



Project N°: **FP7-610582**
Project Acronym: **ENVISAGE**
Project Title: **Engineering Virtualized Services**
Instrument: **Collaborative Project**
Scheme: **Information & Communication Technologies**

Deliverable D5.4.3

Final Report on Academic Reach-Out

Date of document: T36



Start date of the project: **1st October 2013**

Duration: **36 months**

Organisation name of lead contractor for this deliverable: **TUD**

Final version

STREP Project supported by the 7th Framework Programme of the EC		
Dissemination level		
PU	Public	✓
PP	Restricted to other programme participants (including Commission Services)	
RE	Restricted to a group specified by the consortium (including Commission Services)	
CO	Confidential, only for members of the consortium (including Commission Services)	

Executive Summary:

Final Report on Academic Reach-Out

This document summarises deliverable D5.4.3 of project FP7-610582 (**Envisage**), a Collaborative Project supported by the 7th Framework Programme of the EC within the Information & Communication Technologies scheme. Full information on this project is available online at <http://www.envisage-project.eu>.

This deliverable is a report on the organization of the workshops D5.4.1 and D5.4.2 and an assessment of their success.

List of Authors

Reiner Hähnle (TUD)

Einar Broch Johnsen (UIO)

Contents

1	Summary	4
1.1	Envisage Academic Dissemination Strategy	4
1.2	The ISoLA 2014 Track	5
1.3	The ES OCC 2016 Conference	5
1.4	Organization of Other Scientific Events	6
1.5	Overall Assessment	7
	Bibliography	8

Chapter 1

Summary

1.1 Envisage Academic Dissemination Strategy

The dissemination strategy of **Envisage** laid down in Deliverable D5.1 specifies the following components for academic reachout activities:

1. Peer-reviewed scientific publications
2. Joint publications
3. Organization of scientific events

The first two items are covered in detail in the annual progress management reports as well as in the intermediate management reports (deliverables D6.3–D6.5). Here we just mention that three LNCS volumes were dedicated to **Envisage** and nearly 100 peer-reviewed publications were generated, many of which are based on invited presentations at international conferences, special issues, collections, and high-profile journals. We list explicitly only two of many highlights:

- R. Hähnle (TUD) and E. B. Johnsen (UIO) were invited to write on the **Envisage** approach in IEEE Computer’s Software Engineering column [6] which reaches hundreds of thousands IT specialists.
- R. Hähnle (TUD) was invited to be co-author of a paper on the State-of-Art in Software Verification that will appear in volume number 10,000 of Springer’s LNCS series. It is planned to highlight the achievements about formal verification of concurrent software achieved in **Envisage**.

In the following we concentrate on the scientific events organized by **Envisage**.

There was the question of which kind of event would be best suited to showcase **Envisage** and maximize academic reachout. For the first **Envisage** workshop, we decided to organize a track at the ISoLA 2014 conference (see Section 1.2 below), for the following reasons:

- ISoLA is an international, well-established venue, with Springer LNCS proceedings.
- The track format have us full control over the workshop programme.
- The track format made the workshop clearly visible as an **Envisage** event within ISoLA.
- ISoLA is one of the few conferences that attracts researchers from different fields, including, formal methods *and* programming languages.

In summary, the ISoLA track format was very well suited to present the **Envisage** project and its first fundamental results.

For the second workshop, we decided to integrate it more tightly into the ESOCC 2016 conference (see Section 1.3 below), for the following reasons:

- ESOCC is the main academic event for the European Cloud Computing community.
- In the final year of the project the results from Envisage were mature enough to present it to a forum of cloud computing specialists.
- Our deep involvement in the organization of ESOCC provided the opportunity to obtain feedback from the participants, as well as to distribute a white paper.

1.2 The ISoLA 2014 Track

As Deliverable D5.4.1, the Envisage project organized a track at ISoLA 2014 on *Engineering Virtualized Services*. The event took place in the Hotel Imperial, Corfu, Greece on Wednesday, October 8, 2014. The organizers were R. Hähnle (TUD) and E. B. Johnsen (UIO). The proceedings of ISoLA 2014, including the Envisage track, were published by Springer as LNCS volume 8803 [7]. In addition to the printed LNCS proceedings, the Envisage track at ISoLa 2014 is documented on the following web page:

<http://www.envisage-project.eu/engineering-virtualized-services-isola-2014/>.

At the time of writing, the web page has received 3800 hits.

The ISoLA Symposium. The ISoLA Symposium is a forum for developers, users, and researchers to discuss issues related to the adoption and use of rigorous tools for the specification, analysis, verification, certification, construction, test, and maintenance of systems from the point of view of their different application domains. To bridge the gap between designers and developers of (formal methods based) rigorous tools, and users in engineering and in other disciplines, it fosters and exploits synergetic relationships among scientists, engineers, software developers, decision makers, and other critical thinkers.

Track description. Virtualized computing services, such as cloud services, create new opportunities, but also pose new challenges for users and providers alike. Over-provisioning of resources and compensative penalties for breaching an SLA are among the only too real downsides of virtualization. At the same time, formal models of software services and advanced static analysis tools promise vast improvements of productivity and cost effectiveness in cloud computing. The track explores the state-of-art in modeling of services deployed on the cloud and in the formalization as well as verification of SLAs.

To expose the project's targeted problem domain and progress to the academic audience in a broad way, the track consisted of three sessions corresponding to work packages WP1, WP2 and WP3 of Envisage. In addition to seven presentations by the project's researchers, there were two invited contributions from colleagues outside of Envisage who presented results on contracts for embedded systems and on energy management in distributed systems.

Assessment. The Envisage track was followed by approximately 20 participants in addition to the presenters. The original plan was to use a questionnaire to collect feedback. However, due to the format of the event, with multiple concurrent tracks, we decided that this was not a well-suited strategy for collecting feedback and opted for traditional academic feedback in terms of interaction during and after presentations. For this reason, the presenters were encouraged to make their presentations interactive and open for questions and comments during their talks. The presentations triggered lively and interesting discussions, and the feedback was provided directly to the active researchers in the different tasks of the project. Together, the papers presented at the track generated already 25 citations in Google Scholar.

1.3 The ESOCC 2016 Conference

As Deliverable D5.4.2, the Envisage project engaged to shape the program of the 5th European Conference on Service-Oriented and Cloud Computing (ESOCC 2016), which took place at the Technical University of

Vienna, Austria, 5–7 September 2016. Einar Broch Johnsen (UIO) accepted the task of being PC Co-chair of ESOC 2016 and explicitly extended both the call for papers and the program committee to put the themes of Envisage on the agenda. The website of ESOC 2016 has the URL <http://esoc2016.eu/>. The printed proceedings of ESOC 2016 appeared in Springer’s LNCS series, volume 9846 [1]. The proceedings of the EU Project Track will feature in the second volume of the conference proceedings, in Springer’s CCIS series (to appear).

The ESOC Conference Series. The European Conference on Service-Oriented and Cloud Computing (ESOC) is the premier conference on advances in the state of the art and practice of Service-Oriented Computing and Cloud Computing in Europe. ESOC has evolved from the ECOWS (European Conference on Web Services) conference series. The first edition of the new series, ESOC 2012, was successfully held in Bertinoro, Italy, the second edition, ESOC 2013, was held in Malaga, Spain, the third edition, ESOC 2014 was held in Manchester, UK and the fourth edition, ESOC 2015, in Taormina (Messina), Italy. The fifth edition, ESOC 2016, was held in Vienna, Austria.

The main objectives of this conference series are to facilitate the exchange between researchers and practitioners in the areas of Service-oriented Computing and Cloud Computing and to foster future collaborations in Europe and beyond. ESOC 2016 included invited talks and presentations of selected research papers with the participation of top researchers from academia and industry. ESOC 2016 also included an EU Projects track, a PhD Symposium, and satellite workshops.

Events at ESOC 2016 Related to Envisage.

- The EU Projects track of the conference started with a presentation of Envisage. This presentation was based on a two-page paper presenting the overall approach of Envisage [2], which is included as an Appendix to this deliverable. The program of the EU Projects track is available at: <http://esoc2016.eu/eu-project-track-program>
- There was a dedicated session on SLA-aware services, which included a contribution on the ABS Smart Deployer [5] (which is part of Deliverable D1.3.2).
- The industrial keynote of ESOC 2016 by David Costa (FRH) motivated and explained the FRH case study of Envisage with a demo on “SLA and Business Guarantee Aware Feedback”.
- The Envisage white paper [4] was printed and distributed to all conference participants.
- The participants were encouraged to fill out a brief online questionnaire with feedback about the Envisage approach described in the white paper. The URL to the questionnaire is also contained in the white paper.

Assessment. ESOC 2016 had approx. 90 participants. For the Envisage related presentations, especially the keynote by David Costa raised many interesting questions which continued well into the coffee break and resulted in an invitation to contribute to the *Insight* column of IEEE Software.

There were also discussions after the Envisage presentation at the EU Projects track, where many agreed with our overall approach of moving deployment decisions into the design stage of virtualized services.

Altogether, the various Envisage-related events at ESOC 2016 created high awareness of the project and its results, as well as for the Envisage methodology among the European Cloud Computing community.

1.4 Organization of Other Scientific Events

In addition to the two ISoLA 2014 track and the events at ESOC 2016 which correspond to Deliverables D5.4.1 and D5.4.2, respectively, members of the Envisage project organized and staged several other scientific events:

1. E. B. Johnsen (UIO) co-organized a workshop on *Reliability of Concurrent and Distributed Software* at the Lorentz Center in Leiden (NL), May 6–9, 2014.¹ The workshop included presentations by Envisage members F. de Boer (CWI), R. Hähnle (TUD), and E. B. Johnsen (UIO). The workshop also included participation and project presentations from a number of other European projects, including VerCors, AdVent, Opencloudware, CARP, and CME.
2. Envisage organized the *14th International School on Formal Methods for the Design of Computer, Communication and Software Systems* on the theme of executable software models in Bertinoro (IT), June 16–20, 2014² with 27 students from 21 different universities in Europe. The speakers included E. Albert (UCM), F. de Boer (CWI), R. Hähnle (TUD), and C. Laneve (BOL). The proceedings are published by Springer within LNCS [3] and are co-edited by R. Hähnle (TUD) and E. B. Johnsen (UIO).
3. E. B. Johnsen (UIO) co-organized a meeting at the NII Shonan Center in Japan on *Static Analysis meets Runtime Verification*, March 16–19, 2015. The workshop attracted 22 participants and included several Envisage-related presentations and discussions.
4. Organization of the *Formal Methods* Conference in Oslo in June 2015, where the Envisage project and its members were showcased:
 - General Chair: E.B. Johnsen (UIO)
 - Co-PC Chair F. de Boer (CWI)
 - Keynote main conference: Elvira Albert (UCM)
 - Tutorial on ABS/Envisage by R. Hähnle (TUD), E. B. Johnsen (UIO)
 - Invited keynote at Doctoral Symposium by S. de Gouw (FRH)
5. Co-organization of a workshop on “Active Objects” at INRIA Sophia Antipolis, France, 28–29 September 2015, see <https://team.inria.fr/scale/28-29-sept-active-object-workshop/>. The workshop was jointly organized by Envisage Scientific Advisory Board member Ludovic Henrio (INRIA) and E. B. Johnsen (UIO). Keynote talks were given by Envisage project members C. Din (TUD), A. Garcia (BOL), B. Nobakht (FRH), V. Serbanescu (CWI).
6. R. Hähnle (TUD) is co-organizer of the ISoLA 2016 track *Correctness-by-Construction and Post-hoc Verification: friends or foes?*, October 2016

1.5 Overall Assessment

The academic reachout strategy of Envisage and, in particular, the organization of scientific events related to the project, achieved the following outcomes:

1. Hundreds of international researchers working on Envisage-relevant topics were made aware of the project and its results at eight international scientific events that took place within less than three years.
2. The large amount of invited presentations, the fact that many Envisage tracks were accepted, and the invitation to be co-chair of ESOC clearly show a strong interest of the international research community.
3. The intense interaction with the international research community enabled constant feedback that helped Envisage to continue with relevant academic research at the forefront of the state-of-art. It is in the nature of this kind of feedback that much of it is not suitable for publication (confidential review reports) or it has an informal nature (questions at presentations, informal discussions at meetings), but the high frequency of events staged by Envisage was, of course, instrumental to obtain it.

¹The full programme is available at <http://www.lorentzcenter.nl/lc/web/2014/640/info.php3?wsid=640&venue=0ort>

²The full programme is available at http://www.envisage-project.eu/?page_id=979

Bibliography

- [1] Marco Aiello, Antonio Brogi, and Einar Broch Johnsen, editors. *Service-Oriented and Cloud Computing - 5th IFIP WG 2.14 European Conference, ES OCC 2016, Vienna, Austria, September 5-7, 2016, Proceedings*, volume 9846 of *Lecture Notes in Computer Science*. Springer, 2016.
- [2] Elvira Albert, Frank S. de Boer, Reiner Hähnle, Einar Broch Johnsen, and Cosimo Laneve. Envisage: developing SLA-aware deployed services with formal methods. In Marco Aiello, Antonio Brogi, and Einar Broch Johnsen, editors, *Service-Oriented and Cloud Computing, 5th European Conf., ES OCC, Vienna, Austria*, CCIS. Springer, 2016.
- [3] Marco Bernardo, Ferruccio Damiani, Reiner Hähnle, Einar Broch Johnsen, and Ina Schaefer, editors. *Executable Software Models: 14th International School on Formal Methods for the Design of Computer, Communication, and Software Systems, Bertinoro, Italy*, volume 8483 of *Lecture Notes in Computer Science*. Springer-Verlag, June 2014.
- [4] Frank de Boer, Elena Giachino, Stijn de Gouw, Reiner Hähnle, Einar Broch Johnsen, Cosimo Laneve, Ka I Pun, and Gianluigi Zavattaro. Analysis of SLA compliance in the cloud: An automated, model-based approach. Envisage Project White Paper, <http://envisage-project.eu/wp-content/uploads/2016/09/EnvisageWhitePaper2016.pdf>, August 2016.
- [5] Stijn de Gouw, Jacopo Mauro, Behrooz Nobakht, and Gianluigi Zavattaro. Declarative elasticity in ABS. In *Service-Oriented and Cloud Computing - 5th IFIP WG 2.14 European Conference, ES OCC 2016, Vienna, Austria, September 5-7, 2016, Proceedings*, volume 9846 of *Lecture Notes in Computer Science*, pages 118–134. Springer, 2016.
- [6] Reiner Hähnle and Einar Broch Johnsen. Designing resource-aware cloud applications. *IEEE Computer*, 48(6):72–75, 2015.
- [7] Tiziana Margaria and Bernhard Steffen, editors. *6th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation (ISOLA’14)*, volume 8803 of *Lecture Notes in Computer Science*. Springer-Verlag, 2014.