

Empowering End-Users to Develop Service-Based Applications

Nikolay Mehandjiev¹, Antonella De Angeli^{1,2}, Usman Wajid¹,
Abdallah Namoun¹, and Alberto Battocchi²

¹The University of Manchester, UK

{firstname.lastname}@mbs.ac.uk

²University of Trento, Italy

{deangeli,battocchi}@disi.unitn.it

Abstract. The 2nd International Workshop on End User Development for Services (EUD4Services) focuses on the issues encountered when people who are not educated as software developers attempt to create and compose software services, and on approaches and theories aiming to support such activities. The aim is to establish a community of academics and practitioners and facilitate the production of a coherent body of work related to this area.

Keywords: End User Development, service oriented architecture.

1 Introduction

The establishment of the Service Oriented Architecture paradigm in professional software development is opening new challenging environments for the EUD community. Service Oriented Architecture has created and disseminated a large number of reusable software components which can be linked and organised into new and evolving applications to satisfy specific business and personal needs. If, on the one hand, SOA provides promising tools for the EUD agenda, so far the SOA approach has been characterised by a very technical attitude with little, if any, interest to the final user of the resulting applications. Services have been designed to perform software functionalities which can be linked to each other to perform complex tasks, yet the responsibility for composition and deployment was left to expert programmers, who are also assumed to be in charge of designing the interface between services and their users. In this respect, the uptake of EUD within the SOA paradigm is hampered by a number of emerging issues, including intrinsic difficulties stemming from the complexity of technology and distributed nature of computations.

The aim of EUD4Services workshop is to establish a community of academics and practitioners and facilitate the production of a coherent body of work related to this area. Specific lines of research include:

- (a) Studies of organisational and societal practices involving the development of service-based software systems;

- (b) Cognitive and behavioural studies aimed at establishing theories and models related to people attempting to design software services and service-based applications;
- (c) Model-informed approaches or tools aiming to facilitate end-user development and design of software services;
- (d) Evaluation and comparative studies of tools, approaches and theoretical models in the area of end user development for services.

The overarching objective of the workshop is to sketch a research agenda on the topic of EUD in service-based computing. We believe the topic is of interest to several streams of research in software engineering, human-computer interaction, services computing. Thus, the purpose of this interdisciplinary workshop is to bring together researchers who have faced the problem of making the SOA paradigm available to end-users, might have some ideas on how to facilitate it, and have experimented with these ideas. We expect to provide a platform for discussion on the potential of SOA for non-technical developers in both professional and personal lives.

Some of the larger questions and issues we want to address during the workshop are the following:

- What are the drivers and obstacles to SOA based EUD?
- What is different about software services compared to conventional software, component-based software and distributed software?
- To what extent are existing methods and tools for supporting end user developers of conventional software applicable to software services?
- What are the suitable principles and approaches for understanding, designing, developing, and evolving software services by people who are not software professionals?
- How can we facilitate uptake of EUD4Services?

The workshop brings together contributions from researchers from a diverse range of interdisciplinary fields, such as human-computer interaction, software engineering, artificial intelligence, computer supported cooperative work and cognitive psychology. To facilitate cross-fertilization between latest research trends in the above areas the workshop has invited research posters in addition to the academic papers.

2 Organization

This workshop is the follow-up to the *EUD4Services* at the *AVI'2010* conference and continues to explore issues raised there¹, ensuring continuity in terms of organisation and PC membership.

The submissions were peer-reviewed for their innovation, relevance to the workshop topics and their potential to generate interesting discussions. Upon acceptance, positions papers were posted on www.EUD4Services.org, our newly established wiki community. Discussions were invited in preparation for the workshop to establish a 'common language' and understanding among the multidisciplinary audience. The

¹ M.F.Costabile, B.E.R. de Ruyter, N.Mehandjiev, P.Mussio: End-user development of software services and applications. Proceedings of the AVI 2010: 403-407.

actual workshop comprises full paper presentations, invited posters and tool demos. An interactive final session is devoted to discussion and summing up.

3 Organizers' Background

Antonella De Angeli is Associate Professor in Human-Computer Interaction at the Department of Information Engineering and Computer Science of the University of Trento. Her research addresses the cognitive, social and cultural consequences of information technology with an emphasis on the application of this knowledge to interaction design. She has a PhD in Experimental Psychology from the University of Trieste where she completed a 2-year post-doctoral research in Applied Cognitive Psychology. She worked as invited researcher at the Oregon Graduate Institute, Loria (Nancy) and IRST (Trento). From 2000 to 2004 she was a senior HCI researcher for NCR Ltd and then joined the University of Manchester. She has published over 100 papers on her HCI research, serves in the editorial board of major HCI journals (including the International Journal of Human-Computer Studies) and regularly sits in the program committee of leading conferences (e.g., DIS, Interact, AVI and CHI2008). She has organised 5 workshops at major International conferences (CHI 2006, Interact 2005-2007, AVI 2008) and acted as Principal Investigator for the University of Manchester in the EU FP7 project ServFace.

Nikolay Mehandjiev is a Reader at the Centre for Service Research of the Manchester Business School. He obtained his PhD for research in user-adaptable office information systems, and organised a number of international workshops on scaling up end user development to organisational context, and on interdisciplinary software engineering research. He has led the University of Manchester's participation in EUD-Net, the European Network of Excellence in End User Development, and has co-edited three special issues of journals devoted to the topic of EUD – two issues of the Journal of Organisational and End User Computing and one of the Communications of ACM. His current research is focused on approaches and models which enable non-technical audience to design dynamic service systems. In this area he leads the University of Manchester's participation in the EU FP7 project SOA4All. Mehandjiev has published two books and more than 100 refereed papers.

Usman Wajid is a Research Associate at Centre for Service Research, Manchester Business School. He obtained his PhD from Manchester Business School. He is interested in end user development in the context of service-based systems to enable collaborative user-driven system and application development. Usman has worked on the EU funded SOA4All project.

Abdallah Namoun is a Research Associate at Centre for Service Research, Manchester Business School, where he also obtained his PhD. His research interests include user interactions with technology, design of visual interfaces, and methods for testing usability. He has worked on models for re-usable interfaces, software re-use, cognitive modelling, usability engineering, end user development, and requirements engineering. Abdallah has worked on ServFace and SOA4All.

Alberto Battocchi is a post-doctoral researcher in Human-Computer Interaction at the Department of Information Engineering and Computer Science of the University of Trento (Italy). His main research interests concern the design and evaluation of innovative technologies for the rehabilitation of people with cognitive disabilities. In 2008, Alberto received his PhD in Cognitive Science and Education by the University of Trento. He has worked as researcher in the Intelligent Interaction and Interfaces research group of Fondazione Bruno Kessler (Italy) and has been visitor at the Centre for Interdisciplinary Applications of Computer Science of the University of Haifa.

4 Program Committee

Alexander Brändle, FHDW, Germany
 Jill Cao, Oregon State University, USA
 Fabio Casati, University of Trento, Italy
 Maria Francesca Costabile, University of Bari, Italy
 Joëlle Coutaz, Laboratory of Informatics of Grenoble, France
 Florian Daniel, University of Trento, Italy
 Scott Fleming, Oregon State University, USA
 Steffen Goebel, SAP Research, Germany
 Neil Maiden, City University, UK
 Maristella Matera, Politecnico di Milano, Italy
 Fabio Paternò, CNR-ISTI, Italy
 Volkmar Pipek, University of Siegen, Germany
 Boris de Ruyter, Philips Research, The Netherlands
 Christian Zirpins, KIT, Germany

5 Accepted Papers

Papers are available from the EUD4Services portal (<http://EUD4Services.org>); their abstracts are included below.

EUD for Semantic Orchestration of Web Services in Task Management System

F. Ariano¹, B.R.Barricelli¹, M.Padula², P.L.Scala², S.Valtolina¹.

¹*Dipartimento di Informatica e Comunicazione, Università degli Studi di Milano;*
²*Istituto per le Tecnologie della Costruzione, Consiglio Nazionale delle Ricerche.*

This paper presents a Task Management System based on a Web service architecture on which a network of software environments is developed. The environments are devoted to support end users in performing End-User Development activities and in exploiting their knowledge and expertise about their business processes. TMS network allows end users, who are experts of a specific domain and work together in the same organization, to design a workflow through visual composition of Web services, to visually validate its execution and to execute it at use time. In particular, the implementation of the TMS Editor, i.e. the environment dedicated to the workflow designer, is presented. The TMS Editor is used to transform the task analysis documents prepared by domain experts into a description of the workflow in terms of the components needed and the relationships among them. The components retrieved and used

by the workflow designer are Web services that are available in remote or local repositories. The TMS was presented in its first stage of design and development at EUD4Services 2010.

Hardware on End-User Development

A. Alessandrini and A. Rizzo.

University of Siena, Communication Science Department.

In this article we present the design process conducted during the prototyping phase for the Aarhus Design Project (AaDP), an open design workshop and space for schools, students and teachers. Students without any previous competence on programming and hardware assembly constructed a functional prototype during a week-long workshop. A digital bricolage development strategy was adopted, where, end-user development tools as Arduino, and Processing were the main resources, together with web resources as Instructable.com and makezine.com. During the development we encounter several challenges on construction deriving both from hardware and software components. With this contribution, we would give a wider perspective on end user development, which, partially comprehend also hardware as important issues to consider in the design of end-user development tools.

End-User Composition in Mobile Pervasive Environments

J. Floch¹, P. Herrmann², M.U. Khan², R. Sanders¹, E. Stav¹, and R. Sætre².

¹*SINTEF ICT*; ²*Norwegian University of Science and Technology (NTNU).*

Intelligent objects and devices are becoming part of the environment where people live. The more mobile and pervasive computing becomes, the greater opportunity users potentially have to customize the computing activities that take place around them. For some people the availability of devices and services offers possibilities for tailoring things to exactly what one wants. For others however, this represents a problem: how to manage the complexity? It is neither practical nor economical to use professional software developers for individual tailoring. Thus, we have to provide users with easily operable tools for service composition. The goal of this paper is to highlight the main challenges for a meaningful end-user tool support.

Integration of Services based on the Community Metaphor: Some Guidelines from an Experience of Use

M.P. Locatelli and C.Simone.

University of Milan-Bicocca.

The community metaphor has been used to define a framework (called Community-Aware-MAS, CASMAS) where existing services can be integrated to define a collaborative support of group activities. The paper reports on the outcomes of an experience of use and identifies some guidelines that could help cooperating end-users in building their collaborative application in this technological setting.

Information Systems' Self-Development as a Model of End-User Development in Networked Organizations

M. Roost¹ and G. Piho².

¹*Department of Informatics, Tallinn University of Technology;*

²*Clinical and Biomedical Proteomics Group, CRUK, LIMM, University of Leeds.*

The term ‘Networked Organization’ is used to describe a variety of new emergent organizational structures such as Virtual and Learning Organizations. Such organizations need evolutionary information systems that are able to survive over time and have built-in support to handle evolution. The development process of such information systems we call as information systems’ self-development. We describe the state-of-the-art of an ongoing research on information systems’ self-development methodology and introduce some main ideas for the (model driven, service and agent oriented) architecture of evolutionary information systems and their development processes. The self development is interpreted as a model of end-user development in the context of networked organizations and their evolutionary information systems.

Social Discovery and Composition of Web Services

A. Maaradji^{1,2}, H. Hacid¹, R. Skraba¹, A. Lateef¹, J. Daigremont¹, and N. Crespi².

¹*Alcatel-Lucent Bell Labs France*; ²*Telecom Sud Paris*.

In this paper, we propose a new approach for services recommendation to assist services composition in a Mashup environment capturing and analyzing social interactions. This approach uses an implicit social graph inferred from the common composition interests of users. We describe in detail the transformation of users-services interactions into a social graph and a possible means to leverage that graph to derive service recommendation. This proposal was implemented within a platform called SoCo and the experiments show interesting results.

Smart Services in Smart Home Environments

D. Cavone and B. De Carolis.

Dipartimento di Informatica, Università di Bari.

A Smart Home Environment (SHE) aims at supporting people in daily activities by adapting service fruition to their goals. Therefore, it is crucial to map opportunely users goals and services. This problem can be solved by leaving completely the initiative to users, by providing them with interfaces for easy and intuitive service mash-up, or by proactively planning service composition, thus living the initiative to the environment. In this paper we propose an agent-based approach that, on the basis of the recognized situation and user goal, combines services of the physical environment with the net-centric ones. In doing so, it leaves the control to the user by means of an interface that allows controlling the proposed services by accepting or changing the suggested combinations.

Acknowledgment. We would like to thank the organizers of the IS-EUD 2011 conference, for giving us the opportunity to organize our workshop. We would also like to acknowledge the help and professional attitude of the Programme Committee members for their reviews within a short deadline.