Lecture Notes in Computer Science 7638

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

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Decision and Game Theory for Security

Third International Conference, GameSec 2012
Budapest, Hungary, November 5-6, 2012
Proceedings

Springer

Volume Editors

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ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-34265-3 e-ISBN 978-3-642-34266-0
DOI 10.1007/978-3-642-34266-0
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012949278

CR Subject Classification (1998): C.2.0, J.1, D.4.6, K.4.4, K.6.5, H.2-3

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

Security is a multifaceted problem area that requires a careful appreciation of many complexities regarding the underlying technical infrastructure as well as of human, economic, and social factors. Securing resources involves decision making on multiple levels of abstraction while considering variable planning horizons. At the same time, the selection of security measures needs to account for limited resources available to both malicious attackers and administrators defending networked systems. Various degrees of uncertainty and incomplete information about the intentions and capabilities of miscreants further exacerbate the struggle to select appropriate mechanisms and policies.

The GameSec conferences aim to bring together researchers who are working on the theoretical foundations and behavioral aspects of enhancing security capabilities in a principled manner. The successful previous instances of the conference series took place in 2010 in Berlin, Germany, and 2011 in College Park, Maryland, USA. Contributions at the first two meetings included analytic models based on game, information, communication, optimization, decision, and control theories that were applied to diverse security topics. In addition, researchers contributed papers which highlighted the connection between economic incentives and real-world security, reputation, trust, and privacy problems.

The Third International Conference on Decision and Game Theory for Security took place in Budapest, Hungary. We solicited papers on all economic aspects of security and privacy, and received a record number of thirty-seven submissions. The submitted papers were evaluated by the international Program Committee based on their significance, originality, technical quality, and exposition.

This edited volume contains ten contributed full papers, and eight contributed short papers that constituted the scientific part of the conference program. These articles are categorized into the following six sections:

- The section on *secret communications* includes two full papers which model the interaction between attackers and defenders in games related to practical steganography and repeated rational secret sharing.
- The second book part on the *identification of attackers* consists of three full papers on security audits, intruder classification, and the crowding out of miscreants from cybercriminal markets.
- Two full papers and one short paper form the section on *multi-step attacks* and improve our understanding of the complex behavior of adversaries.
- The section on *network security* includes one full paper and two short papers with economic models of security decision making under consideration of network topologies.

- One full paper and three short papers are focused on improved models of *system defense*. Topics include the placement of honeypots and the optimal management of moving target defense systems.
- The section on *applications security* with one full paper and two short papers addresses challenges related to security in electricity distribution, smart grid systems, and cloud-based architectures.

The contributed research papers address important challenges that security practitioners are confronted with in practice. Studying security from the economic perspective allows for generalizable insights across different types of security incidents, and strengthens the ability to formulate appropriate questions about complex security problems. This edited volume will also be of interest to experienced researchers and students who aim to contribute to the next wave of research results at the exciting intersection of economics and security.

November 2012

Jens Grossklags
Jean Walrand

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GameSec 2012 was locally supported by the Laboratory of Cryptography and System Security (CrySyS Lab) at the Budapest University of Technology and Economics (BME), Hungary.

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