

ASCENS

Autonomic Service-Component Ensembles

D9.2: Progress Report on Dissemination, Collaboration and Exploitation

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Executive Summary

This report describes the efforts performed in the first and second reporting period of the ASCENS project to achieve the dissemination, collaboration and exploitation objectives of month 1-24. This is therefore a cumulative report. The objectives are defined in the Annex I "Description of Work" of the project contract while the dissemination and exploitation strategy is described in deliverable D9.1.a.

The report includes a section describing the project identity and three sections dedicated each to one of the main topics: dissemination, collaboration and exploitation. The first section describes the activities completed to disseminate the knowledge of the project, the second section gives an overview on collaboration platforms and activities, and the third section addresses exploitable knowledge that is produced within the scope of the ASCENS project. Finally, a table of measurable results is presented as summary.

During the first two years of the project ASCENS members produced 130 publications. The list of accepted and submitted publications includes 16 articles for journals, 104 conference and workshop papers, 5 book contributions, 4 technical reports and a short overview article published in the Awareness Magazine. The number of joint publications in which two or more partners or an associated researcher and a partner were involved adds up to 49 (38%). In addition, 71 presentations not directly related to a publication were held during these reporting periods. Project members organized 31 conferences and workshops, participated in the organization of 4 summer schools, and taught ASCENS related topics in 27 courses. The collaboration activities with other projects comprise the participation in the AWARENESS coordination action (CA) meetings, the contact to and joint work with associated researchers, bilateral meetings with other projects and teaching at the AWARENESS Virtual Lecture Series (AVLS).

Contents

1	Project Identity	5
2	Dissemination of Project Results	5
2.1	ASCENS Website	5
2.2	Press Releases	9
2.3	ASCENS Publications	10
2.3.1	Joint Publications	10
2.3.2	Non-Joint Publications	14
2.3.3	Publications Management System	22
2.4	Presentations	22
2.5	Organization of Events	36
2.5.1	Conferences	36
2.5.2	Workshops	37
2.6	Summer Schools	38
2.7	Courses	39
2.8	Distribution of Software Products	40
2.9	Poster	44
2.10	Use of Other Dissemination Channels	44
3	Collaboration Platforms and Activities	46
3.1	Coordination Action AWARENESS	46
3.2	Associated Researchers	46
3.3	Contacts to Industry and other Projects	47
4	Exploitable Knowledge	48
4.1	Exploitation Strategies of Industrial Partners	48
4.1.1	Mobility Assistant	49
4.1.2	Simulation of Distributed, Autonomous Agents	49
4.1.3	Cloud Scheduling Component	50
4.2	Patents	50
5	Summary	51

1 Project Identity

ASCENS presented its project identity (PI) at the kick-off meeting in Munich, Germany, on October 10-11, 2010. Since then it is used in the website, presentations and reports, i.e. whenever projects results are presented. We believe that a strong PI helps to reinforce the image of the project and supports the dissemination activities. The PI is implemented by

- a set of colors,
- a logo (see Figure 1),
- templates for presentations (LaTeX beamer and PowerPoint format), and
- templates for deliverables, progress reports and technical reports (LaTeX and Word format).



Figure 1: ASCENS logo

In particular, the templates for deliverables and reports were made more general during the second year of the project.

2 Dissemination of Project Results

To attain the goal to promote and publish the results of the ASCENS project to a wide scientific and industrial audience, in the first two years the research results were disseminated through scientific publications, invited speakers' presentations, tutorials and lectures. Another dissemination activity consisted in the organization of events such as conferences, workshops and symposia on topics related to the ASCENS research area. The general public is informed about the project through the website and a blog. In the following sections the different dissemination activities and results are presented in detail.

2.1 ASCENS Website

The ASCENS website (<http://www.ascens-ist.eu>) was set-up by LMU before the start of the project by October 1st, 2010 and was continuously updated since then. The website contains general information as well as all non-confidential results, i.e. papers, presentations, course material, software, etc. It allows easy access to this information for researchers, interested companies, and institutions. It includes objectives of the project, a page for each partner of the project describing the role of the partner and the researchers involved in the project, some results achieved so far, the list of publications and deliverables. In addition, the website contains a link to the social network facebook. The list of associated researchers is also published on the project website.

The ASCENS website (shown in Figure 2) is built using a content management application (open source Joomla of Apache) and imports the publications from the Publication Management Interface application (PMI) developed by LMU. For more details on the PMI see Section 2.3.

ascens
autonomic service-component ensembles

Home | Objectives | Consortium | Results | Work in Progress | Publications | Related Projects | Contact

Latest news

LMU (Project Coordinator) best German University in [Excellence Initiative](#)

AWARENESS [Summer School](#) AWASS 2012

Elsevier Theory most downloaded article 2011 of ASCENS member [M. Dorigo](#)

Blog

[Engineering Distributed Adaptive Systems using Components](#)
Traditional software engineering methodologies together with related programming paradigms have long been guiding...
[Is your software adaptive?](#)
As business processes and software architectures have started to extend beyond the boundaries...
[Challenges of Engineer Autonomic Behaviors](#)
A well recognized research challenge for future large-scale pervasive computing scenarios relates to...

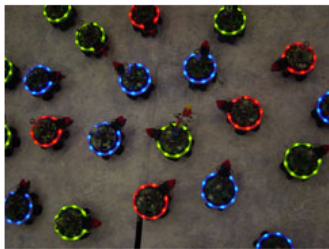
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ASCENS Profile

Project goal

Self-aware, self-adaptive and self-expressive autonomic components, running within environments which are called "ensembles", have been proposed to handle open-ended, highly parallel, massively distributed systems that can span millions of nodes with complex interactions and behaviours. However, these complex systems are currently difficult to develop, deploy, and manage.



The goal of the ASCENS project is to build ensembles in a way that combines the maturity and wide applicability of traditional software engineering approaches with the assurance about functional and non-functional properties provided by formal methods and the flexibility, low management overhead, and optimal utilization of resources promised by autonomic, adaptive, self-aware systems.

Project information

Information Society Technologies (IST) project funded by the EU as Integrated Project (IP) in the 7th Framework Programme (FP7) as part of the Future Emerging Technologies Proactive Initiative (FET Proactive)

Partners: 14
Countries: 6 EU member states and 1 associated state
Coordinator: Martin Wirsing, LMU Munich

Start: October 1st, 2010
End: September 30th, 2014

ASCENS Topics

Service-component ensemble language

Service-Component Ensemble Language (SCEL), developed as a multi-layer language for self-aware, autonomic service components (SCs) and service-component ensembles (SCEs) that integrates behavioural description with knowledge representation and reasoning about the environment.

Formal methods


Theoretical foundations and models for reliable and predictable system behaviour while exploiting the possibilities of highly dynamic, autonomic components.

Adaptation and self-expression

Adaptive systems for the integration of top-down and bottom-up approaches to adaptation and self-expression.

Swarm robotics

Generation of robot swarm with both autonomous and collective behaviour.



Cloud computing

New science clouds with resource-aware cloud computing.

Energy saving e-Mobility

e-Vehicles, which are goal oriented and fully aware of its own, its neighbours' and its environment's resources.

Last Updated on Monday, 05 December 2011 15:21

SEVENTH FRAMEWORK PROGRAMME

Figure 2: ASCENS website

We use an ASCENS blog (<http://blog.ascens-ist.eu/>) to communicate the goals and the progress of the ASCENS project to the public in a way that can be understood by people who are interested in engineering ensembles, but not experts in this field (see Figure 3). Therefore, we address the non-technical public describing easy understandable scenarios to illustrate how methods, techniques and languages developed within the scope of ASCENS will be applied in the development of autonomic service-component ensembles. Over the course of the first two years of the project we have published 16 blog articles (8 in each reporting year) covering not only questions related to the main topics of our project, but also first results.

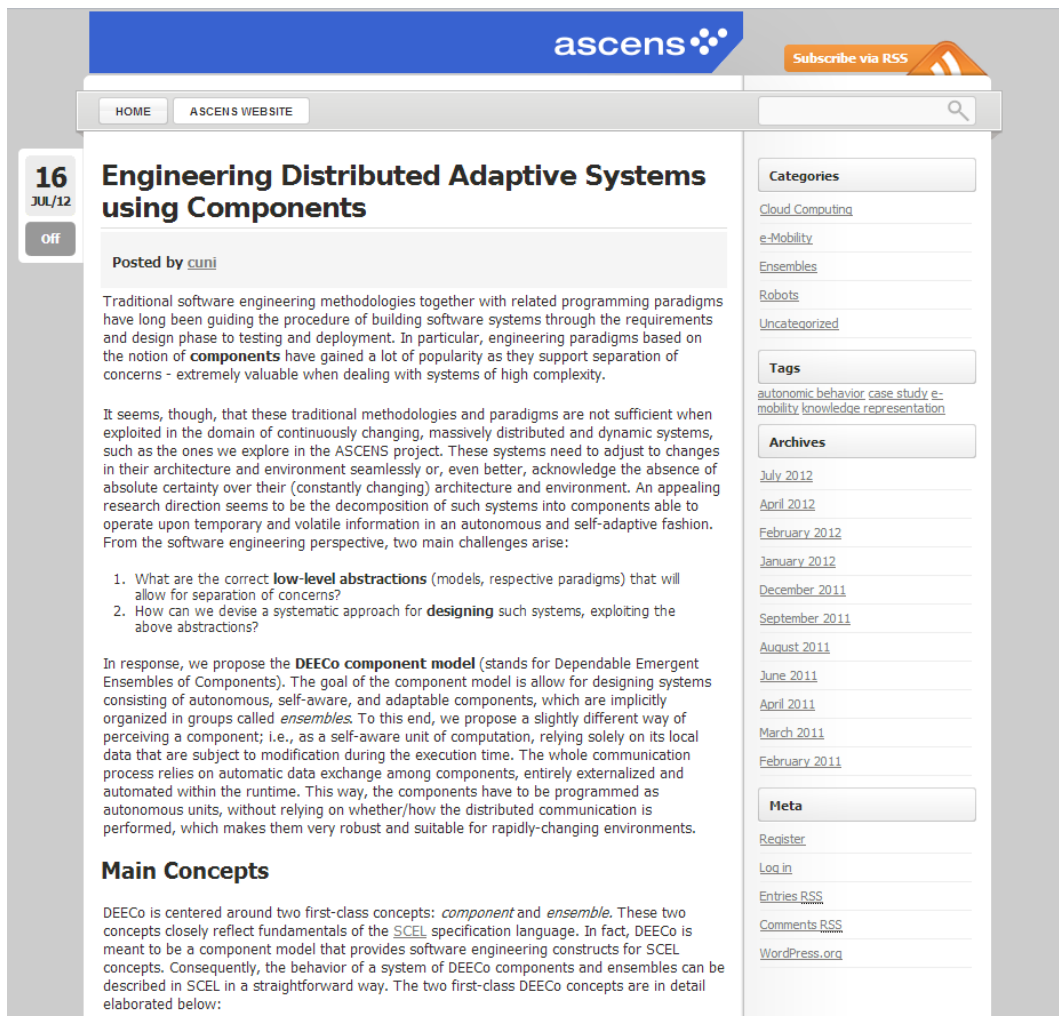


Figure 3: ASCENS blog

Regarding cross references, on the one hand the ASCENS website provides links to many related projects grouped in categories, such as self-awareness, global computing, and swarm robotics. On the other hand, several websites of organizations, universities, institutes and other projects as well as the homepages of many partner members include links to the ASCENS website, for example:

- Homepages of universities, organizations and companies
 - European Commission, ICT Research in FP7, FET Proactive
http://cordis.europa.eu/fp7/ict/fet-proactive/aware_en.html

- Ludwig-Maximilians-Universität München (LMU), Institute for Informatics, Programming and Software Engineering Unit
<http://www.pst.ifi.lmu.de/Research/current-projects>
 - Ludwig-Maximilians-Universität München (LMU), Institute for Informatics, Communication Systems and System Programming Unit
<http://www.nm.ifi.lmu.de/projects/ASCENS/>
 - Ludwig-Maximilians-Universität München (LMU), European Projects
http://www.uni-muenchen.de/forschung/service/forschungsfoerderung/eu_programme/7frp/koord_7frp/index.html
 - Consiglio Nazionale delle Ricerche, Istituto di Scienza e Tecnologie dell’Informazione “A. Faedo” (ISTI), Formal Methods and Tools Laboratory
<http://www.isti.cnr.it/research/unit.php?unit=FMT§ion=projects>
 - IMT Institute for Advanced Studies Lucca, System Modelling and Analysis Research Unit
<https://sysma.lab.imtlucca.it/>
 - IRIDIA-CoDE laboratory, Université Libre de Bruxelles
<http://code.ulb.ac.be/iridia.home.php>
 - Lero – the Irish Software Engineering Research Centre, University of Limerick
<http://www.lero.ie/project/ascens>
 - Università di Firenze, Dipartimento di Sistemi e Informatica, Concurrency and Mobility Group
<http://gdn.dsi.unifi.it/cmgi/index.php/projects/>
 - Fraunhofer FIRST
<http://www.first.fraunhofer.de/projekte/ascens/>
 - Fraunhofer FOKUS
http://www.fokus.fraunhofer.de/en/quest/projekte/laufende_projekte/ascens/index.html
 - Mobysa Association
<https://sites.google.com/site/mobysa/activites?pli=1>
 - Verimag
<http://www-verimag.imag.fr/ASCENS.html>
 - EPFL MOBOTS
<http://mobots.epfl.ch/self-assembling-robots.html>
 - Department of Distributed and Dependable Systems, Charles University in Prague
<http://d3s.mff.cuni.cz/projects/>
- Homepages of other projects
 - AWARENESS Coordination Action
<http://www.aware-project.eu/about/ascens/>
 - SAPERE Project
<http://www.sapere-project.eu>
 - CoCoRo Collective Cognitive Robots Project
<http://cocoro.uni-graz.at/>

- ARGoS Robot Simulator
http://iridia.ulb.ac.be/argos/argos_in_use.php
- Homepages of ASCENS members
 - Homepages of Martin Wirsing, Mirco Tribastone, Nora Koch, Annabelle Klarl, Philip Mayer (LMU)
<http://www.pst.ifi.lmu.de/people/staff/>
 - Homepages of Diego Latella and Mieke Massink (ISTI)
<http://www.isti.cnr.it/about/people.php>
 - Homepages of IMT members
https://sysma.lab.imtlucca.it/?page_id=4
 - Homepages of Roberto Bruni, Andrea Corradini, Gianluigi Ferrari, Fabio Gadducci, Ugo Montanari, Matteo Sammartino (UNIFI)
<http://compass2.di.unifi.it/amministrazione/persone/index.asp>
 - Homepages of Marco Dorigo, Mauro Birattari, Carlo Pinciroli (ULB)
<http://iridia.ulb.ac.be/~mdorigo/HomePageDorigo/projects.php>,
<http://iridia.ulb.ac.be/~mbiro/projects.html>,
<http://iridia.ulb.ac.be/~cpinciroli/research.php>
 - Homepage of Franco Zambonelli (UNIMORE)
<http://www.agentgroup.unimo.it/Zambonelli>
 - Homepage of Emil Vassev (Lero at UL)
<http://www.vassev.com/>
 - Homepages of Michele Boreale, Michele Loreti, Rosario Pugliese (UDF)
<http://www.dsi.unifi.it/~boreale/>,
<http://www.dsi.unifi.it/~loreti/>,
<http://www.dsi.unifi.it/~pugliese/>
 - Homepage of Jacques Combaz (Verimag)
<http://www-verimag.imag.fr/~jcombaz/>
 - Homepages of Jan Kofron, Petr Hnetynka (CUNI)
<http://d3s.mff.cuni.cz/~kofron/>,
<http://d3s.mff.cuni.cz/~hnetynka/index.cgi/index/research>

2.2 Press Releases

A press release was posted at the website of the project coordinator (LMU) in order to provide general information on the start of the project to a wide audience. In addition, announcements were also done by two Italian local newspapers and the Università di Modena e Reggio Emilia. These press releases and the corresponding links are listed below.

- LMU site (October 11,2010)
<http://www.en.uni-muenchen.de/news/newsarchiv/2010/2010-ascens-wirsing.html>

- UNIMORE site (November 15, 2010)
http://www.magazine.unimore.it/index.php?option=com_content&view=article&id=526_finanze-europei-per-la-ricerca-unimore&catid=91:ricerca&Itemid=346
- Modena 2000 newspaper (November 21, 2010)
<http://www.ascens-ist.eu/images/ascens/modena2000.pdf>
- Giornale di Reggio Emilia newspaper (November 22, 2010)
<http://www.ascens-ist.eu/images/ascens/modena2000.pdf>

An overview article on the ASCENS project was written during the first reporting year and published by the AWARENESS magazine in 2012 (see list of publications in Sec. 2.3).

2.3 ASCENS Publications

During the first two years of the ASCENS project 130 publications were produced, of which 50 were published in the first period. The list of publications includes articles for journals (16), conference and workshop papers (104), book contributions (5), technical reports (4) and an overview article. All publications with exception of the two last categories were peer reviewed and were submitted to the best scientific journals like *Theoretical Computer Science*, *Journal of Grid Computing*, and *ACM Transactions on Autonomous and Adaptive Systems*, major international conferences, ranging from the more foundation-oriented like FACS, FASE, FORTE and NASA Formal Methods, to those that address more methodological and application-oriented aspects of software engineering, such as DEXA and IROS. All of the publications listed below have been already published or accepted for publication.

In this two reporting periods 48 joint publications were published, i.e. a 38% of the total. Joint publications are those in which at least two partners (39) or at least a partner and an associated researcher (10) were involved. In the following we include both lists, of joint and non-joint publications. Almost all partners participated in joint publications. In the last part of the section we give some details on the Publication Management System used in the ASCENS project.

2.3.1 Joint Publications

- [ABN11] Lucia Acciai, Michele Boreale, and Rocco De Nicola. Linear-Time and May-Testing in a Probabilistic Reactive Setting. In Roberto Bruni and Juergen Dingel, editors, *Formal Techniques for Distributed Systems*, volume 6722 of *LNCS*, pages 29–43. Springer Berlin / Heidelberg, June 2011.
- [AZH12] Dhaminda Abeywickrama, Franco Zambonelli, and Nicklas Hoch. Towards Simulating Architectural Patterns for Self-Aware and Self-Adaptive Systems. In *2nd SASO Workshop on Awareness in Autonomic Systems*, Lyon (F), September 2012. IEEE CS Press.
- [BBGM10] Paolo Baldan, Filippo Bonchi, Fabio Gadducci, and Giacomina Valentina Monreale. Concurrency Can't Be Observed, Asynchronously. In Kazunori Ueda, editor, *Programming Languages and Systems - 8th Asian Symposium, APLAS 2010, Shanghai, China, November 28 - December 1, 2010. Proceedings*, volume 6461 of *Lecture Notes in Computer Science*, pages 424–438. Springer, 2010.
- [BC13] Michele Boreale and Alessandro Celestini. Asymptotic Risk Analysis for Trust and Reputation Systems. In Peter van Emde Boas et al., editor, *To appear on SOFSEM 2013, Theory and Practice of Computer Science*, LNCS. Springer, 2013.

- [BCDCM11] Maria Grazia Buscemi, Mario Coppo, Mariangiola Dezani-Ciancaglini, and Ugo Montanari. Constraints for Service Contracts. In Roberto Bruni and Vladimiro Sassone, editors, *TGC 2011*, volume 7173 of *Lecture Notes in Computer Science*, pages 104–120. Springer, 2011.
- [BCG⁺12a] Roberto Bruni, Andrea Corradini, Fabio Gadducci, Alberto Lluch Lafuente, and Andrea Vandin. Modelling and Analyzing Adaptive Self-assembly Strategies with Maude. In *Proceedings of the 9th International Workshop on Rewriting Logic and its Applications (WRLA 2012)*, number 7571 in LNCS, pages 18–138, 2012.
- [BCG⁺12b] Roberto Bruni, Andrea Corradini, Fabio Gadducci, Alberto Lluch-Lafuente, and Andrea Vandin. A Conceptual Framework for Adaptation. In Juan de Lara and Andrea Zisman, editors, *Proceedings of the 15th International Conference on Fundamental Approaches to Software Engineering, FASE 2012*, volume 7212 of *Lecture Notes in Computer Science*, pages 240–254. Springer, 2012.
- [BDFZ09] Massimo Bartoletti, Pierpaolo Degano, Gian Luigi Ferrari, and Roberto Zunino. Model Checking Usage Policies. *Mathematical Structures in Computer Science*, To appear, 2009.
- [BFK12] Roberto Bruni, Carla Ferreira, and Anne Kersten Kauer. First-Order Dynamic Logic for Compensable Processes. In *COORDINATION 2012*, volume 7274 of LNCS, pages 104–121. Springer, 2012.
- [BGL⁺11] Saddek Bensalem, Andreas Griesmayer, Axel Legay, Thanh-Hung Nguyen, Joseph Sifakis, and Rongjie Yan. D-Finder 2: Towards Efficient Correctness of Incremental Design. In Mihaela Gheorghiu Bobaru, Klaus Havelund, Gerard J. Holzmann, and Rajeev Joshi, editors, *NASA Formal Methods - Third International Symposium, NFM 2011, Pasadena, CA, USA, April 18-20, 2011. Proceedings*, volume 6617 of *Lecture Notes in Computer Science*, pages 453–458. Springer, 2011.
- [BGM11] Filippo Bonchi, Fabio Gadducci, and Giacomina Valentina Monreale. Towards a General Theory of Barbs, Contexts and Labels. In Hongseok Yang, editor, *Proceedings of the 9th Asian Symposium on Programming Languages and Systems (APLAS 2011)*, volume 7078 of *Lecture Notes in Computer Science*, pages 289–304. Springer, 2011.
- [BK12] Roberto Bruni and Anne Kersten Kauer. LTS Semantics for Compensation-based Processes. In *TGC 2012*, LNCS. Springer, 2012. To appear.
- [BKK11] Marianne Busch, Alexander Knapp, and Nora Koch. Modeling Secure Navigation in Web Information Systems. In Janis Grabis and Marite Kirikova, editors, *10th International Conference on Business Perspectives in Informatics Research, LNBIP*, pages 239–253. Springer Verlag, 2011.
- [BKM⁺12] Marianne Busch, Nora Koch, Massimiliano Masi, Rosario Pugliese, and Francesco Tiezzi. Towards Model-Driven Development of Access Control Policies for Web Applications. In *Workshops MoDELS 2012*, page 6. ACM, September 2012. to appear.
- [BL11] Roberto Bruni and Alberto Lluch-Lafuente. Evaluating the Performance of Model Transformation Styles in Maude. In *Proceedings of FACS 2011, 8th International Workshop on Formal Aspects of Component Software*, LNCS. Springer, 2011. To appear.

- [BLM11] Roberto Bruni, Alberto Lluch Lafuente, and Ugo Montanari. On Structured Model-Driven Transformations. *International Journal of Software and Informatics*, 5(1-2):185–206, 2011.
- [BM11] Filippo Bonchi and Ugo Montanari. Symbolic and Asynchronous Semantics via Normalized Coalgebras. *Logical Methods in Computer Science*, 7(2), 2011.
- [BM12] Maria Grazia Buscemi and Ugo Montanari. A Game-Theoretic Analysis of Grid Job Scheduling. *Journal of Grid Computing*, 10(3):501–519, 2012.
- [BMM11] Roberto Bruni, Hernán Melgratti, and Ugo Montanari. A Connector Algebra for P/T Nets Interactions. In J.-P. Katoen and B. Koenig, editors, *Proceedings of CONCUR 2011, 22nd International Conference on Concurrency Theory*, volume 6901 of *LNCS*, pages 312–326. Springer, 2011.
- [BMM12a] Roberto Bruni, Hernán Melgratti, and Ugo Montanari. A Survey on basic Connectors and Buffers. In *FMCO 2011*, *LNCS*. Springer, 2012. To appear.
- [BMM12b] Roberto Bruni, Hernán Melgratti, and Ugo Montanari. Connector Algebras, Petri Nets, and BIP. In *PSI 2011*, volume 7162 of *LNCS*, pages 19–38. Springer, 2012.
- [BNL11] Marco Bernardo, Rocco De Nicola, and Michele Loreti. Uniform Labeled Transition Systems for Nondeterministic, Probabilistic, and Stochastic Process Calculi. In Luca Aceto and Mohammad Reza Mousavi, editors, *Proceedings First International Workshop on Process Algebra and Coordination*, volume 60 of *Electronic Proceedings in Theoretical Computer Science*, pages 66–75, July 2011.
- [BNL12] Marco Bernardo, Rocco De Nicola, and Michele Loreti. Revisiting Trace and Testing Equivalences for Nondeterministic and Probabilistic Processes. In *Foundations of Software Science and Computational Structures - 15th International Conference, FOSSACS 2012, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2012, Tallinn, Estonia, March 24 - April 1, 2012*, volume 7213 of *Lecture Notes in Computer Science*, pages 195–209. Springer, 2012.
- [BP12a] Michele Boreale and Francesca Pampaloni. Quantitative Multirun Security under Active Adversaries. In Lisa O’Conner, editor, *To appear on QEST 2012, IEEE*, pages 158–167, 2012.
- [BP12b] Michele Boreale and Michela Paolini. Worst- and Average-Case Privacy Breaches in Randomization Mechanisms. In Jos C.S. Baeten, Thomas Ball, and Frank S. De Boer, editors, *IFIP TCS 2012*, volume 7604 of *Lecture Notes in Computer Science*, pages 72–86. Springer, 2012.
- [BPP11a] Michele Boreale, Francesca Pampaloni, and Michela Paolini. Asymptotic Information Leakage under One-Try Attacks. In Martin Hofmann, editor, *Foundations of Software Science and Computational Structures*, volume 6604 of *LNCS*, pages 396–410. Springer Berlin / Heidelberg, March 2011.
- [BPP11b] Michele Boreale, Francesca Pampaloni, and Michela Paolini. Quantitative Information Flow, with a View. In Vijay Atluri and Claudia Diaz, editors, *Computer Security - ESORICS 2011*, volume 6879 of *LNCS*, pages 588–606. Springer Berlin / Heidelberg, 2011.

- [BPP12] Michele Boreale, Francesca Pampaloni, and Michela Paolini. Asymptotic Information Leakage under One-Try Attacks. *To appear on MSCS*, 2012.
- [DLLM11] Rocco De Nicola, Diego Latella, Michele Loreti, and Mieke Massink. State to Function Labelled Transition Systems: A Uniform Framework for Defining Stochastic Process Calculi. Technical Report ISTI-2011-TR-012, CNR - ISTI, May 2011.
- [FJN⁺11] Yliès Falcone, Mohamad Jaber, Thanh Hung Nguyen, Marius Bozga, and Saddek Bensalem. Runtime Verification of Component-based Systems . In *SEFM*, 2011.
- [GBL⁺11] Andreas Griesmayer, Saddek Bensalem, Axel Legay, Thanh-Hung Nguyen, and Doron Peled. Efficient Deadlock Detection for Concurrent Systems . In *MEMOCODE*, 2011.
- [GLLV10] Fabio Gadducci, Alberto Lluch-Lafuente, and Andrea Vandin. Counterpart Semantics for a Second-Order μ -Calculus. In Hartmut Ehrig, Arend Rensink, Grzegorz Rozenberg, and Andy Schürr, editors, *Graph Transformations - 5th International Conference, ICGT 2010, Enschede, The Netherlands, September 27 - - October 2, 2010. Proceedings*, volume 6372 of *Lecture Notes in Computer Science*, pages 282–297. Springer, 2010.
- [GLLV12a] Fabio Gadducci, Alberto Lluch-Lafuente, and Andrea Vandin. Counterpart Semantics for a Second-Order-Calculus. *Fundam. Inform.*, 118(1-2):177–205, 2012.
- [GLLV12b] Fabio Gadducci, Alberto Lluch-Lafuente, and Andrea Vandin. Exploiting Over- and Under-Approximations for Infinite-State Counterpart Models. In Hartmut Ehrig, Gregor Engels, Hans-Jörg Kreowski, and Grzegorz Rozenberg, editors, *ICGT*, volume 7562 of *Lecture Notes in Computer Science*, pages 51–65. Springer, 2012.
- [GLP⁺12] Edmond Gjondrekaj, Michele Loreti, Rosario Pugliese, Francesco Tiezzi, Carlo Pinciroli, Manuele Brambilla, Mauro Birattari, and Marco Dorigo. Towards a Formal Verification Methodology for Collective Robotic Systems. In *Proc. of the 14th International Conference on Formal Engineering Methods (ICFEM 2012)*, LNCS. Springer, 2012.
- [GLPT12] Edmond Gjondrekaj, Michele Loreti, Rosario Pugliese, and Francesco Tiezzi. Modeling Adaptation with a Tuple-based Coordination Language. In *Proc. of the 2012 ACM Symposium on Applied Computing (SAC'12), Special Track on Coordination Models, Languages and Applications*. ACM, 2012.
- [GM11] Fabio Gadducci and Giacomina Valentina Monreale. A Decentralised Graphical Implementation of Mobile Ambients. *Journal of Logic and Algebr. Program.*, 80(2):113–136, 2011.
- [HK11] Rolf Hennicker and Alexander Knapp. Modal Interface Theories for Communication-Safe Component Assemblies. In Antonio Cerone and Pekka Pihlajasaari, editors, *Theoretical Aspects of Computing - ICTAC 2011 - 8th International Colloquium, Johannesburg, South Africa, August 31 - September 2, 2011. Proceedings*, volume 6916 of *Lecture Notes in Computer Science*, pages 135–153. Springer, 2011.
- [KKK12] Nora Koch, Alexander Knapp, and Sergej Kozuruba. Assessment of Effort Reduction due to Model-to-Model Transformations in the Web Domain. In Marco Brambilla, Takehiro Tokuda, and Robert Tolksdorf, editors, *ICWE 2012 International Conference on Web Engineering*, volume 7387 of *LNCS*, page 8. Springer Verlag, July 2012.

- [MBL⁺12a] Mieke Massink, Manuele Brambilla, Diego Latella, Marco Dorigo, and Mauro Birattari. Analysing Robot Swarm Decision-Making with Bio-PEPA. In Marco Dorigo, Mauro Birattari, Christian Blum, Anders Lyhne Christensen, Andries Petrus Engelbrecht, Roderich Groß, and Thomas Stützle, editors, *Swarm Intelligence - 8th International Conference, ANTS 2012*, volume 7461 of *LNCS*, pages 25–36, Brussels, Belgium, September 2012. Springer.
- [MBL⁺12b] Mieke Massink, Manuele Brambilla, Diego Latella, Marco Dorigo, and Mauro Birattari. Analysing Robot Swarm Decision-making with Bio-PEPA. Technical Report TR/IRIDIA/2012-005, Université Libre de Bruxelles - IRIDIA, April 2012. Extended version of paper presented at ANTS 2012 (Bruxelles, Sept. 2012).
- [MMH12] Giacomina Valentina Monreale, Ugo Montanari, and Nicklas Hoch. Soft Constraint Logic Programming for Electric Vehicle Travel Optimization. In *WLP*, pages 3–19, 2012.
- [MPT11] Massimiliano Masi, Rosario Pugliese, and Francesco Tiezzi. A Standard-Driven Communication Protocol for Disconnected Clinics in Rural Areas. In George Demiris and Kendall Ho, editors, *Proc. of HEALTHCOM 2011*, pages 308–315. IEEE, 2011.
- [MPT12] Massimiliano Masi, Rosario Pugliese, and Francesco Tiezzi. Formalisation and Implementation of the XACML Access Control Mechanism. In *Proc. of the 4th International Symposium on Engineering Secure Software and Systems (ESSoS'12)*, volume 7159 of *LNCS*. Springer, 2012.
- [MV12] Ugo Montanari and Emil Vassev. Soft Constraints for KnowLang. In *Proceedings of C* Conference on Computer Science & Software Engineering (C3S2E '12)*, pages 99–103. ACM, 2012.
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2.3.3 Publications Management System

Publications are managed in ASCENS by a password protected web application called PMI (Publications Management Interface), which is available under <http://pmi.ascens-ist.eu/>. The PMI has been developed by the LMU for a user friendly management of publications providing a user interface for input and search of publications as shown in Figure 4. It supports CRUD operations, simple and advanced search facilities, provides a set of Rich Internet Application (RIA) features, such as validation on the fly, and the generation of publication lists ordered by year, by author, and by type. The PMI is implemented in Ruby on Rails.

The screenshot displays the 'ascens' logo and the 'PUBLICATION MANAGEMENT INTERFACE' title. Navigation buttons for 'search', 'BibTeX import', and 'new publication' are visible. The search section includes 'simple search', 'advanced search', and 'count publications' tabs. A search form contains fields for 'global search' (with 'wirsing' entered), 'title', 'person (surname)', and 'year'. A 'sorting' dropdown is set to 'year', with radio buttons for 'desc' (selected) and 'asc'. 'search' and 'reset' buttons are present. Below the search form, there is a link to 'export all publications as BibTeX file' and a list of publications for the year 2012. Each entry includes the authors, title, and conference information, along with links for 'details', 'pdf', 'bibtex', 'delete', and 'edit'.

Figure 4: Publication Management Interface

2.4 Presentations

The project members have presented ASCENS results at many events held in the period from 01.10.2010 to 30.9.2012. The following list includes 71 presentations that comprise tutorials, invited and keynote talks held during months 1 – 24 of the project. The table does not include – in order to avoid repetitions – presentations performed at conferences and workshops directly related to accepted papers listed in the previous section.

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
1	Invited Talk	Joseph Sifakis	Verimag	Component-based Construction of Heterogeneous Real-time Systems in BIP	22.11.2010	ETH, Zurich, Switzerland	University	-	Italy
2	Seminar	Franco Zambonelli	UNI-MORE	Research Trends in Autonomic Computing and Communication.	16.12.2010	Faculty of Engineering Enzo Ferrari, Modena, Italy	Master and PhD. students, Faculty	30	Italy
3	Invited Talk	Rocco De Nicola	IMT	A Uniform Framework for Modeling Processes Behaviors and their Performances	04.02.2011	ICE'11 & PACO'11 at Reykjavik, Iceland	Workshop	40	all
4	Tutorial	Diego Latella	CNR-ISTI	A Uniform Framework for the Definition of (Stochastic) Process Languages (Part I)	04.02.2011	MT-Lab Seminars, Lyngby, Copenhagen, Denmark	Faculty and PhD. students	20	all
5	Talk	Nora Koch	LMU	Integration of Methodologies and Tools	09.02.2011	NESSoS Plenary Meeting, Madrid, Spain	NESSoS partners	40	all
6	Tutorial	Diego Latella	CNR-ISTI	A Uniform Framework for the Definition of (Stochastic) Process Languages (Part II)	11.02.2011	MT-Lab Seminars, Lyngby, Copenhagen, Denmark	Faculty and PhD. students	20	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
7	Invited Talk	Ugo Montanari	UNIPI	Logica e Modelli di Calcolo: Due Facce della Stessa Medaglia (in Italian)	17.02.2011	Fano, Info-Incontri Informatica, Dalla Logica Computazionale all' Intelligenza Artificiale	Series of Seminars	80	all
8	Invited Talk	Mieke Massink	CNR-ISTI	A Process Algebraic Fluid Flow Model of Emergency Egress	18.02.2011	MT-Lab Seminars, Lyngby, Copenhagen, Denmark	Faculty and PhD. students	20	all
9	Tutorial	Rolf Hennicker	LMU	Large Simulations: The GLOWA-Danube Approach to Integrative Environmental Simulations	22.02.2011	Utrecht, The Netherlands	Master Students	35	Netherlands
10	Invited Talk	Mieke Massink	CNR-ISTI	Modelling Crowd Dynamics in Bio-PEPA	25.02.2011	MT-Lab Seminars, Lyngby, Copenhagen, Denmark	Faculty and PhD. students	20	all
11	Invited Talk	Mieke Massink	CNR-ISTI	A Formal Fluid-flow Approach to Agent Based Models	11.03.2011	Model Based & Formal Verification Techniques, Pisa, Italy	Faculty and PhD. students	40	Italy

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
12	Keynote Talk	Rolf Hennicker	LMU	Interface Coherence of Reactive Software Components: Solutions and Challenges	02.04.2011	FESCA'11, Saarbruecken, Germany	Workshop	30	all
13	Invited Talk	Nikola Serbedzija	Fraunhofer	This Pervasive Day Exhibition	19.04.2011	Science Festival, Edinburgh, UK	Exhibition	40	UK
14	Invited Talk	Lucia Acciai	UDF	Spatial and Behavioural Types: Safety, Liveness and Decidability	20.04.2011	Faculdade de Ciencias e Tecnologia, Universidade Nova de Lisboa, Portugal	Workshop	40	all
15	Seminar	Emil Vassev	UL	Knowledge Representation for Autonomous Systems – The ASCENS Case Study	02.05.2011	Organic Computing – Design of Self-Organizing Systems (Dagstuhl Seminar 11181), Schloss Dagstuhl, Wadern, Germany	Workshop	40	all
16	Invited Talk	Ugo Montanari	UNIFI	Ensembles Autonomici	05.05.2011	Aula Magna Facoltà di Scienze, Pisa, Italy	Internet Festival	40	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
17	Invited Talk	Nikola Serbedzija	Fraunhofer	Heaven and Hell: Visions for Pervasive Adaptation	05.05.2011	FET' 11, Budapest, Hungary	Special session	30	Hungary
18	Invited Talk	Michele Loreti	DSIUF	A Uniform Framework for Process Models and Behavioral Equivalences of Nondeterministic, Probabilistic, or Stochastic Nature	24.05.2011	Quantitative Modelling and Formal Analysis, Lucca, Italy	Workshop	20	all
19	Invited Talk	Mieke Massink	CNR-ISTI	Modelling Non-linear Crowd Dynamics in Bio-PEPA	24.05.2011	Quantitative Modelling and Formal Analysis, Lucca, Italy	Faculty and PhD. students	20	all
20	Invited Talk	Michele Boreale	UDF	A Survey on Quantitative Information Flow	24.05.2011	Quantitative Modelling and Formal Analysis, Lucca, Italy	Faculty and PhD. students	20	all
21	Invited Talk	Stephan Reiter	LMU	The ASCENS Science Cloud	25.05.2011	Working Group: Grid, Leibniz Supercomputing Centre, Munich, Germany	Staff and PhD. students	10	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
22	Invited Talk	Nikola Serbedzija	Fraunhofer	Reflective Computing	30.05.2011	Véhicules et transports intelligents et communicants, Telecom ParisTech, Paris, France	Workshop	80	France
23	Seminar	Franco Zambonelli	UNI-MORE	The SAPERE and the ASCENS Projects	31.05.2011	Faculty of Engineering Reggio Emilia, Reggio Emilia, Italy	Master and PhD. students	20	Italy
24	Invited Talk	Joseph Sifakis	Verimag	Embedded Systems Design – Challenges and Work Directions	May 2011	IMT Institute for Advanced Studies, Lucca, Italy	University	–	Italy
25	Invited Talk	Ugo Montanari	UNIFI	Un'Algebra di Connettori Per le Reti di Petri (in Italian)	22.06.2011	Università di Milano, Milano, Italy	Giornata in Onore di Gianni Degli Antoni	100	all
26	Invited Talk	Ugo Montanari	UNIFI	Connector Algebras And Petri Nets	30.06.2011	Siberian Academy of Sciences, Akademgorodok, Novosibirsk, Russia	PSI'11, Ershov Informatics Conference	80	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
27	Workshop	Annabelle Klarl	LMU	Hands-on Robots: Simulation with ARGoS	10.07.2011	PST Hut Seminar, Bayrischzell, Germany	and PhD. students	15	Germany
28	Workshop	Martin Wirsing	LMU	Towards a System Model for Ensembles	12.07.2011	PST Hut Seminar, Bayrischzell, Germany	Faculty and PhD. students	15	Germany
29	Invited talk	Michele Boreale	UDF	Quantitative Information Flow, with a View	21.07.2011	Trinity College, Dublin, Ireland	Faculty and PhD. students	15	Europe
30	Invited Talk	Bernd Werther	VW	E-Mobility as a Challenge for New ICT Solutions in the Car Industry	09.09.2011	Trustworthy Global Computing, Aachen, Germany	Symposium	50	all
31	Invited Talk	Henry Bensler	VW	Volkswagen und Elektromobilität	09.09.2011	Elektromobilität von morgen, Aachen, Germany	Symposium	60	Germany
32	Invited Talk	Matthias Hözl	LMU	Adaptation and Awareness in Ensembles	09.09.2011	Trustworthy Global Computing, Aachen, Germany	Symposium	50	all
33	Colloquium	Martin Wirsing	LMU	Adaptation and Awareness in Ensembles	12.09.2011	IMDEA Software, Madrid, Spain	Faculty and PhD. students	20	Spain

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
34	Invited Talk	Michele Loreti	DSIUF	Uniform Labeled Transition Systems for Nondeterministic, Probabilistic, and Stochastic Process Calculi	19.09.2011	PASTA'11, Ragusa, Italy	Workshop	20	all
35	Invited Talk	Mieke Massink	CNR-ISTI	Fluid Analysis of Foraging Ants	19.09.2011	PASTA'11, Ragusa, Italy	Faculty and PhD. students	20	all
36	Invited Talk	Matthias Hözl	LMU	Research Challenges for Ensembles	21.09.2011	AWARENESS Steering Committee, Amsterdam, The Netherlands	Symposium	20	all
37	Invited Talk	Roberto Bruni	UNIPI	Distributed Compensations with Interruptions in Long-Running Transactions	21.09.2011	Department of Computer Science, University of Leicester, UK	Faculty and PhD. students	20	all
38	Invited Talk	Alberto Luch Lafuente	IMT	A Conceptual Framework for Behavioural Adaptation	22.09.2011	Department of Computer Science, University of Leicester, UK	Faculty and PhD. students	20	all
39	Invited Talk	Ugo Montanari	UNIPI	Component-Based Network Models	23.09.2011	IFIP WG 2.2, LIAFA, Université Paris Diderot, Paris, France	Seminar	20	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
40	Talk	Carlo Pinciroli	ULB	The ARGoS Simulator	30.09.2011	IROS2011, San Francisco, USA	IROS2011	-	USA
41	Keynote Talk	Joseph Sifakis	Verimag	Rigorous System Design	03.10.2011	VLSI-SoC Conference, Hong Kong, China	Conference	-	all
42	Invited Talk	Matthias Hözl	LMU	Adaptation and Awareness in Ensembles	04.10.2011	Formal Methods for Components and Objects, Turin, Italy	Conference	30	all
43	Tutorial	Joseph Sifakis	Verimag	Rigorous System Design in BIP	09.10.2011	Tutorial on Time-Predictable and Composable Architectures for Dependable Embedded Systems in Esweek, Taipei, Taiwan	Conference	-	all
44	Invited Talk	Stephan Reiter	LMU	The ASCENS Science Cloud	02.11.2011	D3S Seminar, Charles University, Prague, Czech Republic	Faculty and PhD. students	20	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
45	Invited Talk	Ugo Montanari	UNIPI	La Ricerca al Dipartimento di Informatica	11.11.2011	La CEP prima della CEP: Storia dell'Informatica, La Limonaia, Pisa, Italy	Seminar	40	all
46	Invited Talk	Ugo Montanari	UNIPI	Models and Languages for Service Component Ensembles	18.11.2011	Departamento de Computación, Buenos Aires, Argentina	Seminar	40	all
47	Invited Talk	Rolf Hennicker	LMU	Modal Interface Theories	15.12.2011	Charles University, Prague, Czech Republic	University	20	Czech Republic
48	Invited Talk	Emil Vassev	UL	Engineering Self-adaptive Systems – Challenges and Approaches	17.01.2012	Seminar at Concordia University, Montreal, Canada	100	–	Canada
49	Workshop Presentation	Gianluca Mezzetti	UNIPI	Checking Security of Behavioural Variations	03.02.2012	COTICO Workshop at Lucca, Italy	Workshop	40	all
50	Workshop Presentation	Roberto Bruni	UNIPI	Transactions Being Arranged	03.02.2012	COTICO Workshop at Lucca, Italy	Workshop	40	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
51	Invited Talk	Ugo Montanari	UNIPI	Network Conscious pi-calculus	09.02.2012	Workshop on Nominal Sets meet Automata Theory, Warsaw, Poland	Seminar	20	all
52	Invited Talk	Rolf Hennicker	LMU	Challenges and Solutions in Interface-Based Design of Component Systems	25.03.2012	FIT'12, Tallinn, Estonia	Workshop	25	all
53	Invited Talk	Martin Wirsing	LMU	Algebraic Specifications: From Concurrent Systems to Clouds	01.04.2012	Symposium in honour of Egidio Astesiano in Genova, Italy	Workshop	60	all
54	Invited Talk	Franco Zambonelli and Marco Mamei	UNIMORE	Toward Sociotechnical Urban Superorganisms	15.05.2012	IBM Smart Cities Center, Dublin, Ireland	Seminar	40	all
55	Invited Talk	Mirco Tribastone	LMU	Performance Modelling of Large-Scale Hierarchical Systems	22.05.2012	GI-Dagstuhl Seminar, Schloss Dagstuhl, Wadern, Germany	Seminar	30	all
56	Seminar	Nikola Serbedzija	Fraunhofer	Engineering Awareness	22.05.2012	52. IFIP 2.4 Working Group Meeting, Vadstena, Sweden	Annual meeting	30	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
57	Invited Talk	Mirco Tribastone	LMU	Performance Modeling of Design Patterns for Distributed Computation	30.05.2012	GI-Dagstuhl Seminar, Schloss Dagstuhl, Wadern, Germany	Seminar	30	all
58	Invited Talk	Franco Zambonelli	UNI-MORE	Reconciling Self-adaptation and Self-organization	05.06.2012	7th International Symposium on Software Engineering for Self-Managing and Adaptive Systems, Zurich Switzerland	Symposium	100	all
59	Invited Talk	Roberto Bruni	UNIFI	Open Multiparty Interaction	07.06.2012	21st International Workshop on Algebraic Development Techniques, Salamanca, Spain	Workshop	50	all
60	Seminar	Rolf Hennicker	LMU	View-based Development of a Simulation Framework for Multi-Disciplinary Environmental Modelling	14.06.2012	Salamanca, Spain	IFIP Working Group	30	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
61	Invited Talk	Rocco de Nicola	IMT	A Language-based Approach to Autonomic Computing	16.06.2012	8th International Workshop on Automated Specification and Verification of Web Systems, Stockholm, Sweden	Workshop	20	all
62	Talk	Matthias Hözl and Annabelle Klarl	LMU	The POEM Language	18.06.2012	PST Hut Seminar, Bayrischzell, Germany	Faculty and PhD. students	20	Germany
63	Talk	Christian Kroiß	LMU	Adaptive Runtime-Verification In Multi Agent Systems	18.06.2012	PST Hut Seminar, Bayrischzell, Germany	Faculty and PhD. students	20	Germany
64	Talk	Martin Wirsing	LMU	The ASCENS Approach	19.06.2012	PST Hut Seminar, Bayrischzell, Germany	Faculty and PhD. students	20	Germany
65	Invited Talk	Diego Latella	CNR-ISTI	Bisimulation of State-to-Function Labeled Transition Systems of Stochastic Process Languages	07.09.2012	PEPA Club Talks, at LFCS – University of Edinburgh, UK	Faculty and Ph.D. students	15	all
66	Seminar	Roberto Bruni	UNIPI	Open Multiparty Interactions in the link-calculus	12.09.2012	IMT Seminar series, Lucca, Italy	Faculty and PhD. students	10	all

No.	Type of activities	Presenter	Partner	Title	Date	Place	Type of audience	Size	Countries
67	Talk	Nora Koch	LMU	Model-Driven Development of Access Control Policies	12.09.2012	NESSoS NoE Meeting, Pisa, Italy	NESSoS partners	15	all
68	Invited Talk	Ugo Montanari	UNIFI	On Hierarchical Graphs: Reconciling Bigraphs, GS-monoidal Theories and GS-graphs	20.09.2012	ICTCS 2012, 13th Italian Conference on Theoretical Computer Science, Varese, Italy	Conference	50	all
69	Invited Talk	Ugo Montanari	UNIFI	Il Consorzio Interuniversitario Nazionale per l'Informatica: Presente e Futuro	21.09.2012	Colloquium Ticinese in Honor of Ivo De Lotto, Pavia, Italy	Colloquium	-	Italy
70	Invited Talk	Gian Luigi Ferrari	UNIFI	Surveillance: Data Secrecy and Privacy	25.09.2012	International Workshop on SURVEILLING and SURVEILLANCE, Florence, Italy	Workshop	-	all
71	Invited Talk	Martin Wirsing	LMU	Softwaretechnik First	29.09.2012	Symposium in honour of Stefan Jähnichen, Berlin, Germany	Symposium	120	all

2.5 Organization of Events

ASCENS members participated in the organization of 31 conferences and workshops in different roles, such as chairs of the event, Program Committee (PC) or Steering Committee (SC) members.

The list presented below is limited to events in which ASCENS partners participated actively in the roles of PC chairs, SC members or organizers. Events in which ASCENS partners only acted in the role of PC members are not included, as this would lead to an unduly long table with hundreds of entries. In addition to the event name, the type and size of the audience is provided as additional information. All the events addressed participants of all countries.

An increasing number of international conferences welcome the organization of satellite events that focus on aspects that are more specific than the topics of the conference, as a means to maximize interaction between participants and to give visibility to emerging areas with clear impact on science and technology. ASCENS members seized this opportunity by collocating some of the organized workshops with major conferences, such as GT-VMT at ETAPS 2011, ICE at DisCoTec'11, as well as FIT, QAPL and GRAPHite at ETAPS 2012, and MDsec at MoDELS 2012.

2.5.1 Conferences

- Joint 15th IFIP International Conference on Formal Methods for Open Object-based Distributed Systems and 31th IFIP International Conference on FORMAL TECHNIQUES for Networked and Distributed Systems (FMOODS-FORTE 2013), 3 – 5 June 2013, Florence (Italy), Faculty and Ph.D. Students, all countries, DSIUF, Michele Boreale, PC chair
- Joint 13th IFIP International Conference on Formal Methods for Open Object-based Distributed Systems and 31th IFIP International Conference on FORMAL TECHNIQUES for Networked and Distributed Systems (FMOODS-FORTE 2011), 6 – 9 June 2011, Reykjavik (Iceland), Faculty and Ph.D. Students, 40, all countries, UNIPI, Roberto Bruni
- 20th European Conference on Artificial Life (ECAL), 8 – 12 August 2011, Paris (France), Faculty and Ph.D. Students, 500, all countries, ULB, Marco Dorigo
- 4th Conference on Algebra and Coalgebra in Computer Science (CALCO 2011), 30 August – 02 September 2011, Winchester (UK), Faculty and Ph.D. Students, 70, all countries, UNIPI, Andrea Corradini & Ugo Montanari.
- International Colloquium on Theoretical Aspects of Computing 2011 (ICTAC 2011), 31 August 31 – 02 September 2011, Johannesburg (South Africa), Faculty and Ph.D. Students, 100, all countries, ISTI, Mieke Massink (PC member)
- 6th International Symposium on Trustworthy Global Computing (TGC 2011), 9 – 10 September 2011, Aachen (Germany), Faculty and Ph.D. Students, 30, all countries, UNIPI, Roberto Bruni
- 9th International Conference on Integrated Formal Methods, 18 – 22 June 2012, Pisa (Italy), Faculty and Ph.D. Students, 100, all countries, ISTI, Diego Latella (PC Co-Chair)
- 4th ACM SIGCHI Symposium on Engineering Interactive Computing Systems (EICS 2012), Copenhagen (Denmark), 25 – 28 June 2012, Faculty and Ph.D. Students, 200, all countries, ISTI, Mieke Massink (PC Member)
- ANTS 2012: Eight International Conference on Swarm Intelligence, 12 – 14 September 2012, Brussels (Belgium), Faculty and Ph.D. Students, 100, all countries, ULB, Marco Dorigo (general chair).

- 10th International Conference on Integrated Formal Methods, 10 – 14 June 2013, Turku (Finland), Faculty and Ph.D. Students, 100, all countries, ISTI, Diego Latella (PC Member)
- 5th ACM SIGCHI Symposium on Engineering Interactive Computing Systems (EICS 2013), London (UK), 24 – 27 June 2013, Faculty and Ph.D. Students, 200, all countries, ISTI, Mieke Massink (PC Member)
- First International Conference on Context-Aware Systems and Applications (ICCASA 2012), 26 – 27 November 2012, Ho Chi Minh City (Vietnam), 200, all countries, UL, Emil Vassev (steering).

2.5.2 Workshops

- Workshop on Foundations and Applications of Component-based Design (WFCD in ESWeek), 24 October 2010, Scottsdale (Arizona, USA), University and Industry, 39, all countries, Verimag, Jacques Combaz & Joseph Sifakis
- Ninth Workshop on Quantitative Aspects of Programming Languages (QAPL 2011), 1 – 3 April 2011, Saarbrücken (Germany), International, 30, all countries, ISTI, Mieke Massink (PC Co-Chair)
- 10th International Workshop on Graph Transformation and Visual Modelling Techniques (GT-VMT 2011), 2 – 3 April 2011, Saarbrücken (Germany), Faculty and Ph.D. Students, 40, all countries, UNIPI, Fabio Gadducci
- 7th International Workshop on Automated Specification and Verification of Web Systems (WWV 2011), 9 June 2011, Reykjavik (Iceland), International, 15, all countries, UDF/IMT, Rosario Pugliese (Program chair) and Francesco Tiezzi (Program chair)
- 4th Interaction and Concurrency Experience (ICE 2011), 9 June 2011, Reykjavik (Iceland), Faculty and Ph.D. Students, 25, all countries, UNIPI, Roberto Bruni
- Third Annual Meeting and Workshop of the Models and Logics for Quantitative Analysis ERCIM WG (MLQA 2011), 5 September 2011, Aachen (Germany), International, 30, all countries, ISTI, Diego Latella.
- 1st SASO Workshop on Self-awareness in Autonomic Systems (AWARE2011), 7 October 2011, Ann Arbor (Michigan, USA), International, 30, all countries, UNIMORE, Giacomo Cabri (Workshop chair)
- Fourth International Workshop on Foundations of Interface Technologies (FIT 2012), 25 March 2012, Tallin (Estonia), International, 30, all countries, LMU, Sebastian Bauer
- Tenth Workshop on Quantitative Aspects of Programming Languages (QAPL 2012), 31 March – 1 April 2012, Tallin (Estonia), International, 30, all countries, ISTI, Mieke Massink (PC Co-Chair)
- 1st Workshop on Graph Inspection and Traversal Engineering (GRAPHite 2012), 1 April 2012, Tallin (Estonia), International, 30, all countries, IMT, Alberto Lluch Lafuente (PC member)
- 5th Interaction and Concurrency Experience (ICE 2012), 16 June 2012, Stockholm (Sweden), Faculty and Ph.D. Students, 25, all countries, UNIPI/IMT, Roberto Bruni (PC member), Alberto Lluch Lafuente (PC member) and Francesco Tiezzi (PC Member)

- 8th International Workshop on Automated Specification and Verification of Web Systems (WWV 2012), 16 June 2012, Stockholm (Sweden), International, 20, all countries, IMT/UDF, Francesco Tiezzi (Program chair) and Rosario Pugliese (PC member)
- First International Workshop on Formal Methods for Self-Adaptive Systems (FMSAS 2012), 27 – 28 June 2012, Montreal (QC, Canada), International, 20, all countries, UL, Emil Vassev (chair), Mike Hinchey (steering)
- 8th Model-Driven and Agile Engineering for the Web (MDWE 2012), 25 July 2012, Berlin (Germany), International, 30, all countries, LMU, Nora Koch
- 3rd Workshop on the Web and Requirements Engineering (WeRE 2012), 27 July 2012, Berlin (Germany), International, 20, all countries, LMU, Nora Koch
- 17th International Workshop on Formal Methods for Industrial Critical Systems (FMICS2012), 27 – 28 August 2012, Paris (France), International, 30, all countries, ISTI, Mieke Massink (PC Member)
- 2nd SASO Workshop on Self-awareness in Autonomic Systems (AWARE2012), 10 September 2012, Lyon (France), International, 20, all countries, UNIMORE, Franco Zambonelli & Giacomo Cabri (Workshop chair)
- 6th International Symposium on Trustworthy Global Computing (TGC 2012), 7 – 8 September 2012, Newcastle (UK), International, 30, all countries, IMT/UNIPI/LMU, Martin Wirsing (steering), Ugo Montanari (steering), Rocco De Nicola (steering), Roberto Bruni (PC member) and Alberto Lluch Lafuente (PC member)
- First Model-Driven Security Workshop (MDsec 2012) at MoDELS 2012 conference, 1st October 2012, Innsbruck (Austria), International, 30, all countries, LMU, Nora Koch

2.6 Summer Schools

ASCENS members actively participated in the organization of the AWARENESS schools. On the one hand many lecturers of the AWARENESS Virtual Lecture Series (AVLS) were ASCENS members. On the other hand senior researchers of ASCENS organized the AWARENESS summer school held in Edinburgh, UK, which was attended among others by ASCENS PhD students. In addition, project members participated in the organization of the Artist Summer School Europe 2011 and the Nano-Tera/Artist Summer School Europe 2012.

- Artist Summer School Europe 2011, 04 – 09 Sept 2011, Aix-les-Bains (France), University and Ph.D. students, 87, all countries, Verimag, Jacques Combaz
- Awareness Virtual Lecture Series (AVLS), all countries, LMU, UDF, UNIMORE, IMT, including the following lectures of ASCENS members:
 - SCEL: Service Component Ensemble Language - Rosario Pugliese (October 28, 2011)
 - Self-aware Pervasive Service Ecosystems - Franco Zambonelli (November 11, 2011)
 - Adaptation and Awareness in Robot Ensembles - Matthias Hölzl (November 25, 2011)
- Awareness Summer School (AWASS 2012), 10 – 16 June 2012, Edinburgh (UK), PhD Students, 30, all countries, IMT, Andrea Vandin, Alberto Lluch
- Nano-Tera/Artist Summer School Europe 2012, 17 – 21 September 2012, Aix-les-Bains (France), University and Ph.D. students, 64, all countries, Verimag, Jacques Combaz

2.7 Courses

During the first two reporting years, the academia partners taught ASCENS-related topics in several courses. The list below includes 27 graduate and postgraduate courses and tutorials. Some of them were taught in more than one term. The list provides name of the courses, type and size of the audiences (if available), location, members that were responsible for the course and the acronym of the partner.

- Distributed Systems and Computer Networks, Autumn 2010, Università di Firenze (Italy), master students, 10, UDF, Rosario Pugliese and Francesco Tiezzi.
- Modellierung dynamischer und adaptiver Systeme, Winter Term 2010/11, Ludwig-Maximilians-Universität München (Germany), master and diploma students, 10, LMU, Martin Wirsing and Wolfgang Hesse.
- Models of Computation, Spring 2011, Università di Pisa (Italy), graduate students, 50, UNIPI, Ugo Montanari.
- Semantica e Teoria dei Tipi (in Italian), Spring 2011, University of Pisa and Scuola Normale (Italy), graduate and PhD students, 10, UNIPI, Ugo Montanari.
- Elements of Computability Theory, Spring 2011, IMT (Italy), PhD students, 10, UNIPI, Ugo Montanari.
- Concurrency Models, Spring 2011, IMT (Italy), PhD students, 10, UNIPI, Ugo Montanari.
- Formal Methods for Security Policies and Protocols, Spring 2011, Università di Pisa (Italy), master students, 15, UNIPI, Fabio Gadducci.
- Methods for the Specification and Verification of Business Processes, Spring 2011, Università di Pisa (Italy), master students, 23, UNIPI, Roberto Bruni.
- Formal Methods for Concurrent System, Spring 2011, IMT (Italy), PhD students, 7, UNIPI and IMT, Roberto Bruni and Rocco De Nicola.
- Probabilistic and Stochastic Methods in Process Algebras, Spring 2011, IMT (Italy), PhD students, IMT, Rocco De Nicola.
- Software Verification Methods, Spring 2011, Università di Pisa (Italy), master students, 5, UNIPI, Andrea Corradini and Gianluigi Ferrari.
- Techniques for System Verification and Evaluation, Spring 2011, Università di Firenze (Italy), undergraduate students, 10, ISTI, Mieke Massink.
- Swarm Intelligence INFO-H-414, Spring 2010-2012, Université Libre de Bruxelles (Belgium), undergraduate students, 20, IRIDIA-ULB, Marco Dorigo, Mauro Birattari, Carlo Pinciroli
- Software and Service Engineering, Spring 2011, 2012, and 2013, Università di Modena e Reggio Emilia (Italy), undergraduate students, 25, UNIMORE, Franco Zambonelli.
- Distributed Software Systems, Autumn 2011 and 2012, Università di Modena e Reggio Emilia (Italy), undergraduate students, 20, UNIMORE, Franco Zambonelli and Giacomo Cabri.
- Formal Methods for Specification and Validation, Autumn 2011, IMT Lucca, PhD students, UNIPI, Gianluigi Ferrari.

- Methods for the Specification and Verification of Business Processes, Autumn 2011, Università di Pisa (Italy), master students, 20, UNIPI, Roberto Bruni.
- Distributed Systems and Computer Networks, Autumn 2011, Università di Firenze (Italy), master students, 10, UDF, Rosario Pugliese and Francesco Tiezzi.
- Interpreters and Compilers, Autumn 2011, Università di Firenze (Italy), master students, 10, UDF, Rosario Pugliese and Francesco Tiezzi.
- Simulation with ARGoS, Spring 2011, Ludwig-Maximilians-Universität München (Germany), students and PhD students, 7, LMU, Annabelle Klarl
- Program Analysis and Code Verification, Autumn 2011, CUNI (Czech Republic), master students, 13, CUNI, Jan Kofron.
- System Behavior Models and Verification, Spring 2012, CUNI (Czech Republic), master students, 20, CUNI, Jan Kofron.
- Modellierung dynamischer und adaptiver Systeme, Winter Term 2011/12, Ludwig-Maximilians-Universität München (Germany), bachelor, master and diploma students, 17, LMU, Martin Wirsing and Wolfgang Hesse.
- Adaptive Agenten, Summer Term 2012, Ludwig-Maximilians-Universität München (Germany), bachelor students, 18, LMU, Martin Wirsing, Andreas Schroeder, Annabelle Klarl, Christian Krois, Lenz Belzner.
- Formal Methods for System Verification, Winter term 2012/13, Università di Firenze (Italy), undergraduate students, 10, UDF, Michele Loreti, ISTI, Mieke Massink.
- Principles of Concurrent and Distributed Programming, Winter term 2012/13, IMT (Italy), PhD students, IMT, Rocco De Nicola
- Software Engineering and Service Oriented Systems, September/October 2012, IMT (Italy), PhD students, 6, IMT/LMU, Francesco Tiezzi, Martin Wirsing.

2.8 Distribution of Software Products

Within the scope of ASCENS, first prototypes were built or existing software tools developed in previous projects were adapted during the first 24 months of the project. The objective is the construction of demonstrators of the technologies that have been developed by the members of the ASCENS consortium. The final aim is to integrate these software tools in the Service Development Environment (SDE), which provides a tool integration platform enabling this way the combined use of tools, i.e. the construction of so-called tool chains.

The following table provides an overview on these ASCENS relevant tools. It includes only a brief description of them; for further details please refer to the deliverable(s) mentioned in the last column of the table. The classification of the tools follows the one provided in D6.2.

Acronym	Software name	Description	Type	License	Partner	Contact	URL	Deliverable
ARGoS	Autonomous Robots Go Swarming	ARGoS is a software designed to prototype robot control code for large heterogeneous swarms of robots	Runtime tool	GPL	ULB	Carlo Pinciroli	http://iridia.ulb.ac.be/argos	D6.2
ARGoS-Lua	ARGoS-Lua	The ARGoS-Lua library allows users to program controllers for ARGoS in Lua instead of C++	Implementation tool	MIT	LMU	Matthias Hözl	https://github.com/hoelzl/ARGoS-Scripting	D8.2
BIP	BIP Compiler	BIP component framework supports the construction of composite, hierarchically structured components from atomic components characterized by their behavior and interfaces. It supports a rigorous system design flow	Implementation tool	GNU	Verimag	Jacques Combaz	http://www-verimag.imag.fr/New-BIP-tools.html	D6.2
GMC	Gimple Model Checker	GMC is an explicit state model checker for C and C++ languages	Implementation tool	LGPL	CUNI	Jan Kofroň	http://d3s.mff.cuni.cz/~sery/gmc/	D5.2 D6.2
Iliad	Implementation of Logical Inference for Adaptive Devices	Iliad is an implementation of the POEM language that allows developers to analyze and execute POEM specifications	Implementation	MIT	LMU	Matthias Hözl	https://github.com/hoelzl/Iliad	D8.2
jDEECo	Java Ensemble Component Framework	jDEECo is a Java-based implementation of the DEECo component model, which is a reification of SCEL geared towards practical development of software systems using SCEL concepts.	Runtime tool	Apache	CUNI	Tomáš Brueš	https://github.com/d3scomp/jDEECo	D1.5 D6.2

Acronym	Software name	Description	Type	License	Partner	Contact	URL	Deliverable
jRESP	Java Runtime-Environment for SCEL Programs	jRESP is a runtime environment, developed in Java, that aims at providing programmers with a framework that permits developing autonomic and adaptive systems	Runtime tool	EPL	UDF	Michele Loreti	https://code.google.com/p/jresp/	D1.5 D6.2
jSAM	Java Stochastic Model-Checker	jSAM is an eclipse plug-in integrating a set of tools that permits supporting stochastic analysis of concurrent and distributed systems specified by means of process algebras, e.g. StoKlaim	Modeling tool	EPL	UDF	Michele Loreti	http://rap.dsi.unifi.it/SAM/ , https://code.google.com/p/jsam/	D6.2
KLT	KnowLang Toolset	KLT provides a development environment for Knowledge Reasoning (KR) where we can write KR specifications in the KnowLang notation by using visual modeling tools and check for the syntactical integrity and consistency of the KR models.	Modeling tool	GPL	UL	Emil Vassev	http://knowlang.lero.ie	D3.2
Lua-Tools	Lua-Tools	Lua is a scripting language with meta-programming features that is frequently used in embedded devices. Lua-Tools is a library that focuses on the development of adaptive, autonomous systems	Implementation tool	MIT	LMU	Matthias Hözl	https://github.com/hoelzl/Lua-Tools	D8.2

Acronym	Software name	Description	Type	License	Partner	Contact	URL	Deliverable
MDW	Maude Daemon Wrapper	The existing Eclipse plug in Maude Daemon encapsulates a Maude process into a set of Java classes and provides an API to programmatically control it. The MDW is a simple wrapper to integrate Maude Daemon into the SDE. The wrapper allows other tools registered to the SDE to execute Maude commands.	Modeling tool	LGNU	IMT, UNIFI	Alberto Lluich, Andrea Vandin, Roberto Bruni	http://sysma.lab.imtlucca.it/tools/maude-daemon-wrapper/	D6.2
MESS	Maude Ensemble Strategies Simulator	MESS is a tool for implementing and analyzing selfassembling strategies with Maude.	Modeling tool	LGNU	IMT, UNIFI	Alberto Lluich, Andrea Vandin, Roberto Bruni	http://sysma.lab.imtlucca.it/tools/ensembles/	D8.2
SCP	Science Cloud Platform	SCP is a Platform as a Service (PaaS) solution	Runtime tool	EPL	Zimory, LMU	Philip Mayer	http://svn.pst.ifi.lmu.de/trac/scp	D6.2, D7.2
SDE	Service Development Environment	SDE provides a service-oriented platform for (development) tool integration.	Runtime tool	CPL	CUNI	Petr Tuma	http://svn.pst.ifi.lmu.de/trac/sde	D6.2
SPL	Runtime Performance Awareness Framework	SPL provides a performance monitoring service for ensembles implemented in Java	Introspection tool	Apache	CUNI	Petr Tuma	http://sourceforge.net/projects/spl-tools/	D6.2
ZEC	Zimory Enterprise Cloud	ZEC provides a web based front-end and a RESTful API to be used within the PaaS solution. It is Zimory's product for IaaS Clouds	Runtime tool	Commercial	Zimory	Jose Velasco	http://www.zimory.com	D7.2

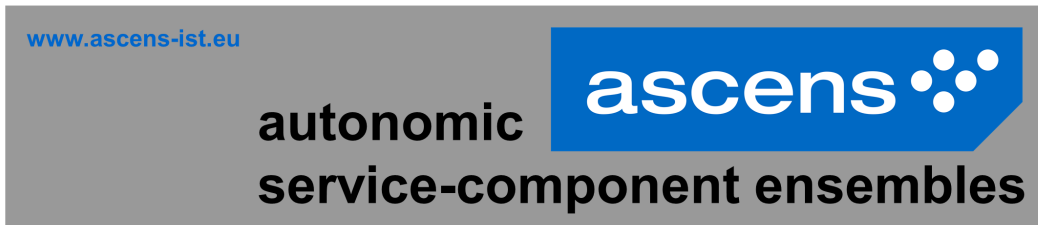
2.9 Poster

The ASCENS overview poster fulfills the objective to present key information of the project at a glance (see Figure 5). The main information provided is the name of the project, URL of the website, list of partners, objectives and case studies. The poster includes also a graphical representation of the ASCENS approach and the main research areas.

2.10 Use of Other Dissemination Channels

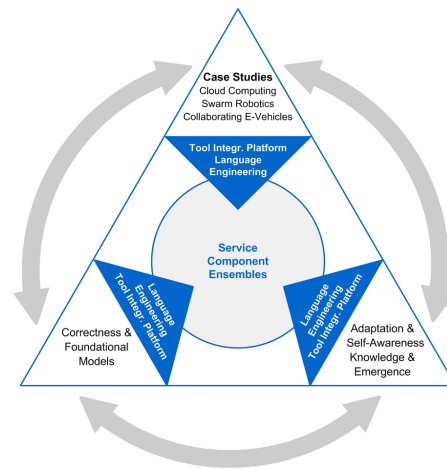
The ASCENS project uses a variety of additional and non-traditional channels for the dissemination of project key information and project results, such as presence in social networks, presentations on monitors at the university hall, internal reports at the partners' organizations or local events.

- **Social Networks.** ASCENS has created a facebook page that provides general information about the project and a platform for content sharing with the public, e.g. graphics and videos illustrating and explaining the progress we make. The facebook page is also integrated with the ASCENS blog, providing users with another way of commenting on our articles and discussing them. Lastly, facebook is a means of improving cooperation and communication among project members by further connecting them.
- **Internet Festival, Pisa, May 5-8 2011.** In 2011 Italy celebrates the 150th Anniversary of Italian unification. The program of national celebrations includes a calendar of initiatives throughout the Italian territory, particularly in the cities that played a key role in the unity process, including Pisa. Pisa has been selected to represent the excellence of Italy in computer science. The Computer Science course at University of Pisa was the first one in the area to be activated in the whole Italy, during the 1960s. While information technologies are changing the changing the ways we understand and construct the world, by providing new ways of sensing, communicating and analyzing data, remains largely unknown to the general audience. Hence, on the occasion of the celebration of the 150th Anniversary of Italy Unification, the Pisa University, the Italian National Research Institute, Scuola Superiore Sant'Anna and Scuola Normale Superiore have organized a conference devoted to the dissemination of research results in computer science. Detailed description of the event is available at <http://2011.internetfestival.it/>. ASCENS contact: Gianluigi Ferrari (UNIFI), Scientific Chair of Internet Festival 2011. Ugo Montanari (UNIFI) gave a Lecture on Autonomic Ensembles. Fabio Gadducci (UNIFI) presented a video on History of Computing.
- **LMU Monitors, Munich, June 2011.** ASCENS key data were published on monitors distributed through public accessible areas of the LMU building. ASCENS contact: Nora Koch (LMU).
- **Fraunhofer Annual Report, September 2011.** An overview on ASCENS is included in the Annual Report http://www.first.fraunhofer.de/uploads/tx_wfproject/Jahresbericht_2010_Projekt_ASCENS_03.pdf (in German). ASCENS contact: Nikola Serbedzija (Fraunhofer).
- **Internet Festival, Pisa, October 4-7 2012.** A second edition of the Internet Festival has taken place in Pisa in October, with a much broader and larger audience than the first edition. ASCENS contact: Gianluigi Ferrari (UNIFI).

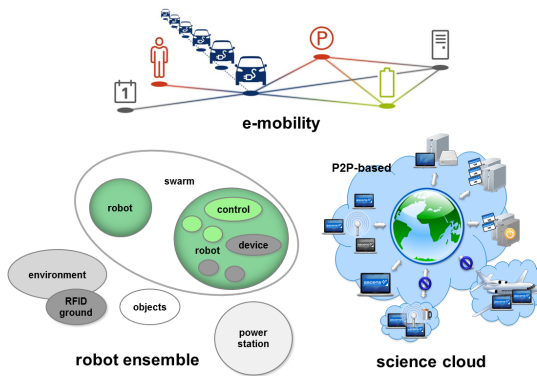


ensembles

- achieve an overall system's goal
- have a massive number of nodes
- operate in open and non-deterministic environments
- are built from self-aware components
- adapt dynamically to new conditions



case studies



engineering ensembles

- language for autonomous behavior
- knowledge representation of self-aware components
- mechanisms for adaptation
- verification using formal methods
- set of tools and tool integration platform

 ASCENS FET Proactive 257414	Project Coordination Martin Wirsing Institute for Informatics Ludwig-Maximilians-Universität München, Germany	VOLKSWAGEN zimory mobsya EPFL ULB UNIVERSITY OF LIMERICK Fraunhofer FIRST	Ludwig-Maximilians-Universität München Università di Pisa Università di Firenze Fraunhofer Gesellschaft VERIMAG Laboratory Università di Modena e Reggio Emilia Université Libre de Bruxelles Ecole Polytechnique Fédérale de Lausanne Volkswagen AG Zimory GmbH University of Limerick – Lero IMT Lucca Mobsya Charles University in Prague CNR – ISTI

Figure 5: ASCENS poster

3 Collaboration Platforms and Activities

The collaboration task includes the creation of communication mechanisms and infrastructure at project level and inter-project activities under the umbrella of the proactive initiative's associated Coordination Action AWARENESS. The communication mechanisms within the project are the basis for the creation of collaboration possibilities with other projects, academia and industry in general.

These communication mechanisms comprise mailing lists, an internal collaboration platform (ASCENS wiki), social networks and a set of associated researchers. In particular, the activities within the scope of the coordination action AWARENESS are very promising.

3.1 Coordination Action AWARENESS

Members of the ASCENS project have been actively involved in the following activities organized by the coordination action AWARENESS or activities in which AWARENESS projects were involved.

- AWARENESS Inaugural Meeting in Amsterdam, The Netherlands, December 14–15, 2010.
- Bilateral meeting of the coordinators of AWARENESS projects ASCENS and SYMBRION in Munich, February 15, 2011.
- AWARENESS Advisory Board Meeting in Amsterdam, September 22–23, 2011. Presentation on “Research Challenges for Ensembles ” (see Sect. 2.4).
- Preparation of the AWARENESS Virtual Lecture Series (AVLS) (<http://www.aware-project.eu/lectures/>) (see Sect. 2.6).
- AWARENESS Inter-Project Workshop in Bologna, January 22–26, 2012.
- AWARENESS Summer School (AWASS), in Edinburgh, June 10–16, 2012.
- AWARENESS Slide Factory in Barcelona, September 24–26, 2012.

3.2 Associated Researchers

ASCENS invited selected researchers of the relevant communities to become an associated researcher to the project and to keep contact during the duration of the project. Associated researchers were invited to ASCENS meetings and informed by email on the project progress. In particular, Heinz Schmidt, Mario Coppo and Marianguola Dezani used these facilities to participate in the project kick-off and general meetings in Grenoble and Florence. In addition, Hernán Melgratti and Stefano Bistarelli attended the Florence meeting.

The following is the list of the current associated researchers to the ASCENS project.

- Heinz Schmidt, University of Melbourne
- Alexander Knapp, University of Augsburg
- Anders Lyhne Christensen, Inst. Telecom. of Lisbon
- Hernán Melgratti, University of Buenos Aires
- Carla Ferreira, Universidade Nova de Lisboa
- Paolo Baldan, University of Padova

- Barbara Koenig, University of Duisburg-Essen
- Gefei Zhang, Bertelsmann IT, Munich
- Tobias Heindel, University of Paris XIII
- Mariangiola Dezani, University of Torino
- Mario Coppo, University of Torino
- Stefano Bistarelli, University of Perugia
- Emilio Tuosto, University of Leicester
- Massimo Bartoletti, University of Cagliari
- Vincenzo Ciancia, ILLC Amsterdam
- Filippo Bonchi, Ecole Normale Sup Lyon
- Lorenzo Bettini, Università di Torino
- Luis Caires, Universidade Nova de Lisboa
- Marco Bernardo, Università degli Studi di Urbino
- Marco Aldinucci, Università di Torino
- Francesca Rossi, Università di Padova

3.3 Contacts to Industry and other Projects

ASCENS partners got in contact with industry, members of other national and European projects; in particular to those related to the AWARENESS coordination action. The most relevant projects, which focus on topics related to the ASCENS research areas, and industrial contacts are listed below. The ASCENS members who are responsible for the contact are included in each item of the list.

- Industry, Intecs Sistemi S.p.A.. ASCENS contacts: Mieke Massink, Diego Latella (ISTI)
- SYMBRION EU Project, Sergej Kernbach, Universität Stuttgart, ASCENS contacts: Martin Wirsing, Matthias Hölzl, Nora Koch (LMU)
- SAPERE EU Project, Franco Zambonelli, Università di Modena e Reggio Emilia, ASCENS contacts: Franco Zambonelli (UNIMORE)
- COST EU Action Towards Autonomic Road Transport Support Systems, Lee McCluskey, University of Huddersfield, ASCENS contacts: Franco Zambonelli (UNIMORE)
- Project RUPOS (funded by Regione Toscana, Italy), Partners: Link.it and Hyperborea, ASCENS contacts: Roberto Bruni, Andrea Corradini and Gianluigi Ferrari (UNIFI)
- Project SisteR (funded by Italian Ministry for the University), Partners: University of Padua, University of Udine, ASCENS contacts: Andrea Corradini, Fabio Gadducci and Valentina Monreale (UNIFI)

- Project IPODS (funded by Italian Ministry for the University), Partners: University of Turin, University of Bologna, University Ca Foscari of Venice. ASCENS contacts: Roberto Bruni and Ugo Montanari (UNIPI)
- Project TESLA – Techniques for Enforcing Security in Languages and Applications (funded by Regione Sardegna, Italy), Partners: University of Cagliari, University Ca Foscari of Venice. ASCENS contact: Gianluigi Ferrari (UNIPI)
- Member of Scientific Advisory Board of FP7 FET Integrated Project HATS (Highly Adaptable and Trustworthy Software using Formal Methods). ASCENS contact: Ugo Montanari (UNIPI)
- Member of Scientific Advisory Board of ICT-2007.8.6, FET Proactive 6, ICT Forever Yours project CONNECT, Emergent Connectors for Eternal Software Intensive Networked Systems. ASCENS contact: Ugo Montanari (UNIPI)
- Project Pro3D of FP7 (Programming for Future 3D Architecture with Many Cores). ASCENS contact: Jacques Combaz (Verimag)
- Project NESSoS of FP7 (<http://www.nessos-project.eu/>) Fabio Martinelli, CNR. ASCENS contact: Nora Koch (LMU)
- IBM Smart Cities Center, Dublin, Ireland. ASCENS contact: Franco Zambonelli (UNIMORE)
- Azienda Ospedaliera Universitaria Pisana, Pisa Italy. ASCENS contact: Roberto Bruni, Andrea Corradini, Gian Luigi Ferrari (UNIPI)
- Project H2Swarm (funded by the European Science Foundation). ASCENS contacts: Marco Dorigo (ULB) and Francesco Mondada (EPFL)
- SRI International, Computer Science Laboratory. ASCENS contact: Matthias Hözl (LMU)
- RMIT University, Melbourne, Australia. ASCENS contact: Martin Wirsing (LMU)

4 Exploitable Knowledge

Although the ASCENS project has a strong theoretical orientation focusing on basic research activities around engineering autonomic service-component ensembles, project results are planned to be demonstrated in pragmatic case studies. For example, the partners with expertise in robotics, Université Libre de Bruxelles, Ecole Polytechnique Fédérale de Lausanne and Mobsya are very interested as well in transferring the developed methods, analysis and technologies for ensembles to concrete robot swarms. In particular, the industrial partners, Volkswagen AG and Zimory GmbH are keen to transfer the research results into prototypes and in the future into products; more details in the following sections.

4.1 Exploitation Strategies of Industrial Partners

During the first reporting year the industrial partners Volkswagen AG and Zimory GmbH defined initial exploitation strategies. Volkswagen AG is planning a new generation of interactive and intelligent e-Vehicles. The ASCENS engineering approach will help Volkswagen to overcome e-Mobility restrictions by developing such e-Vehicles and to support the flexible integration of new services such as e-Charging into the vehicle under consideration. Zimory developed a unique technology to build federated cloud environments integrated in the current production solutions. This technology enables

customers to build infrastructure clouds across their own partner networks. The results of the ASCENS engineering approach will be used by Zimory to improve the cloud environment providing solutions for very critical workloads. In particular, self awareness in such cloud environments will reduce the starting time even more.

The following table provides an overview of the components that Volkswagen and Zimory are developing within the scope of the ASCENS project. The vehicle service planner, the user service planner and the cloud application scheduler are briefly described in the sections below.

Type of Exploitable foreground	Description of exploitable foreground	Confidential	Exploitable products	Sectors of application
Mobility Scheduling Unit	Software component allowing the user to automatically optimize his daily travel pattern	yes	Mobility Assistant	e-mobility
Simulation	Simulation allowing the verification of the behaviour of autonomous, distributed SCs	yes	Simulation	e-mobility
Cloud scheduling component	Software component allowing the autonomous application scheduling in a distributed cloud environment	yes	Cloud application scheduler	cloud computing

4.1.1 Mobility Assistant

Mobility planning services intend to improve mobility resource usage and customer satisfaction. In a connected mobility system, these services need to handle distributed knowledge and operate seamlessly in diverse environments. Sensing, cognition and execution units are distributed on different devices such as vehicles, mobile phones and clouds. The mobility assistant aggregates user-, vehicle- and infrastructure-related information and proposes optimal travel patterns to the user. Human-machine interaction may be realized by web-services, mobile phone applications or in-vehicle navigation services. Based on the personal calendar of the user, the mobility assistant schedules and displays travel information. Results of the scheduling process include route proposals and charging recommendations, which are based on the user preferences. Moreover, the mobility assistant raises the user's awareness of traffic flow, charging station availability and vehicle energy consumption. The mobility assistant continuously observes the energy consumption and intervenes if necessary. The mobility assistant can be understood as a further development of the user journey planner and the vehicle journey planner as described by last year's report.

The development of a distributed, autonomous version of the mobility assistant is greatly supported by ASCENS concepts, in particular the design and the verification phase.

4.1.2 Simulation of Distributed, Autonomous Agents

Products of autonomous behaviour that are designed in a distributed fashion require extensive evaluation. An extended traffic simulation framework is developed in order to deploy SCs and both verify their behaviour and validate the improvement potential. The traffic simulation is to be used to validate future autonomous services.

4.1.3 Cloud Scheduling Component

In the cloud case study the commercial exploitation is focused on leveraging the tools and methods investigated within ASCENS in a commercial context. Of particular interest are the research into and the prototype for the science cloud platform, with a specific focus on how self-aware behavior in cloud applications is realized.

The science cloud platform (SCP) developed in work package seven of the ASCENS project is used both a set of industry-inspired features testing the ASCENS methods and tools, and, on the other hand, for gathering feedback from the ASCENS tools and methods back to the SCP and industry. The SCP focusses on running applications on a peer-to-peer, voluntary computing based cloud platform, which integrates tightly with the existing Zimory SaaS solution, adding a PaaS layer. A first prototype of the SCP has already been implemented, and a first set of tools and (formal) methods has been applied to the case study.

The next year will see an evaluation phase in which Zimory and the scientific ASCENS partners discuss the use of formal and other methods and tools in the science cloud application area, possibly leading to (architectural) redesigns and/or new insights into tools and methods. The methods will include looking at how self-aware behavior can be successfully achieved. In this context, the focus for the exploitation will be on analyzing a potential implementation in a commercial distributed cloud environment. Zimory will do such an analysis within a high-profile industry project, where multiple industry players aim to build a distributed cloud environment. Zimory will present the results and gather a formal feedback. This feedback will further direct the direction of the commercialization.

4.2 Patents

No patents have been registered during the first period of the ASCENS project.

5 Summary

The dissemination activities performed during the first two periods of the project (October 2010 to September 2012) include publication of project results on the ASCENS website and the ASCENS blog, publications and presentations at conferences and workshops, co-organization of events, teaching courses and tutorials, distribution of software products, and the preparation of dissemination material for a wide audience, such as a poster and a magazine overview article.

This section presents a summary “in numbers” to the composition of the consortium and the dissemination of project results and collaboration activities.

Measurement Category	Subcategory	Year 1	Year 2	Total
Partners	Universities	10	-	10
	Research organizations	3	-	3
	Companies	2	-	2
	Countries	7	-	7
Participants	Researchers	68	1	69
	Associated researchers	16	5	21
Web presence	Web pages	58	8	66
	Blog entries	8	7	15
	Links to project site	41	3	44
Publications	Total	50	80	130
	Book contributions	4	1	5
	Articles in journals	7	9	16
	Papers in conf. and workshops	37	67	104
	Technical reports	1	3	4
	Overview online publication	1	-	1
	Joint publications (partners)	8	31	39
	Joint publications (assoc. res.)	4	6	10
Presentations and tutorials		40	31	71
Summer schools	co-organized	2	2	4
Courses		17	10	27
Conferences and workshops	co-organized	11	20	31
Contacts to industry/other projects		12	5	17
Software products	Modeling tools	1	2	3
	Implementation tools	-	5	5
	Runtime tools	3	3	6
	Introspection tools	-	1	1

Table 4: ASCENS in numbers