 appreciates individual collaboration with IoS FP7 projects with regards to the preceding areas of collaboration;
- Section 4 values global collaboration with the FP7 Collaboration Working Groups;
- Section 5 plans actions with projects beyond those funded under Call 5, Objective 1.2, projects, simply qualified as ISSV (*Internet of Services, Software and Virtualization*) projects in what follows.

2. Main Areas of Collaboration

This section briefly recalls CHOReOS main objectives and cross-references them with the main fields of interest of Call 5 ISSV projects as well as of FP7 Collaboration Working Groups. Indeed, only Call 5 projects have been considered for active collaboration for the next 3 years since most of Call 1 projects will be over before the end of 2011.
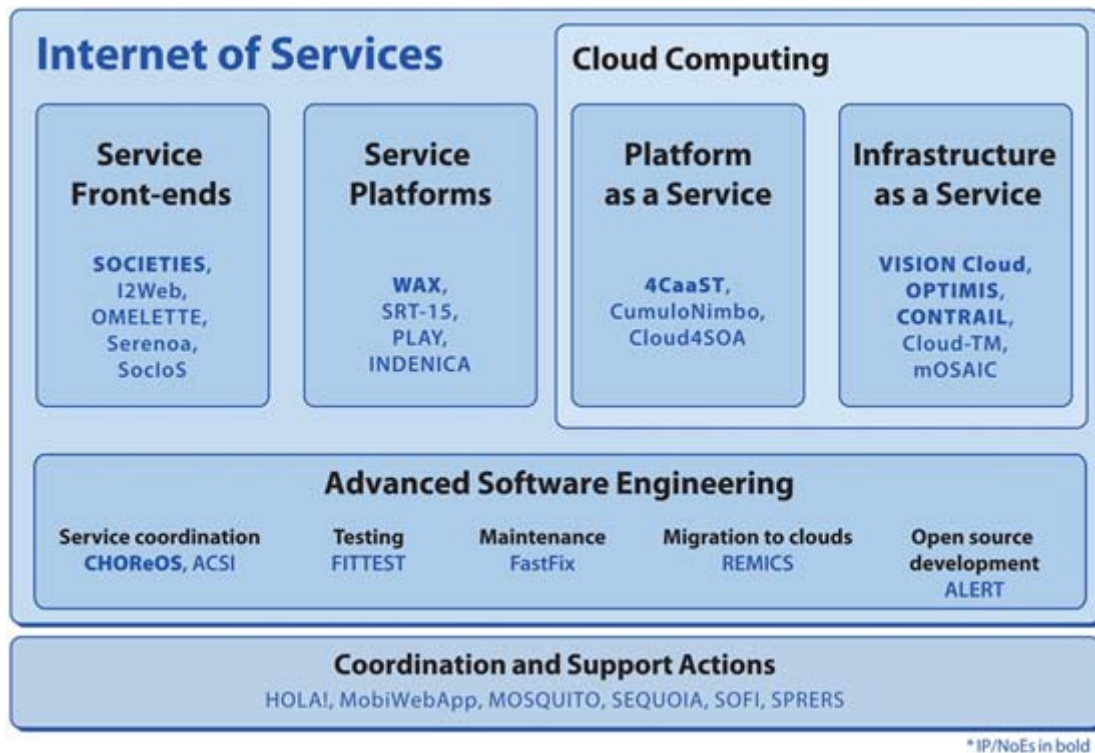
2.1. CHOReOS Main Objectives

Overall, CHOReOS aims at assisting the engineering of software service compositions in the revolutionary networking environment created by the Future Internet. To achieve its goal, CHOReOS will devise a dynamic development process, and associated methods, tools and middleware, to sustain the composition of services in the Future Internet.

In more detail and as stated in CHOReOS Description of Work (DoW), main objectives, and associated progress beyond the state of the art, of CHOReOS are:

- I- Abstractions and models for the Future Internet of Services: CHOReOS will "leverage existing abstractions, models and methodologies, and further evolution for scalability characterizing key concepts of the ULS Future Internet";
- II- Dynamic choreography-centric development process and supporting environment for the Future Internet:
  - II.a - From domain expert requirements to service composition: CHOReOS will enable "requirements specification by domain experts, accounting for both functional and non-functional (QoS) properties";
  - II.b - Scaling up to the ultra-large service base: CHOReOS will offer "scalable hierarchically structured registry based on reverse engineering of service abstractions with respect to both functional and non-functional properties";
  - II.c - Synthesizing scalable and adaptable choreographies: CHOReOS will provide "scalable synthesis of adaptable decentralized choreographies based on compositional reasoning using assume-guarantee techniques, and further generation of service wrappers";
- III - Service-oriented Middleware for the Future Internet:
  - III.a - Enabling scalable service provisioning based on Grid and Cloud computing: CHOReOS will integrate "Grid and Cloud middleware so that service execution may scale up to the load";
  - III.b - Enabling networking of services in the ULS network based on ESB-based middleware: CHOReOS will develop "the distributed service bus technology to meet the ULS challenge and further support for choreography deployment and execution";
  - III.c - Enabling networking of services from the Internet of Things based on middleware for pervasive networks: CHOReOS will "leverage and make evolve service oriented middleware technology for pervasive networks to face the challenges of the Internet of Things";
  - III.d - Enabling adaptable choreographies in the ULS Future Internet: CHOReOS will devise "Service-oriented middleware for ULS decentralized choreographies, based on the integration of the abovementioned technologies";
- IV - Governance for ultra-large-scale choreographies: CHOReOS will provide "run-time support for multi-organizations governance and for V&V activities".

2.2. CHOReOS Objectives wrt Call 5 IoS Projects

The following figure (from EC website[1]) depicts the different spheres of interest of the Call 5 ISSV ("Internet of Services, Software and Virtualisation") projects ("*Internet of Services, Software and Virtualisation*"):

FP7 - ICT - Call 5 - Objective 1.2 Projects

The table below further shows the correspondence between CHOReOS main objectives and Call 5-ISSV main fields of interest with respect to the Internet of Services, i.e.:

- *Services Fronts-ends*;
- *Service Platforms*;
- *Cloud computing* through two of its constituents: *Platform as a Service* and *Infrastructure as a Service*; and
- *Advanced Software Engineering*.

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[1] http://cordis.europa.eu/fp7/ict/ssai/projects-call5_en.html

		Call 5 main areas of interest			
		Services Fronts-ends	**Service Platforms**	**Cloud computing (PaaS & IaaS)**	**Advanced Software Engineering**
CHOReOS Objectives	**I**	/	/	/	Formal models for the FI
	II.a	/	/	/	From domain expert requirements to service composition
	II.b	/	Scalable registry	/	/
	II.c	/	Generation of service wrappers	/	/
	III.a	/	/	Integration of Grid and Cloud middleware	/
	III.b	/	Distributed service bus for FI	/	/
	III.c	/	SOM for pervasive networks	/	/
	III.d	/	SOM for choreographies	/	/
	IV	/	Run-time supporting multi-organizations governance and V&V activities	/	multi-organizations governance and V&V

2.3. CHOReOS Objectives wrt Collaboration Working Groups

The following table shows the correspondence between the foci of FP7 Collaboration Working Groups[2] and CHOReOS main objectives. Still, note that the WGs on *Semantics* and on *Service Front Ends* are not considered further due to the weak potential of collaboration for CHOReOS.

CHOReOS Objectives	FP7 Collaboration Working Groups					
	Service Architectures	Service Engineering	QoS & SLAs	Future Internet Assembly	Trust & Security	Formal Methods for SOA and FI
I	NEXOF Ref. model	/	/	Models for the FI	Need of collaboration to counterweigh the lack of security concern in CHOReOS	Formally grounded models for the FI
II.a	NEXOF Ref. model	From domain expert requirements to service composition	Requirements accounting for both functional and non-functional properties	Choreography-centric development for the FI		/
II.b	/	/	/			/
II.c	/	/	/			/
III.a	/	/	Grid and Cloud so that service execution may scale up to the load	Service-oriented Middleware for the Future Internet		/
III.b	/	/	/			/
III.c	/	/	/			/
III.d	/	/	/			/
IV	NEXOF Ref. model	/	SLA enforcement for ULS choreographies	V&V for multi-organizations governance		/

Besides, more horizontal working groups are also of interest for CHOReOS, and specifically:

- *Best practices for open source* due to the strong involvement of CHOReOS in OSS;
- *Techno Socio-Economics* since CHOReOS work includes socio-economics studies (Tasks 6.4, 7.4, 8.4 and 10.2).

3. Related Projects

For each of the most relevant spheres of ISSV, as sketched previously, this section reviews projects with which point-to-point collaborations will be investigated during CHOReOS life time.

3.1. Service Platforms

Projects that are parts of this field of interest are (as defined in EC's "*Software & Services FP7 Project Portfolio*"):

- *WEBINOS* (f.k.a. WAX): Secure WebOS Application Delivery Environment;
- *SRT-15*: Subscription Routing Technology for 2015;
- *PLAY*: Pushing dynamic and ubiquitous interaction between services Leveraged in the Future Internet by applying complex event processing; and
- *INDENICA*: Engineering virtual domain-specific service platforms.

Despite sharing common interest with CHOReOS on Service Platforms, the above projects do not address the main topics of interest to CHOReOS in the area, i.e.: Scalable registry, Generation of service wrappers, SOM for pervasive networks, SOM for choreographies, Run-time V&V supporting multi-organizations governance.

Yet, **PLAY is to be contacted (Action: Jean-Pierre Lorré, EBM)** about "Distributed service bus for FI" since it deals with Event Driven Architecture and Complex Event Processing and it could be worthwhile to exchange with them on how to take into account these techniques into CHOReOS.

3.2. Advanced Service/Software Engineering

This area of interest addresses the following points: service coordination, testing, maintenance, migration to clouds and open source development, among which service coordination and open source development are of utmost interest to CHOReOS.

We thus consider the following projects (with their definition from EC's "*Software & Services FP7 Project Portfolio*") for possible collaborations:

- *ACSI* develops a rich framework around the notions of dynamic artefacts and interoperation hubs, enabling a substantial simplification in the establishment and maintenance of service collaborations; and
- *ALERT* develops methods and tools that improve FLOSS (Free/Libre Open Source Soft ware) coordination by maintaining awareness of community activities through real-time, personalized, context-aware notification.

As a matter of fact, the ACSI project already made contact with CHOReOS. ACSI develops a rich framework around the notions of dynamic artefacts and interoperation hubs, enabling a substantial simplification in the establishment and maintenance of service collaborations. **Potential collaboration with the ACSI project includes mutual test bed for comparison between the two approaches, and still needs to be formalized; we plan this formalization for Year 2 of CHOReOS (Action: Hugues Vincent, THA)**.

Collaboration with ALERT would also be appropriate since CHOReOS targets to outcome its results as OSS: **contact with ALERT's project coordinator needs to be done during Year 1 of CHOReOS to investigate potential for collaboration and related concrete actions (Action: Cédric Thomas, OW2)**.

3.3. Cloud Computing Technologies

This section encompasses the projects related to Cloud Computing (from EC's "*Software & Services FP7 Project Portfolio*"):

- *4CaaST* creates a PaaS Cloud platform which supports the optimized and elastic hosting of Internet-scale multi-tier applications;
- *CumuloNimbo* delivers a new generation of Cloud Platforms as a Service (PaaS) that will provide consistency, availability, and simpler programming abstractions, such as transactions;
- *Cloud4SOA* focuses on resolving the semantic interoperability issues that exist in current Clouds platforms and infrastructures and on introducing a user-centric approach for applications which are built upon and deployed using Cloud resources;
- *VISION* Cloud introduces a powerful ICT infrastructure for reliable and effective delivery of data-intensive storage services, facilitating the convergence of ICT, media and telecommunications;
- *OPTIMIS* enables an open and dependable Cloud Service Ecosystem that delivers IT services that are adaptable, reliable, auditable and sustainable;
- *CONTRAIL* designs, implements, evaluates and promotes an open source system in which resources that belong to different operators are integrated into a single homogeneous Federated Cloud that users can access seamlessly;
- *Cloud-TM* define a novel programming paradigm to facilitate the development and administration of Cloud applications; and
- *mOSAIC* develops an open-source platform that enables applications to negotiate Cloud services as requested by their users.

From our perspective, CHOReOS is not a project about Cloud Computing *per se*; CHOReOS aims at enabling compositions of services for the Future Internet, which includes services hosted on Cloud infrastructures.

Furthermore, none of the above projects shows any specificity that could create an opportunity for point-to-point collaboration. Indeed, CHOReOS targets the exploitation of the high-performance computing power available in Grid and Cloud Computing building upon two well-known open source, InteGrade[3] and Hadoop[4]. Moving to a to-be-implemented PaaS and/or IaaS would put CHOReOS's schedule at stake.

3.4. Coordination and Support Actions

Regarding CSAs, the most relevant ones with respect to CHOReOS are:

- *SEQUOIA SA*[5], which aims at "maximising the socio-economic impact of SaaS and IoS research projects". Here, the common interest with the Task 10.2 on "*Socio-technical factor evaluation of the Choreography-base FI approach*" is straightforward.

  Contacts have already been taken with the SEQUOIA team and will be followed (Action: Egils Ginters, SSII VIA).

- *SOFI SA*[6], which "builds upon and complements the current effort around the FIA, and most particularly the service-related working groups, and most specifically the FISO WG". This SA is then to be followed in the same way the Future Internet Assembly has to be (see Section 4).

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[3] www.integrade.org.br
[4] http://hadoop.apache.org
[5] http://www.sequoiaproject.eu/index.php/home
[6] http://www.sofi-project.eu

We will also follow closely progress and results in the Network of Excellence NESSOS, which answered Call 5 under Objective 1.4 (Trustworthy ICT), which is relevant for the security concerns of choreographies in the FI (see Section 5).

4. Related Collaboration Working Groups

This section establishes which global collaborations will be investigated as part of the Collaboration Working groups, according to the principles drawn in the Section 2.

4.1. Service Architectures WG

As pointed out by the ECSS Web site[7], collaboration within the *Service Architecture* WG followed the activities of the NEXOF-RA project, which core outcome was the NEXOF Reference Service Architecture.

This Reference Architecture can be seen as a holistic model that refines and enriches all the previously defined conceptual and architectural knowhow about modelling and/or describing service-based systems, and provides an integrated and well structured view of them.

The NEXOF Reference Architecture defines a pattern-based reference architecture for SOA infrastructures within the FI and, as part of it, defines a conceptual model specifying the first-level entities that constitute these infrastructures, the facilities they provide, as well as relationships among them.

As detailed in Deliverable D1.2 on "*CHOReOS perspective on the Future Internet and initial conceptual model*", the NEXOF-RA Reference Model served as baseline for the CHOReOS Conceptual Model that will accompany CHOReOS all along its development phase.

Hence, **the activities of this Working Group will be closely followed and participated to (Action: Andrea Polini, University of Camerino, and Hugues Vincent, THA)**.

4.2. Service Engineering WG

The *Service Engineering* WG is definitely in scope with CHOReOS, mainly with regards to
- Model-driven service engineering;
- Design and development of adaptive services;
- Service engineering standards; and
- Run-time environment for services.

2010's CWG meeting in Brussels gave the opportunity to meet the leaders of this working group. **Planned collaboration includes books, articles, events and collaborative inputs to evolving standards for service engineering (Action: Darius Silingas, NME)**.

4.3. QoS and SLAs WG

The interest of the QoS and SLAs WG resides in CHOReOS's interest in Governance in general and in SLA enforcement for ultra-large scale choreographies in particular.

Following the aim, **contacts will be taken with this group to investigate further paths for collaboration (Action: Jean-Pierre Lorré, EBM).**

4.4. Future Internet Assembly

The FIA is the assembly for all concerns about the Future Internet. Collaboration with this assembly will be made either through their wiki or through the SOFI SA.

At the time of writing this plan, the FIA seems to take a bottom-up approach to the Future Internet by, e.g., devising its infrastructure from its fundamental limitation.

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[7] http://www.eu-ecss.eu/contents/collaboration-working-groups

While this assembly is undoubtedly of interest for CHOReOS, main collaborations will not take place early and highly depends on FIA's plans. Still, **CHOReOS will follow closely the FIA work in order to take opportunity of, e.g., presentations (Action: Hugues Vincent, THA)**.

4.5. Trust and Security WG

Since CHOReOS has no involvement in terms of security and because this is a main concern for today's industries, there is a need for collaboration in this area.

The *Trust and Security* WG, which covers technical, business as well as operational issues concerning security (authentication, authorization…), is thus of interest. **It is thus planed to follow and exchange with this Working Group at large including the Effect Plus SA[8] in order to get some advice on the design of choreography Integrated Design and Runtime Environment (Action: Vangelis Mihalopoulos, VTRIP, and Riccardo Mazza, WIND).**

4.6. Formal Methods for SOA and FI WG

Section 3 established that the main interest for CHOReOS on collaborating with the **Formal Methods for SOA and FI** WG is about "Models for the FI".

A first presentation of CHOReOS was given during 2010 CWG meeting in Brussels and C**ollaboration includes books, articles and events (Action: Massimo Tivoli, UDA).**

4.7. Best Practices for Open Source WG

CHOReOS being the first FP7 IP project having an open OSS organization among its members (OW2 consortium), it will bring its know-how to this Working Group.

More precisely, **CHOReOS committed for an active participation (Action: Cédric Thomas, OW2)**: guidelines for future project, list of reference sources for open source licences…

4.8. Techno Socio-Economics WG

CHOReOS will mainly follow this working group through the SEQUOIA SA with which, as already stated, contacts have already been taken.

Moreover, we'll **serve as OSS "reference" (Action for this point: Cédric Thomas, OW2)**: presentation about open source business models and so forth.

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[8] http://www.effectsplus.eu/

5. Other projects and initiatives

In addition to the collaboration plan outlined in the previous sections, Call 1 project SOA4ALL offered us to present their results: **follow-up actions will be planned following this presentation scheduled during the CHOReOS plenary project meeting to be held April 6-8, 2011 (Action: Hugues Vincent, THA)**.

Furthermore, as already mentioned, CHOReOS has no direct involvement in security issues while this is a main concern in the Future Internet of services. In this field, a key player in the Future Internet is the NESSOS Network of Excellence. As stated on NESSOS's web site (http://www.nessos-project.eu), the Network of Excellence on Engineering Secure Future Internet Software Services and Systems (NESSoS) aims at constituting and integrating a long lasting research community on engineering secure software-based services and systems. NESSOS consortium groups twelve members, among which CNR and INRIA, who are also CHOReOS partners. It also plans to coalesce with other key players as associated partners. It is then expected that it will produce an impact in setting the foundations and a shared conceptual and technical framework for addressing security concerns in open dynamic systems, such as those addressed by CHOReOS. The Network will target integration and harmonization of research, as well as training and education.

We will in particular closely follow the conceptual framework under development within the NESSOS Network of Excellence (Action: Andrea Polini, University of Camerino).