

*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*

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

*University of Dortmund, Germany*

Madhu Sudan

*Massachusetts Institute of Technology, MA, USA*

Demetri Terzopoulos

*New York University, NY, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Moshe Y. Vardi

*Rice University, Houston, TX, USA*

Gerhard Weikum

*Max-Planck Institute of Computer Science, Saarbruecken, Germany*

Peter Herrmann Valérie Issarny  
Simon Shiu (Eds.)

# Trust Management

Third International Conference, iTrust 2005  
Paris, France, May 23-26, 2005  
Proceedings



Springer

## Volume Editors

Peter Herrmann

University of Dortmund, Department of Computer Science

44221 Dortmund, Germany

E-mail: peter.herrmann@udo.edu

Valérie Issarny

INRIA Rocquencourt, Domaine de Voluceau

78153 Le Chesnay Cedex, France

E-mail: valerie.issarny@inria.fr

Simon Shiu

Hewlett-Packard Labs

Bristol BS34 8QZ, UK

E-mail: simon.shiu@hp.com

Library of Congress Control Number: 2005925757

CR Subject Classification (1998): H.4, H.3, H.5.3, C.2.4, I.2.11, K.4.3-2, K.5

ISSN 0302-9743

ISBN-10 3-540-26042-0 Springer Berlin Heidelberg New York

ISBN-13 978-3-540-26042-4 Springer Berlin Heidelberg New York

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.

Springer is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005

Printed in Germany

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

Printed on acid-free paper SPIN: 11429760 06/3142 5 4 3 2 1 0

# Preface

This volume constitutes the proceedings of the 3rd International Conference on Trust Management, held in Paris, France, during 23–26 May 2005. The conference follows successful International Conferences in Crete in 2003 and Oxford in 2004. All conferences were organized by iTrust, which is a working group funded as a thematic network by the Future and Emerging Technologies (FET) unit of the Information Society Technologies (IST) program of the European Union.

The purpose of the iTrust working group is to provide a forum for cross-disciplinary investigation of the applications of trust as a means of increasing security, building confidence and facilitating collaboration in dynamic open systems. The notion of trust has been studied independently by different academic disciplines, which has helped us to identify and understand different aspects of trust.

The aim of this conference was to provide a common forum, bringing together researchers from different academic branches, such as the technology-oriented disciplines, law, social sciences and philosophy, in order to develop a deeper and more fundamental understanding of the issues and challenges in the area of trust management in dynamic open systems.

The response to this conference was excellent; from the 71 papers submitted to the conference, we selected 21 full papers and 4 short papers for presentation. The program also included two keynote addresses, given by Steve Marsh from National Research Centre Canada, Institute for Information Technology, and Steve Kimbrough from the University of Pennsylvania; an industrial panel; 7 technology demonstrations; and a full day of tutorials.

The running of an international conference requires an immense effort from all involved parties. We would like to thank the people who served on the Program Committee and the Organizing Committee for their hard work. In particular, we would like to thank the people at INRIA Rocquencourt for handling the logistics for the conference.

May 2005

Peter Herrmann  
Valerie Issarny  
Simon Shiu

# Organization

The 3rd International Conference on Trust Management was organized by iTrust, a Working Group on Trust Management in Dynamic Open Systems, and INRIA Rocquencourt. The conference was partially funded by the Future and Emerging Technologies (FET) unit of the European IST program.

## Executive Committee

Conference Chair	Valerie Issarny, INRIA, France
Program Chairs	Peter Herrmann, University of Dortmund, Germany
Tutorials	Simon Shiu, Hewlett-Packard, UK
Demonstrations	Yuecel Karabulut, SAP AG, Germany
Panels	Nikolaos Georgantas, INRIA, France
Local Arrangements	Paul Kearney, BT Exact, UK
	Dominique Potherat, INRIA, France

## Local Organizing Committee

Emmanuelle Grousset	INRIA
Jinshan Liu	INRIA
Marie-Francoise Loubressac	INRIA

## Program Committee

Adrian Baldwin	HP Labs, UK
Yolanta Beres	HP Labs, UK
Elisa Bertino	University of Milan, Italy
Jon Bing	NRCCL, University of Oslo, Norway
Jeremy Bryans	University of Newcastle, UK
Cristiano Castelfranchi	CNR, Italy
David Chadwick	University of Salford, UK
Andrew Charlesworth	University of Bristol, UK
Mark Roger Dibben	University of St Andrews, UK
Theo Dimitrakos	CLRC, UK
Rino Falcone	CNR, Italy
Peter Herrmann	University of Dortmund, Germany
Valerie Issarny	INRIA, France
Keith Jeffery	CLRC, UK

## VIII Organization

Christian D. Jensen	Technical University of Denmark, Denmark
Andrew Jones	King's College London, UK
Audun Jøsang	DSTC, Australia
Yuecel Karabulut	SAP AG, Germany
Paul Kearney	BT Exact, UK
Graham Klyne	Nine by Nine, UK
Heiko Krumm	University of Dortmund, Germany
Ninghui Li	Stanford University, USA
Peter Linington	University of Kent at Canterbury, UK
Stephane Lo Presti	University of Southampton, UK
Fabio Martinelli	CNR, Italy
Fabio Massacci	Università di Trento, Italy
Erich Neuhold	Darmstadt University of Technology, and Fraunhofer IPSI, Germany
Christos Nikolaou	University of Crete, Greece
Paddy Nixon	University of Strathclyde, UK
Stefan Poslad	Queen Mary, University of London, UK
Jeremy Riegelsberger	University of Newcastle, UK
Babak Sadighi	SICS, Sweden
Simon Shiu	Hewlett-Packard, UK
Morris Sloman	Imperial College London, UK
Ketil Stølen	SINTEF, Norway
Yao-Hua Tan	Free University of Amsterdam, Netherlands
Sotirios Terzis	University of Strathclyde, UK
Dimitris Tsigos	Virtual Trip Ltd., Greece
Stavroula Tsinorema	University of Crete, Greece
Emily Weitzenboeck	NRCCL, University of Oslo, Norway
Marianne Winslett	University of Illinois at Urbana-Champaign, USA

# Table of Contents

## Third International Conference on Trust Management

---

### I Keynote Addresses

---

Foraging for Trust: Exploring Rationality and the Stag Hunt Game <i>Steven O. Kimbrough</i> .....	1
Trust, Untrust, Distrust and Mistrust – An Exploration of the Dark(er) Side <i>Stephen Marsh, Mark R. Dikken</i> .....	17

---

### II Full Papers

---

Security and Trust in the Italian Legal Digital Signature Framework <i>Stefano Zanero</i> .....	34
Specifying Legal Risk Scenarios Using the CORAS Threat Modelling Language <i>Fredrik Vraalsen, Mass Soldal Lund, Tobias Mahler, Xavier Parent, Ketil Stølen</i> .....	45
On Deciding to Trust <i>Michael Michalakopoulos, Maria Fasli</i> .....	61
Trust Management Survey <i>Sini Ruohomaa, Lea Kutvonen</i> .....	77
Can We Manage Trust? <i>Audun Jøsang, Claudia Keser, Theo Dimitrakos</i> .....	93
Operational Models for Reputation Servers <i>David W. Chadwick</i> .....	108
A Representation Model of Trust Relationships with Delegation Extensions <i>Isaac Agudo, Javier Lopez, Jose A. Montenegro</i> .....	116

Affect and Trust <i>Lewis Hassell</i> . . . . .	131
Reinventing Forgiveness: A Formal Investigation of Moral Facilitation <i>Asimina Vasalou, Jeremy Pitt</i> . . . . .	146
Modeling Social and Individual Trust in Requirements Engineering Methodologies <i>Paolo Giorgini, Fabio Massacci, John Mylopoulos, Nicola Zannone</i> . . . . .	161
Towards a Generic Trust Model – Comparison of Various Trust Update Algorithms <i>Michael Kinateder, Ernesto Baschny, Kurt Rothermel</i> . . . . .	177
A Probabilistic Trust Model for Handling Inaccurate Reputation Sources <i>Jigar Patel, W.T. Luke Teacy, Nicholas R. Jennings, Michael Luck</i> . . . . .	193
Trust as a Key to Improving Recommendation Systems <i>Georgios Pitsilis, Lindsay Marshall</i> . . . . .	210
Alleviating the Sparsity Problem of Collaborative Filtering Using Trust Inferences <i>Manos Papagelis, Dimitris Plexousakis, Themistoklis Kutsuras</i> . . . . .	224
Experience-Based Trust: Enabling Effective Resource Selection in a Grid Environment <i>Nathan Griffiths, Kuo-Ming Chao</i> . . . . .	240
Interactive Credential Negotiation for Stateful Business Processes <i>Hristo Koshutanski, Fabio Massacci</i> . . . . .	256
An Evidence Based Architecture for Efficient, Attack-Resistant Computational Trust Dissemination in Peer-to-Peer Networks <i>David Ingram</i> . . . . .	273
Towards an Evaluation Methodology for Computational Trust Systems <i>Ciarán Bryce, Nathan Dimmock, Karl Krukow, Jean-Marc Seigneur, Vinny Cahill, Waleed Wagealla</i> . . . . .	289
Trusted Computing: Strengths Weaknesses and Further Opportunities for Enhancing Privacy <i>Siani Pearson</i> . . . . .	305



Trust Transfer: Encouraging Self-recommendations Without Sybil Attack	
<i>Jean-Marc Seigneur, Alan Gray, Christian Damsgaard Jensen . . . . .</i>	321
Privacy-Preserving Search and Updates for Outsourced Tree-Structured Data on Untrusted Servers	
<i>Tran Khanh Dang . . . . .</i>	338

---

### III Short Papers

---

Persistent and Dynamic Trust: Analysis and the Related Impact of Trusted Platforms	
<i>Siani Pearson, Marco Casassa Mont, Stephen Crane . . . . .</i>	355
Risk Models for Trust-Based Access Control (TBAC)	
<i>Nathan Dimmock, Jean Bacon, David Ingram, Ken Moody . . . . .</i>	364
Combining Trust and Risk to Reduce the Cost of Attacks	
<i>Daniel Cvrček, Ken Moody . . . . .</i>	372
IWTrust: Improving User Trust in Answers from the Web	
<i>Ilya Zaihrayeu, Paulo Pinheiro da Silva, Deborah L. McGuinness . . .</i>	384

---

### IV Demonstration Overviews

---

Trust Record: High-Level Assurance and Compliance	
<i>Adrian Baldwin, Yolanta Beres, David Plaquin, Simon Shiu . . . . .</i>	393
Implementation of the SECURE Trust Engine	
<i>Ciarán Bryce, Paul Couderc, Jean-Marc Seigneur, Vinny Cahill . . . .</i>	397
The CORAS Tool for Security Risk Analysis	
<i>Fredrik Vraalsen, Folker den Braber, Mass Soldal Lund, Ketil Stølen . . . . .</i>	402
Towards a Grid Platform Enabling Dynamic Virtual Organisations for Business Applications	
<i>Theo Dimitrakos, G. Laria, I. Djordjevic, N. Romano, F. D'Andria, V. Trpkovski, P. Kearney, M. Gaeta, P. Ritrovato, L. Schubert, B. Serhan, L. Titkov, S. Wesner . . . . .</i>	406

Multimedia Copyright Protection Platform Demonstrator <i>Miguel Soriano, Marcel Fernandez, Elisa Sayrol, Joan Tomas, Joan Casanellas, Josep Pegueroles, Juan Hernández-Serrano . . . . .</i>	411
ST-Tool: A CASE Tool for Modeling and Analyzing Trust Requirements <i>P. Giorgini, F. Massacci, J. Mylopoulos, A. Siena, N. Zannone . . . . .</i>	415
The VoteSecure <sup>TM</sup> Secure Internet Voting System <i>Periklis Akritidis, Yiannis Chatzikian, Manos Dramitinos, Evangelos Michalopoulos, Dimitrios Tsigos, Nikolaos Ventouras . . . . .</i>	420
<b>Author Index . . . . .</b>	<b>425</b>