Lecture Notes in Computer Science 8978

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Frank Piessens Juan Caballero
Nataliia Bielova (Eds.)

Engineering Secure Software and Systems

7th International Symposium, ESSoS 2015
Milan, Italy, March 4-6, 2015
Proceedings

Springer

Volume Editors

Frank Piessens
KU Leuven, Department of Computer Science
Celestijnenlaan 200A
3001 Heverlee, Belgium
E-mail: frank.piessens@cs.kuleuven.be

Juan Caballero
IMDEA Software Institute
Campus de Montegancedo S/N
28223 Pozuelo de Alarcón, Spain
E-mail: juan.caballero@imdea.org

Nataliia Bielova
Inria Sophia Antipolis – Mediterranee
2004 route des Lucioles, B.P. 93
06902 Sophia Antipolis Cedex, France
E-mail: nataliia.bielova@inria.fr

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-319-15617-0 e-ISBN 978-3-319-15618-7
DOI 10.1007/978-3-319-15618-7
Springer Cham Heidelberg New York Dordrecht London

Library of Congress Control Number: 2015930610

LNCS Sublibrary: SL 4 – Security and Cryptology

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

It is our pleasure to welcome you to the proceedings of the 7th International Symposium on Engineering Secure Software and Systems (ESSoS 2015). This event is part of a maturing series of symposia that attempts to bridge the gap between the software engineering and security scientific communities with the goal of supporting secure software development. The parallel technical sponsorship from ACM SIGSAC (the ACM interest group in security) and ACM SIGSOFT (the ACM interest group in software engineering) demonstrates the support from both communities and the need for providing such a bridge.

Security mechanisms and the act of software development usually go hand in hand. It is generally not enough to ensure correct functioning of the security mechanisms used. They cannot be blindly inserted into a security-critical system, but the overall system development must take security aspects into account in a coherent way. Building trustworthy components does not suffice, since the interconnections and interactions of components play a significant role in trustworthiness. Lastly, while functional requirements are generally analyzed carefully in systems development, security considerations often arise after the fact. Adding security as an afterthought, however, often leads to problems. Ad hoc development can lead to the deployment of systems that do not satisfy important security requirements. Thus, a sound methodology supporting secure systems development is needed. The presentations and associated publications at ESSoS 2015 contribute to this goal in several directions: First, improving methodologies for secure software engineering (such as formal methods and machine learning). Second, with secure software engineering results for specific application domains (such as access control, cloud, and password security). Finally, a set of presentations on security measurements and ontologies for software and systems.

The conference program featured two keynotes by Herbert Bos (Vrije Universiteit Amsterdam) and Felix Lindner (Recurity Labs GmbH), as well as research and idea papers. In response to the call for papers, 41 papers were submitted. The Program Committee selected 11 full-paper contributions (27%), presenting new research results on engineering secure software and systems. In addition, there were five idea papers, giving a concise account of new ideas in the early stages of research.

Many individuals and organizations contributed to the success of this event. First of all, we would like to express our appreciation to the authors of the submitted papers and to the Program Committee members and external referees, who provided timely and relevant reviews. Many thanks go to the Steering Committee for supporting this series of symposia, and to all the members of the Organizing Committee for their tremendous work and for excelling in their respective tasks. The DistriNet research group of the KU Leuven did an excellent job with the website and the advertising for the conference. Finally, we owe

gratitude to ACM SIGSAC/SIGSOFT, IEEE TCSP, and LNCS for continuing to support us in this series of symposia.

December 2014

Frank Piessens
Juan Caballero
Nataliia Bielova

Organization

General Chair

Stefano Zanero	Politecnico di Milano, Italy

Program Co-chairs

Frank Piessens	Katholieke Universiteit Leuven, Belgium
Juan Caballero	IMDEA Software Institute, Spain

Publication Chair

Nataliia Bielova	Inria, France

Publicity Chair

Raoul Strackx	Katholieke Universiteit Leuven, Belgium

Web Chair

Ghita Saevels	Katholieke Universiteit Leuven, Belgium

Steering Committee

Jorge Cuellar	Siemens AG, Germany
Wouter Joosen	Katholieke Universiteit Leuven, Belgium
Fabio Massacci	Universitá di Trento, Italy
Gary McGraw	Cigital, USA
Bashar Nuseibeh	The Open University, UK
Daniel Wallach	Rice University, USA

Program Committee

Aslan Askarov	Harvard University, USA
Leyla Bilge	Symantec Research Labs, France
Stefano Calzavara	Università Ca' Foscari Venezia, Italy
Lorenzo Cavallaro	Royal Holloway, University of London, UK

Bruno Crispo	University of Trento, Italy
Werner Dietl	University of Waterloo, Canada
Michael Franz	University of California, Irvine, USA
Christian Hammer	Saarland University, Germany
Marieke Huisman	University of Twente, The Netherlands
Somesh Jha	University of Wisconsin, USA
Martin Johns	SAP Research, Germany
Christian Kreibich	Lastline, USA
Wenke Lee	Georgia Institute of Technology, USA
Zhenkai Liang	National University of Singapore, Singapore
Jay Ligatti	University of South Florida, USA
Patrick McDaniel	Pennsylvania State University, USA
Nick Nikiforakis	Stony Brook University, USA
Georgios Portokalidis	Stevens Institute of Technology, USA
Joachim Posegga	University of Passau, Germany
Alexander Pretschner	Technische Universität München, Germany
Tamara Rezk	Inria, France
Konrad Rieck	University of Göttingen, Germany
Andrei Sabelfeld	Chalmers University of Technology, Sweden
Ahmad-Reza Sadeghi	TU Darmstadt, Germany
Kapil Singh	IBM T.J. Watson Research Center, USA
Asia Slowinska	Vrije Universiteit Amsterdam, The Netherlands
Pierre-Yves Strub	IMDEA Software Institute, Spain
Carmela Troncoso	Gradiant, Spain
Xiaofeng Wang	Indiana University, USA
Mohammad Zulkernine	Queen's University, Canada

Additional Reviewers

Gunes Acar	William Harris	Davide Papini
Daniel Arp	Daniel Hedin	Juan D. Parra Rodriguez
Musard Balliu	Prachi Kumari	Silvio Ranise
Bastian Braun	Sebastian Lekies	Manuel Rudolph
Jan Cederquist	Tobias Marktscheffel	Christian Wachsmann
Drew Davidson	Dimiter Milushev	Bogdan Warinschi
Lorenzo De Carli	Martín Ochoa	Fabian Yamaguchi
Matt Fredrikson	Damien Octeau	Hong-Sheng Zhou
Alexander Fromm	Alessandro Oltramari	

Sponsoring Institutions

Politecnico di Milano, Italy

NESSoS FP7 Project, Network of Excellence on Engineering Secure Future Internet Software Services and Systems, www.nessos-project.eu

PRIN Project TENACE, Protecting National Critical Infrastructures from Cyber Threats, http://www.dis.uniroma1.it/∼tenace/

Table of Contents

Formal Methods

Machine Learning

Cloud and Passwords

Measurements and Ontologies

Access Control