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IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

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Luis M. Camarinha-Matos · Thais A. Baldissera
Giovanni Di Orio · Francisco Marques (Eds.)

Technological Innovation for Cloud-Based Engineering Systems

6th IFIP WG 5.5/SOCOLNET Doctoral Conference
on Computing, Electrical and Industrial Systems,
DoCEIS 2015
Costa de Caparica, Portugal, April 13–15, 2015
Proceedings

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ISSN 1868-4238

ISSN 1868-422X (electronic)

IFIP Advances in Information and Communication Technology

ISBN 978-3-319-16765-7

ISBN 978-3-319-16766-4 (eBook)

DOI 10.1007/978-3-319-16766-4

Library of Congress Control Number: 2015935201

Springer Cham Heidelberg New York Dordrecht London

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Printed on acid-free paper

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(www.springer.com)

Preface

This proceedings book, which collects selected results produced in engineering doctoral programs, focuses on development and application of Cloud-based Engineering Systems. These systems leverage the emerging “network effect” and rely on the access to large pools of computational resources that are available in the “cloud” to overcome the limitations of environments with scarce processing and information storage capability. Potential benefits can be found in all engineering fields and at all levels, e.g., supporting management, operation, and services provision in small and medium enterprises, facilitating high-level sensorial perception based on sensor networks with limited local intelligence, supporting monitoring, and diagnosis of a machine with limited computer power, etc.

This approach is changing the way engineering systems are designed, giving rise to new subareas such as the so-called cloud manufacturing, while leading to exciting challenges for researchers and industrial practitioners. Instead of trying to increase local computational resources at the level of each component/ subsystem, which in some cases might be technically difficult, the efforts can be channeled to give connectivity and communication capabilities to such components, connecting them to “the cloud”. As a result, not only elasticity and more robust security mechanisms may be acquired, but also wider access to larger pools of resources available on the Internet, opening the opportunity for the development of higher value-added services. Furthermore, it also challenges systems engineers to pay attention to the underlying business models, security concerns, and user acceptability aspects.

The DoCEIS series of advanced doctoral conferences on Computing, Electrical and Industrial Systems aims at creating a space for sharing and discussing ideas and results from doctoral research in these interrelated areas of engineering, while promoting a strong multidisciplinary dialog. As such, participants were challenged to look beyond their specific research question and relate their work to the selected theme of the conference, namely to identify in which ways their research topics can benefit from, or contribute to cloud-based solutions. Current trends in strategic research programs are confirming the fundamental role of multidisciplinary and interdisciplinary approaches in innovation. As a matter of fact, more and more funding agencies are including this element as a key requirement in their calls for proposals. In such a way, the “exercise” requested by DoCEIS can be seen as a contribution to the process of acquiring such skills, which are mandatory in the profession of a PhD.

The sixth edition of DoCEIS, which is sponsored by SOCOLNET, IFIP, and IEEE IES, attracted a considerable number of paper submissions from a large number of PhD students and their supervisors from 23 countries. This book comprises the works selected by the International Program Committee for inclusion in the main program and covers a wide spectrum of application domains. As such, research results and ongoing work are presented, illustrated, and discussed in areas such as:

- Collaborative networks
- Cloud-based manufacturing
- Reconfigurable manufacturing
- Distributed computing and embedded systems
- Perception and signal processing
- Healthcare
- Smart monitoring systems
- Renewable energy and energy-related management, decision support, simulation, and power conversion

As anticipated, and confirmed by the submissions, it is shown that virtually any research topic in this broad engineering area can either benefit from a cloud-based engineering systems perspective, or be a direct contributor with models, approaches, and technologies for further development of such systems.

We expect that this book will provide readers with an inspiring set of promising ideas and new challenges, presented in a multidisciplinary context, and that by their diversity these results can trigger and motivate richer research and development directions.

We would like to thank all the authors for their contributions. We also appreciate the efforts and dedication of the DoCEIS Program Committee members who both helped with the selection of articles and contributed with valuable comments to improve their quality.

February 2015

Luis M. Camarinha-Matos
Thais A. Baldissera
Giovanni Di Orio
Francisco Marques

Organization



6th IFIP/SOCOLNET Advanced Doctoral Conference
on COMPUTING, ELECTRICAL AND
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Costa de Caparica, Portugal, April 13–15, 2015

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