

CHOReVOLUTION

H2020 ICT9 Project

Deliverable D7.4

Dissemination and Standardization - v1

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Abstract

This report summarizes achievement of the CHOReVOLUTION project in terms of disseminating project's goals and results towards the scientific community during the first year. It further provides links to the concrete material that has been disseminated so far, hence enabling the interested reader to get access to the published material to know more about CHOReVOLUTION. Furthermore, this deliverable outlines the project's plan towards possible future standardization opportunities.

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Dissemination, Publications, Standardization

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Glossary, acronyms & abbreviations

Item	Description
DOW	Description of Work
PC	Programme Committee
PMC	Project Management Committee
SDOs	Standard Defining Organizations
WG	Working Group
WP	Work Package

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1. Introduction

By relying on the project's DOW, CHOReVOLUTION partners are planning the following dissemination and standardization activities towards raising awareness and further fostering the taking up of project results, as part of the dedicated Task 7.4 of WP7:

- Submitting contributions on CHOReVOLUTION results for presentation at leading academic conferences and publishing in leading scientific journals.
- Potentially contributing model examples and improvement suggestions to BPMN; possibly contributing to other relevant standards.
- Organizing international scientific workshop in conjunction with major event in the area of service/software engineering (e.g., ICSOC, ICSE, ESEC, FSE), to be organized during the 2nd year and to be held in the last year of CHOReVOLUTION.
- Preparing and publishing technical reports for disseminating final CHOReVOLUTION results.
- Monitoring and possibly contributing to relevant SDOs working groups to ensure CHOReVOLUTION's compliance with state-of-the-art standards.

These activities are focused on the dissemination of the CHOReVOLUTION technology advances that will be of interest for the scientific community and the standard defining organizations (SDOs).

Obviously, concrete dissemination (and even more standardization-oriented) results are expected to become increasingly effective over the years, according to the project's progress.

Still, the consortium has been very active regarding organization of academic events, editorship of special issues, and publications about CHOReVOLUTION, although the project is in the first year and hence has been concentrating on the design of the CHOReVOLUTION platform and associated elements, while further publications require concrete artefacts for the sake of assessment and validation.

As for the other dissemination and standardization-oriented activities, they will be implemented in the next years, according to the project's plan.

Last but not least, dissemination about CHOReVOLUTION is actually supported by all the tasks of WP7 on "Dissemination, Exploitation and Market Take-up", beyond Task 7.4 that is specifically devoted to scientific dissemination and standardization and whose results are reported in this deliverable. In particular, industry-oriented dissemination is pursued in Task 7.2. Further information about the achievements of these related tasks may be found in the various Deliverables D7.x.

According to the above, the report is structured as follows:

- Chapter 2 concentrates on scientific dissemination activities, further summarizing publications of the 1st year as well as participation of the CHOReVOLUTION consortium in conference programme committees, which help promoting awareness about the CHOReVOLUTION fields of study.
- Chapter 3 outlines standardization areas of interest to CHOReVOLUTION, as a preliminary step towards identifying the CHOReVOLUTION plan for standardization-oriented activities.

- Chapter 4 concludes with the CHOReVOLUTION dissemination and standardization plan for the next periods, which will in particular build on targeted implementation results.

2. CHOReVOLUTION Scientific Dissemination

CHOReVOLUTION targets dissemination in both leading academic venues and strong industry-oriented events, so as to foster take up of CHOReVOLUTION results in the various communities of relevance.

Regarding leading academic venues that are targeted by the consortium, these cover the various areas studied by the project, i.e.:

- **Software, services and systems engineering:**
 - **Journals & magazines:** *IEEE TSE, ACM TOSEM, SoSyM (Springer), JSS (Elsevier), ...;*
 - **Conferences:** *ICSE, ACM SIGSOFT FSE, Joint ESEC/ACM FSE, IEEE ASE, FASE, IEEE ICST, IEEE/IFIP WICSA, ICSOC, IEEE ICWS, IEEE SCC, IEEE CAiSE, ACM SAC, ACM/IEEE MODELS, ServiceWave, ...*
- **Distributed systems, middleware, services, Internet, clouds, mobile ad hoc and sensor networks:**
 - **Journals & magazines:** *IEEE TPDS, ACM TOCS, JPDC (Elsevier), CACM, IEEE Computer, IEEE TMC, PMC (Elsevier), IEEE Pervasive Computing, IEEE TSC, IEEE Internet Computing, Journal of Internet Services and Applications (Springer), ...;*
 - **Conferences:** *ACM/IFIP/USENIX Middleware, IEEE ICDCS, IFIP DAIS, IEEE/IFIP DSN, ACM/USENIX Mobisys, IEEE PerCom, IEEE Pervasive, International Conference on Ubiquitous Computing, Internet of Things Conference, IEEE CCGrid, ACM Conference SenSys, IEEE DCOSS, ...*

As for industry-focused exhibits, the following major industrial conferences and exhibitions have been identified: ICT Event, CeBIT, OOP, JavaOne, JAX World, Software Engineering Today, Software Architect, ... As already pointed out, only scientific dissemination results are reported in this deliverable.

As we are in the first year of the project, dissemination results are mainly oriented toward CHOReVOLUTION platform components design. On the other hand, major publications are expected based on concrete, assessed results, which are to become available in the second year. Hence, presentation and publications in the first year have also targeted workshops, which are the venue of choice to exchange about vision and initial design.

Next to presentations and publications, another important dissemination-oriented activity lies in participating to conference organization committees and especially programme committees so as to raise awareness in the research fields of interest in the community.

Main achievements regarding presentations and publications are quantitatively summarized in the table below.

Dissemination path	Achievements
Event chairing and editorship of special issues	6
Journal papers & Book chapters	1

Conference papers	4
Workshops and posters	6

The following sections then detail achievements of the CHOReVOLUTION consortium during the first year regarding: Publications (Section 2.1), Event chairing and editorship of special issues (Section 2.2), and Programme committee membership (Section 2.3).

2.1. Publications

The following sections list the publications of the project in the first year by major categories of venue.

2.1.1. Journals and Book chapters

- M. Autili, P. Inverardi, A. Perucci, M. Tivoli, Synthesis of Distributed and Adaptable Coordinators to Enable Goal-driven Choreography Evolution. *Submitted to Software Engineering for Self-Adaptive Systems: Assurances (SEfSAS Book 3)*, LNCS volume, Springer Verlag, 2015

2.1.2. Conferences

- Marco Autili, Paola Inverardi and Massimo Tivoli, Automated Integration of Service-oriented Software Systems, in: LNCS Proceedings of the 6th International Conference on Fundamentals of Software Engineering (FSEN 2015), pages 30-45, Springer International Publishing, 2015
- Ajay Kattepur, Nikolaos Georgantas, Georgios Bouloukakis, Valerie Issarny. Analysis of Timing Constraints in Heterogeneous Middleware Interactions. International Conference on Service Oriented Computing (ICSOC 2015), Nov 2015, Goa, India. 2015
- Georgios Bouloukakis, Rachit Agarwal, Nikolaos Georgantas, Animesh Pathak, Valerie Issarny. Leveraging CDR datasets for Context-Rich Performance Modeling of Large-Scale Mobile Pub/Sub Systems. WiMob 2015 - 11th IEEE International Conference on Wireless and Mobile Computing, Networking and Communications, Oct 2015, Abu Dhabi, United Arab Emirates. 2015
- Garvita Bajaj, Georgios Bouloukakis, Animesh Pathak, Singh Pushpendra, Nikolaos Georgantas, Valerie Issarny. Toward Enabling Convenient Urban Transit through Mobile Crowdsensing. 18th IEEE International Conference on Intelligent Transportation Systems, Sep 2015, Gran Canaria, Spain. 2015

2.1.3. Workshops and posters

- Marco Autili, Amleto Di Salle, Alexander Perucci and Massimo Tivoli, On the Automated Synthesis of Enterprise Integration Patterns to Adapt Choreography-based Distributed Systems, in: Proceedings of the 14th FOCLASA 2015, 2015
- Marco Autili, Amleto Di Salle, Francesco Gallo, Alexander Perucci and Massimo Tivoli, Biological Immunity and Software Resilience: two faces of the same coin, in: Proceedings of the 7th International Workshop on Software Engineering for Resilient Systems (SERENE'15), pages 1-15, Springer International Publishing - LNCS, 2015
- Amleto Di Salle, Francesco Gallo, Alexander Perucci, Towards Adapting Choreography-based Service Compositions Through Enterprise Integration Patterns, in: Proceedings of the 1st International Workshop of The Art of Service Composition and Formal Verification for Self-* Systems (VERY*SCART) - Springer International Publishing - LNCS, 2015, York, UK

- Amleto Di Salle, Francesco Gallo, Alexander Perucci, VISION: Dependable Composition of Software and Services in the Internet of Things: a Biological Approach, in: Proceedings of the 1st International Workshop of The Art of Service Composition and Formal Verification for Self-* Systems (VERY*SCART) - Springer International Publishing - LNCS, 2015, York, UK
- Georgios Bouloukakis, Nikolaos Georgantas, Rachit Agarwal, Animesh Pathak, Valerie Issarny. Towards Mobile Social Crowd-Sensing for Transport Information Management. NetMob, Data for Development (D4D) Challenge, Apr 2015, MIT Media Lab, United States. 2015
- Gomes, R., Lima, J., Costa, F., Rocha, R., Georgantas, N.. A Model-Based Approach to Pragmatic Service Choreography Deployment. In: Second Workshop on Seamless Adaptive Multi-cloud Management of Service-based Applications, 2015, Taormina, Italy. Proceedings of Second Workshop on Seamless Adaptive Multi-cloud Management of Service-based Applications, 2015 at the Fourth European Conference on Service-Oriented and Cloud Computing (ESOCC 2015)

2.2. Event chairing and editorship of special issues

In the following, we list CHOReVOLUTION-related event chairing and thematic series/special issues of international journals led by CHOReVOLUTION consortium members:

- Marco Autili, Alfredo Goldman and Massimo Tivoli, (Organizers and Editors of) Proceedings of the 11th IEEE World Congress on SERVICES 2015 Visionary Track on Service Composition for the Future Internet (SCFI 2015), IEEE Conference Publishing Services - 11th World Congress on Services - IEEE SERVICES, 2015
- Marco Autili, Alfredo Goldman and Massimo Tivoli, (Organizers and Editors of) Proceedings of the International Workshop on the "ART" of Software Composition (SCART 2015), Springer International Publishing, LNCS - 13th International Conference on Software Engineering and Formal Methods (SEFM 2015), 2015
- Marco Autili, Tom Ritter, Andrey Sadovykh and Massimo Tivoli, (Organizers and Editors of) Proceedings of the Projects Showcase@STAF'15, CEUR PROCEEDINGS - Software Technologies: Applications and Foundations federation of conferences - STAF, 2015
- Marco Autili, Alfredo Goldman and Massimo Tivoli, (Editors of) Thematic Series on Service Composition for the Future Internet, Springer Science and Business Media, Springer Open, volume To Appear, 2015
- Aniruddha Gokhale and Nikolaos Georgantas, (Organizers and Editors of) Proceedings of the 14th Workshop on Adaptive and Reflective Middleware (ARM 2015), ACM - ACM/IFIP/USENIX Middleware conference (Middleware 2015)
- Nikolaos Georgantas, Bhaskar Krishnamachari, Animesh Pathak, Nalini Venkatasubramanian, (Editors of) Thematic Series on the Internet of Things, Springer Open, Journal of Internet Services and Applications (JISA)

2.3. Programme committees

The following members took part in programme committees of the listed events:

Marco Autili (UDA)

- ACM Student Research Competition (ACM SRC) sponsored by Microsoft Research The competition is hosted by MOBILESoft 2016 co-located with ICSE 2016

- 2st International Conference on Fundamentals and Advances in Software Systems Integration (FASSI 2016)
- 4th International Conference on Model-Driven Engineering and Software Development (MODELSWARD 2016)
- 3rd IEEE/ACM International Conference on Mobile Software Engineering and Systems (MOBILESoft 2016) co-located with ICSE 2016
- 1st International Workshop on domain specific Model-based Approach to verification and validation (AMARETTO 2016) held in conjunction with MODELSWARD 2016
- ModelCyPhy Track on Model-Driven Engineering for Cyber-Physical Systems (ModelCyPhy 2016) at the 13th International Conference On Information Technology: New Generations ITGN
- SEfSAS Book 3 - Dagstuhl Seminar 13511 Software Engineering for Self-Adaptive Systems: Assurances
- 2nd International Workshop on Model-Driven Engineering for Component-Based Software Systems (ModComp 2015) at MODELS 2015
- 14th International Workshop on Foundations of Coordination Languages and Self-Adaptive Systems (FOCLASA 2015), co-located with CONCUR
- 10th International Conference on Software Engineering Advances (ICSEA 2015)
- 7th International Workshop on Software Engineering for Resilient Systems (SERENE 2015)
- 1st International Conference on Fundamentals and Advances in Software Systems Integration (FASSI 2015)

Massimo Tivoli (UDA)

- 5th International Conference on Information Society and Technology (ICIST 2015)
- 41st Euromicro Conference series on Software Engineering and Advanced Applications (SEAA 2015)
- 13th edition of the International Conference on Software Engineering and Formal Methods (SEFM 2015)
- 18th International ACM Sigsoft Symposium on Component-Based Software Engineering (CBSE 2015)
- 10th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE NIER 2015)
- 38th International Conference on Software Engineering Poster Track (ICSE 2016)
- 37th International Conference on Software Engineering - RC member (ICSE 2015)
- 3th International Conference on Model-Driven Engineering and Software Development (MODELSWARD 2015)
- 4th International Conference on Model-Driven Engineering and Software Development (MODELSWARD 2016)
- 10th International Conference on Software Engineering Advances (ICSEA 2015)

- 1st International Conference on Fundamentals and Advances in Software Systems Integration (FASSI 2015)

Nikolaos Georgantas (Inria)

- 1st International Workshop on the ART of Software Composition (SCART 2015)
- 10th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC 2015) - Track on Big Data, Data Management and Analytic
- Projects Showcase at Software Technologies: Applications and Foundations (STAF 2015)
- European Conference on Ambient Intelligence (Aml 2015)
- 7th International Workshop on Software Engineering for Resilient Systems (SERENE 2015)
- IEEE International Symposium on Service-Oriented System Engineering (SOSE 2015)
- 11th International Joint Conference on Software Engineering and Applications (ICSOFT-EA 2015)
- 11th International Joint Conference on Software Paradigm Trends (ICSOFT-PT 2015)
- 24th IEEE International Conference on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2015)
- 6th International Conference on Ambient Systems, Networks and Technologies (ANT 2015) - Track on Agent Systems, Intelligent Computing and Applications
- 6th International Conference on Ambient Systems, Networks and Technologies (ANT 2015) - Track on Smart Environments and Applications
- 3rd International Workshop on Software Engineering for Systems-of-Systems (SESoS 2015)
- 18th International ACM Sigsoft Symposium on Component-Based Software Engineering (CBSE 2015)
- 31st ACM/SIGAPP Symposium on Applied Computing (SAC 2016) - Track on Reliable Software Technologies and Communication Middleware

3. Standardization areas related to CHOReVOLUTION

While CHOReVOLUTION partners are not directly involved in standardization activities, we are closely following ongoing standardization efforts that are related to the CHOReVOLUTION areas of interest. Based on the expected outcomes of the project, we are considering the future possibility to contribute to such standards under discussion by proposing enhancements or improvements of the current specifications. In the following, we outline standardization areas of interest to CHOReVOLUTION.

3.1. Service Choreography Synthesis

To realize the automated synthesis of secure and dynamically evolvable choreographies, while requiring as less as possible additional knowledge with respect to the usage of choreography specification standards, we propose enhanced BMN2-based choreography specifications. While producing these specifications, we rely on different standards for

services and Things specification as well as for choreography specification. Some of them, such as WSDL¹ for services, WADL² for Thing-based services, CoAP³ for Things, WS-Security⁴ for specifying security policies, do not need more effort on standardization. Some others, such as BPMN2⁵ for choreography specification, although well established, might represent, in the future, an opportunity to either contribute to enhance its defining standard specification, or to fix some issues of the current standard. The following table summarizes the main area for possible future standardization opportunities related to the specification of choreographies that supports choreography automated synthesis.

Date of activity	SDO as link	Contribute or Monitor	SDO work-item or topic to monitor/contribute	Responsible Partner(s)	Stds-Phase, Comment & Status
Ongoing	BPMN2	Monitor	BPMN2 Choreography Diagrams	UDA	Defining a clear semantics for some of the BPMN2 Choreography Diagrams elements; Implementation in CHOReVOLUTION of possible extensions of BPMN2 Choreography Diagrams.

3.2. Identity Management and Security Federation

Regarding Identity Management and federated Access Control, different standards are used and, in general, do not need more effort on standardization. Nevertheless, applying these standards in CHOReVOLUTION could lead to identifying possible evolutions. The following table gives the main area for potential future contribution to standardization:

Date of activity	SDO as link	Contribute or Monitor	SDO work-item or topic to monitor/contribute	Responsible Partner(s)	Stds-Phase, Comment & Status
Ongoing	OASIS XACML TC	Monitor	XACML v3.0 Core Specification, Multiple Decision Profile, Core and Hierarchical RBAC Profile	THA	Implementation in CHOReVOLUTION of XACML 3.0 Core, RBAC and part of the Multiple Decision profile.
Ongoing	SCIM 2.0	Monitor	SCIM 2.0 API Specification	THA	Some concepts of the SCIM RESTful API are reused in the design of the Authorization PDP's RESTful API.

3.3. Interaction Interoperability in the IoT

To support the cross-interaction of different heterogeneous services and Things, we are using multiple standards, abstracted by the General Middleware (GM) protocol. Thus, it is

¹ <http://www.w3.org/TR/wsd1>

² <http://www.w3.org/Submission/wadl/>

³ <http://coap.technology/spec.html>

⁴ https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wss

⁵ <http://www.omg.org/spec/BPMN/2.0/>

necessary to follow the defined primitives of different protocols; these are, in general, established and do not need more effort for standardization. However, we additionally intend to introduce Quality of Service (QoS) parameters to support QoS guarantees in services' and Things' interactions, hampered by the mobility aspect. Therefore, we may need to introduce new protocol parameters that are not included in the specifications; this may raise the need for future standardization. The following table gives the main area for the standardization:

Date of activity	SDO as link	Working group	Contribute or Monitor	SDO work-item or topic to monitor/contribute	Responsible Partner(s)	Stds-Phase, Comment & Status
Ongoing	OASIS MQTT	OASIS-WG	Monitor	MQTT v3.1.1 primitives and QoS Flags in each MQTT header	Inria	Implementation of the General Middleware (GM) protocol using the MQTT primitives; support for QoS.
Ongoing	IETF RFC-7252	core	Monitor	CoAP primitives' QoS parameters defined in the Interaction Model	Inria	Implementation of the General Middleware (GM) protocol using the CoAP primitives; support for QoS.
Ongoing	IETF RFC-6455	WHATWG	Monitor	WebSocket primitives' QoS parameters defined in the Interaction Model	Inria	Implementation of the General Middleware (GM) protocol using the WebSocket primitives; support for QoS.

3.4. Cloud Enactment of Choreographies

For cloud enactment of choreographies in CHOReVOLUTION, we make use of Openstack, which can be seen as the main industrial standard regarding cloud based infrastructures. Openstack is a very large open source community with contributions from numerous companies coming from many countries. Monitoring and potentially contributing to the Openstack community could lead to identifying possible further components to be exploited in the CHOReVOLUTION Enactment Engine (EE) architecture. The following table gives the main area for potential future contribution to the Openstack community:

Date of activity	SDO as link	Contribute or Monitor	SDO work-item or topic to monitor/contribute	Responsible Partner(s)	Stds-Phase, Comment & Status
Ongoing	Openstack	Monitor and interact with the Openstack community	Nova, Glance, Ceilometer	CEFRIEL	Chorevolution EE heavily uses Nova and Glance. Work in progress concerns the use of Ceilometer for monitoring.

4. Conclusion

While the CHOReVOLUTION project has achieved good results in terms of dissemination despite being in its first year, dissemination achievements are expected to significantly grow in the 2nd and even more 3rd year, in particular due to available software prototypes.

Concretely, dissemination and standardization-oriented activities will be along the line of the objectives recalled in the Introduction:

1. **Publications:** CHOReVOLUTION publications will increasingly target leading venues, such as the ones listed in Section 2.

2. **Organization of an open international CHOReVOLUTION workshop:** The CHOReVOLUTION workshop is planned to be held in the project's 3rd year. However, organization will start during the 2nd year, in particular selecting the events with which the workshop should be co-located for greater impact, as well as preparing the calls for contributions for early publicity.
3. Preparing and publishing **technical reports** for disseminating final CHOReVOLUTION results.
4. Continue **standardization-oriented monitoring activities** and identify potential opportunities for contribution to standards.
5. **Final dissemination and standardization report:** This activity will be undertaken during the 3rd year, building upon the various CHOReVOLUTION results and supporting material.