

# Privacy and Identity Management. Between Data Protection and Security

Michael Friedewald, Stephan Krenn, Ina Schiering, Stefan Schiffner

#### ▶ To cite this version:

Michael Friedewald, Stephan Krenn, Ina Schiering, Stefan Schiffner. Privacy and Identity Management. Between Data Protection and Security. Springer International Publishing, AICT-644, 2022, IFIP Advances in Information and Communication Technology, 978-3-030-99099-2. 10.1007/978-3-030-99100-5. hal-04636349

## HAL Id: hal-04636349 https://inria.hal.science/hal-04636349v1

Submitted on 5 Jul 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



# IFIP Advances in Information and Communication Technology

644

#### Editor-in-Chief

Kai Rannenberg, Goethe University Frankfurt, Germany

#### **Editorial Board Members**

TC 1 – Foundations of Computer Science

Luís Soares Barbosa, University of Minho, Braga, Portugal

TC 2 - Software: Theory and Practice

Michael Goedicke, University of Duisburg-Essen, Germany

TC 3 - Education

Arthur Tatnallo, Victoria University, Melbourne, Australia

TC 5 - Information Technology Applications

Erich J. Neuhold, University of Vienna, Austria

TC 6 – Communication Systems

Burkhard Stiller, University of Zurich, Zürich, Switzerland

TC 7 – System Modeling and Optimization

Fredi Tröltzsch, TU Berlin, Germany

TC 8 – Information Systems

Jan Pries-Heje, Roskilde University, Denmark

TC 9 - ICT and Society

David Kreps, National University of Ireland, Galway, Ireland

TC 10 - Computer Systems Technology

Ricardo Reis, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

TC 11 – Security and Privacy Protection in Information Processing Systems

Steven Furnell, Plymouth University, UK

TC 12 - Artificial Intelligence

Eunika Mercier-Laurent, University of Reims Champagne-Ardenne, Reims, France

TC 13 - Human-Computer Interaction

Marco Winckler, University of Nice Sophia Antipolis, France

TC 14 – Entertainment Computing

Rainer Malaka, University of Bremen, Germany

#### IFIP - The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the first World Computer Congress held in Paris the previous year. A federation for societies working in information processing, IFIP's aim is two-fold: to support information processing in the countries of its members and to encourage technology transfer to developing nations. As its mission statement clearly states:

IFIP is the global non-profit federation of societies of ICT professionals that aims at achieving a worldwide professional and socially responsible development and application of information and communication technologies.

IFIP is a non-profit-making organization, run almost solely by 2500 volunteers. It operates through a number of technical committees and working groups, which organize events and publications. IFIP's events range from large international open conferences to working conferences and local seminars.

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 generally smaller and occasionally 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.

IFIP distinguishes three types of institutional membership: Country Representative Members, Members at Large, and Associate Members. The type of organization that can apply for membership is a wide variety and includes national or international societies of individual computer scientists/ICT professionals, associations or federations of such societies, government institutions/government related organizations, national or international research institutes or consortia, universities, academies of sciences, companies, national or international associations or federations of companies.

More information about this series at https://link.springer.com/bookseries/6102

Michael Friedewald · Stephan Krenn · Ina Schiering · Stefan Schiffner (Eds.)

# Privacy and Identity Management

# Between Data Protection and Security

16th IFIP WG 9.2, 9.6/11.7, 11.6/SIG 9.2.2 International Summer School, Privacy and Identity 2021 Virtual Event, August 16–20, 2021 Revised Selected Papers



Editors
Michael Friedewald
Fraunhofer ISI
Karlsruhe, Germany

Ina Schiering (D)
Ostfalia University of Applied Sciences
Wolfenbüttel, Germany

Stephan Krenn 

AIT Austrian Institute of Technology Vienna, Austria

Stefan Schiffner D University of Münster Münster, Germany

ISSN 1868-4238 ISSN 1868-422X (electronic) IFIP Advances in Information and Communication Technology ISBN 978-3-030-99099-2 ISBN 978-3-030-99100-5 (eBook) https://doi.org/10.1007/978-3-030-99100-5

#### © IFIP International Federation for Information Processing 2022

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, 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.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

#### **Preface**

This volume contains the proceedings of the 16th IFIP Summer School on Privacy and Identity Management, which took place during August 16–20, 2021. While planned to be held in Esch-sur-Alzette, Luxembourg, the summer school finally had to be held as a fully virtual event, due to the ongoing COVID-19 pandemic and associated uncertainties.

The 16th IFIP Summer School was a joint effort among IFIP Working Groups 9.2, 9.6/11.7, 11.6, and Special Interest Group 9.2.2, in co-operation with the European Union's cybersecurity competence network pilot projects SPARTA<sup>1</sup>, CyberSec4Europe<sup>2</sup>, and CONCORDIA<sup>3</sup>. The summer school was also supported by Forum Privatheit<sup>4</sup> and the EnCaViBS project<sup>5</sup>. This IFIP Summer School brought together more than 40 junior and senior researchers and practitioners from different parts of the world from many disciplines, including many young entrants to the field. They met to share their ideas, build a network, gain experience in presenting their research, and have the opportunity to publish a paper through these proceedings.

As in previous years, one of the goals of the IFIP Summer School was to encourage the publication of thorough research papers by students and emerging scholars. To this end, it had a three-phase review process for submitted papers. In the first phase, authors were invited to submit short abstracts of their work. Abstracts within the scope of the call were selected for presentation at the school. After the school, authors were encouraged to submit full papers of their work, which received two to three reviews by members of the Program Committee. They were then given time to revise and resubmit their papers for inclusion in these post-proceedings, and were offered in-depth shepherding where necessary.

In total, 23 abstracts were submitted, out of which 20 were presented at the virtual conference, and nine were finally accepted for publication. Insightful keynote talks were given by Kai Kimppa ("Ethical social engineering penetration testing – can it be done?"), Sebastian Pape ("Serious Games for Security and Privacy Awareness"), François Thill ("Information Security Risk Management"), and Jakub Čegan ("Training Development in KYPO Cyber Range Platform"). Finally, a total of five workshops and tutorials on topics related to privacy and identity management complemented a diverse and educational program.

We are grateful to all contributors of the summer school and especially to the Program Committee for reviewing the abstracts and papers as well as advising the

<sup>1</sup> https://www.sparta.eu/.

<sup>&</sup>lt;sup>2</sup> https://cybersec4europe.eu.

<sup>3</sup> https://www.concordia-h2020.eu/.

<sup>4</sup> https://www.forum-privatheit.de/.

<sup>&</sup>lt;sup>5</sup> https://encavibs.uni.lu/.

#### vi Preface

authors on their revisions. Our thanks also go to all supporting projects, the Steering Committee for their guidance and support, and all participants and presenters.

February 2022

Michael Friedewald Stephan Krenn Ina Schiering Stefan Schiffner

#### **Organization**

#### **General Chair**

Stefan Schiffner University of Luxembourg, Luxembourg

#### **Program Chairs**

Michael Friedewald Fraunhofer ISI, Germany

Stephan Krenn AIT Austrian Institute of Technology, Austria
Ina Schiering Ostfalia University of Applied Sciences, Germany

#### **Program Committee**

Florian Adamsky Hof University of Applied Sciences, Germany

Rose-Mharie Åhlfeldt University of Skövde, Sweden

Sébastien Canard Orange Labs, France

José M. Del Álamo Universidad Politécnica de Madrid, Spain

Jana Dittmann Otto von Guericke University Magdeburg, Germany

Josep Domingo-Ferrer Universitat Rovira i Virgili, Italy Simone Fischer-Hübner Karlstad University, Sweden Jan Hajny VUT Brno, Czech Republic

Marit Hansen Unabhängiges Landeszentrum für Datenschutz

Schleswig-Holstein, Germany

Paula Helm University of Tuebingen, Germany Dominik Herrmann University of Bamberg, Germany

Demosthenes Ikonomou ENISA, Greece

Galina Ivanova University of Ruse, Bulgaria

Meiko Jensen Kiel University of Applied Sciences, Germany

Stefan Katzenbeisser University of Passau, Germany Kai Kimppa University of Turku, Finland Jani Koskinen University of Turku, Finland

Christiane Kuhn Karlsruhe Institute of Technology, Germany

Bertrand Lathoud Securitymadein.lu, Luxembourg Joachim Meyer Tel Aviv University, Israel

Sebastian Pape Goethe University Frankfurt, Germany
Robin Pierce Tilburg University, The Netherlands
Jo Pierson Vrije Universiteit Brussel, Belgium
Henrich C. Pöhls University of Passau, Germany
Maria Grazia Porcedda Trinity College Dublin, Ireland
Tobias Pulls Karlstad University, Sweden
Charles Raab University of Edinburgh, UK

Delphine Reinhardt University of Göttingen, Germany

#### viii Organization

Kjetil Rommetveit Arnold Roosendaal Denis Royer

Sandra Schmitz Stefan Strauss Regina Valutytė Simone van der Hof University of Bergen, Norway Privacy Company, The Netherlands

Ostfalia University of Applied Sciences, Germany

University of Luxembourg, Luxembourg Austrian Academy of Sciences, Austria Mykolas Romeris University, Lithuania Leiden University, The Netherlands

### **Contents**

Keynote Papers	
Challenges for Designing Serious Games on Security and Privacy Awareness	3
Information Security Risk Management	17
Workshop and Tutorial Papers	
Conceptualising the Legal Notion of 'State of the Art' in the Context of IT Security	25
Privacy-Preserving Identity Management and Applications to Academic  Degree Verification	33
The State of Surveillance – An Overall Account of Surveillance? Felix Bieker	47
Selected Student Papers	
Bringing Privacy, Security and Performance to the Internet of Things Through Usage Control and Blockchains	57
SynCare: An Innovative Remote Patient Monitoring System Secured by Cryptography and Blockchain	<b>7</b> 3
Taxpayers' Rights, the Right to Data Protection and Cybersecurity in the EU	90
Usable Privacy and Security from the Perspective of Cognitive Abilities Joakim Kävrestad, Allex Hagberg, Robert Roos, Jana Rambusch,	105

and Marcus Nohlberg

#### x Contents

Cloud Native Privacy Engineering through DevPrivOps	122
Gamification in mHealth - Opportunities and Privacy Risks	142
Exploration of Factors that Can Impact the Willingness of Employees to Share Smart Watch Data with Their Employers	160
Public Education, Platformization and Cooperative Responsibility: The Case of the Privacy Covenant in the Netherlands	180
Observing Road Freight Traffic from Mobile Network Signalling Data While Respecting Privacy and Business Confidentiality	195
Author Index	207