

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Alfred Kobsa

*University of California, Irvine, CA, USA*

Friedemann Mattern

*ETH Zurich, Switzerland*

John C. Mitchell

*Stanford University, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

Oscar Nierstrasz

*University of Bern, Switzerland*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*TU Dortmund University, Germany*

Madhu Sudan

*Microsoft Research, Cambridge, MA, USA*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Gerhard Weikum

*Max Planck Institute for Informatics, Saarbruecken, Germany*

Willem Jonker Milan Petković (Eds.)

# Secure Data Management

9th VLDB Workshop, SDM 2012  
Istanbul, Turkey, August 27, 2012  
Proceedings



Springer

## Volume Editors

Willem Jonker

University of Twente, EIT ICT Labs  
Faculty of Electrical Engineering, Mathematics and Computer Science  
P.O. Box 217, 7500 AE Enschede, The Netherlands  
E-mail: willem.jonker@ictlabs.eu

Milan Petković

Philips Research Europe, Technical University Eindhoven  
High Tech Campus 34, 5656 AE Eindhoven, The Netherlands  
E-mail: milan.petkovic@philips.com

ISSN 0302-9743

e-ISSN 1611-3349

ISBN 978-3-642-32872-5

e-ISBN 978-3-642-32873-2

DOI 10.1007/978-3-642-32873-2

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012944556

CR Subject Classification (1998): H.2.7-8, K.6.5, H.3, H.4, E.3, C.2

LNCS Sublibrary: SL 3 – Information Systems and Application, incl. Internet/Web and HCI

© Springer-Verlag Berlin Heidelberg 2012

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

*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

This year was the ninth edition of the VLDB Secure Data Management Workshop. The topic of data security remains an important area of research especially with the ever-growing amounts of data in numerous application areas and on the World-Wide Web.

We received 22 submissions of which the Program Committee selected 10 full papers and 2 position papers to be presented at the workshop and included in the proceedings (approx. 50% acceptance rate). We hope the papers collected in this volume will stimulate your research in this area.

The regular papers in the proceeding are grouped into four sections. Privacy and access control remain central topics in secure data management, especially where new applications keep posing new and often increasing requirements. Therefore the first two sections focus on privacy protection and access control. With the fast growth of the cloud for applications and data storage the need for security solutions for applications storing data in the cloud is also growing. Therefore, the third section focuses on secure storage on the cloud. Finally, the topic of trust is receiving more and more attention and gaining concreteness in recent research activities. Thus, the fourth and final section focuses on trust on the Web.

We wish to thank all the authors of submitted papers for their high-quality submissions. We would also like to thank the Program Committee members as well as additional referees for doing an excellent review job. Finally, we acknowledge Christoph Bösch who helped in the technical preparation of the proceedings.

August 2012

Willem Jonker  
Milan Petković

# Organization

## Workshop Organizers

Willem Jonker	EIT ICT Labs/University of Twente, The Netherlands
Milan Petković	Philips Research/Eindhoven University of Technology, The Netherlands

## Program Committee

Gerrit Bleumer	Francotyp-Postalia, Germany
Ljiljana Brankovic	University of Newcastle, Australia
Sabrina De Capitani di Vimercati	University of Milan, Italy
Ernesto Damiani	University of Milan, Italy
Eric Diehl	Techicolor, France
Jeroen Doumen	Irdeto, The Netherlands
Csilla Farkas	University of South Carolina, USA
Elena Ferrari	Università degli Studi dell'Insubria, Italy
Simone Fischer-Hubner	Karlstad University, Sweden
Tyrone Grandison	IBM Research, USA
Dieter Gollmann	Technische Universität Hamburg-Harburg, Germany
Marit Hansen	Independent Centre for Privacy Protection, Germany
Min-Shiang Hwang	National Chung Hsing University, Taiwan
Mizuho Iwaihara	Waseda University, Japan
Sushil Jajodia	George Mason University, USA
Ton Kalker	Huawei, USA
Marc Langheinrich	University of Lugano (USI), Switzerland
Nguyen Manh Tho	Vienna University of Technology, Austria
Sharad Mehrotra	University of California at Irvine, USA
Stig Frode Mjolsnes	Norwegian University of Science and Technology, Norway
Eiji Okamoto	University of Tsukuba, Japan
Sylvia Osborn	University of Western Ontario, Canada
Günther Pernul	University of Regensburg, Germany
Bart Preneel	KU Leuven, Belgium
Kai Rannenberg	Goethe University Frankfurt, Germany

VIII Organization

David G. Rosado

Ahmad-Reza Sadeghi

Andreas Schaad

Jason Smith

Morton Swimmer

Clark Thomborson

Nicola Zannone

Universidad de Castilla-La Mancha, Spain

Darmstadt University, Germany

SAP Labs, France

Queensland University of Technology, Australia

Forward-looking Threat Research, Trend

Micro, Germany

University of Auckland, New Zealand

TU/e, The Netherlands

# Table of Contents

## Privacy Protection

Tradeoff Analysis of Relational Database Storage of Privacy Preferences .....	1
<i>Md. Sadim Mahmud and Sylvia L. Osborn</i>	
Differential Privacy in Practice .....	14
<i>Maryam Shoaran, Alex Thomo, and Jens Weber</i>	
A Model for Quantifying Information Leakage .....	25
<i>Steven Euijong Whang and Hector Garcia-Molina</i>	

## Access Control

Privacy Protocol for Linking Distributed Medical Data .....	45
<i>Daniel Janusz, Martin Kost, and Johann-Christoph Freytag</i>	
Cloud and the City: Facilitating Flexible Access Control over Data-Streams .....	58
<i>Wen Qiang Wang, Dinh Tien Tuan Anh, Hock Beng Lim, and Anwitaman Datta</i>	
Policies for Composed Emergencies in Support of Disaster Management .....	75
<i>Barbara Carminati, Elena Ferrari, and Michele Guglielmi</i>	

## Secure Storage on the Cloud

Indexing Encrypted Documents for Supporting Efficient Keyword Search .....	93
<i>Bijit Hore, Ee-Chien Chang, Mamadou H. Diallo, and Sharad Mehrotra</i>	
Secure Quasi-Realtime Collaborative Editing over Low-Cost Storage Services .....	111
<i>Chunwang Zhang, Junjie Jin, Ee-Chien Chang, and Sharad Mehrotra</i>	
Secure Metric-Based Index for Similarity Cloud .....	130
<i>Stepan Kozak, David Novak, and Pavel Zezula</i>	

**Trust on the Web**

Provenance for Web 2.0 Data . . . . . 148  
*Meghyn Bienvenu, Daniel Deutch, and Fabian M. Suchanek*

Towards Enabling Behavioral Trust among Participating Cloud  
Forensic Data Center Agencies . . . . . 156  
*Sean Thorpe, Tyrone Grandison, Indrajit Ray, and Abbie Barbir*

Towards Trustworthy Health Platform Cloud . . . . . 162  
*Mina Deng, Marco Nalin, Milan Petković, Ilaria Baroni, and  
Abitabile Marco*

**Author Index . . . . . 177**