SYNCHRONIZING E-SECURITY

Advances in Information Security

Sushil Jajodia

Consulting editor Center for Secure Information Systems George Mason University Fairfax, VA 22030-4444 email: jajodia@gmu.edu

The goals of Kluwer International Series on ADVANCES IN INFORMATION SECURITY are, one, to establish the state of the art of, and set the course for future research in information security and, two, to serve as a central reference source for advanced and timely topics in information security research and development. The scope of this series includes all aspects of computer and network security and related areas such as fault tolerance and software assurance.

ADVANCES IN INFORMATION SECURITY aims to publish thorough and cohesive overviews of specific topics in information security, as well as works that are larger in scope or that contain more detailed background information than can be accommodated in shorter survey articles. The series also serves as a forum for topics that may not have reached a level of maturity to warrant a comprehensive textbook treatment.

Researchers as well as developers are encouraged to contact Professor Sushil Jajodia with ideas for books under this series.

Additional titles in the series:

INTRUSION DETECTION IN DISTRIBUTED SYSTEMS: An Abstraction-Based Approach by Peng Ning, Sushil Jajodia and X. Sean Wang ISBN: 1-4020-7624-X SECURE ELECTRONIC VOTING edited by Dimitris A. Gritzalis; ISBN: 1-4020-7301-1

DISSEMINATING SECURITY UPDATES AT INTERNET SCALE by Jun Li, Peter Reiher, Gerald J. Popek; ISBN: 1-4020-7305-4

SECURE ELECTRONIC VOTING by Dimitris A. Gritzalis; ISBN: 1-4020-7301-1

APPLICATIONS OF DATA MINING IN COMPUTER SECURITY, edited by Daniel Barbará, Sushil Jajodia; ISBN: 1-4020-7054-3

MOBILE COMPUTATION WITH FUNCTIONS by Zeliha Dilsun Kırlı, ISBN: 1-4020-7024-1

TRUSTED RECOVERY AND DEFENSIVE INFORMATION WARFARE by Peng Liu and Sushil Jajodia, ISBN: 0-7923-7572-6

RECENT ADVANCES IN RSA CRYPTOGRAPHY by Stefan Katzenbeisser, ISBN: 0-7923-7438-X

E-COMMERCE SECURITY AND PRIVACY by Anup K. Ghosh, ISBN: 0-7923-7399-5

INFORMATION HIDING: Steganography and Watermarking-Attacks and

Countermeasures by Neil F. Johnson, Zoran Duric, and Sushil Jajodia, ISBN: 0-7923-7204-2

SYNCHRONIZING E-SECURITY

by

Godfried Williams

Senior Lecturer
University of East London, United Kingdom



SPRINGER SCIENCE+BUSINESS MEDIA, LLC

Library of Congress Cataloging-in-Publication

SYNCHRONIZING E-SECURITY by Godfried B. Williams ISBN 978-1-4613-5104-7 ISBN 978-1-4615-0493-1 (eBook) DOI 10.1007/978-1-4615-0493-1

Copyright © 2004 by Springer Science+Business Media New York Originally published by Kluwer Academic Publishers, New York in 2004 Softcover reprint of the hardcover 1st edition 2004

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photo-copying, microfilming, recording, or otherwise, without the prior written permission of the publisher, with the exception of any material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work.

Permissions for books published in the USA: <u>permissions@wkap.com</u> Permissions for books published in Europe: <u>permissions@wkap.nl</u> Printed on acid-free paper.

Dedications

To my wife, Sylvia, daughter, Maxine and In memory of my Uncle, Maxwell

CONTENTS

De	dication	7
Lis	t of Figures	iz
Lis	t of Tables	Х
Lis	t of Contributors	xii
Pre	face	χV
Acl	knowledgements	xvi
1.	Overview of Technologies that Support International Banking	1
2.	Manpower Technical and Non Technical Support for E-Security	21
3.	Risk Assessment, Policies and Standards	27
4.	Empirical Analysis and Evaluations of Case Studies	53
5.	Toolkit for Synchronising E-Security Methods in Global Electronic Transactions	67
Bibliography		89
Glossary		92
Appendix		93
Index		95

LIST OF FIGURES

Figure 1 Categories of authentication

Figure 2 Kohonen Neural Network

Figures 3, 4, 6, 7 SSTM (Service Server Transmission Models)

Figure 5 RIG (Risk Identification Grid)

Figure 8 RISG (Risk Identification Solution Grid)

Figure 9 Electromagnetic Spectrum

Figure 10 Internetworking via a Router

Figure 11 Trojans and Ports

Figure 12 Default Port Numbers

Figure 13 Forensics and Evidence Collection

LIST OF TABLES

Table 1	Profiles under study
Table 2	Security Spending
Table 3	Global cost remedial actions
Table 4	OECD countries initiatives
Table 5	Developing countries initiatives
Table 6	Advanced countries participation
Table 7	Ratio Analysis
Table 8	OECD risk spending
Table 9	Developing countries risk spending
Table 10	Communications Infrastructure
Table 11	Number of ISPs, Internet Users and Population
Table 12	Investments in risk preventive technologies
Table 13	Investments in risk assessment exercises
Table 14	Security Expertise

LIST OF CONTRIBUTORS

Mr. Jamil Ampomah, Editing Consultant
Mr. Paul Victor Avudzivi, CEO, Dayspring Conglomerate
NOBA Research
Data Pro Ltd
Zeenext Ltd
Manipal Ltd
Soft Ltd
AT & T Global Network
MTNL Ltd
Afrisat Ltd
AST Ltd
Wang CSL
AOL

Preface

This book is a critical investigation and empirical analysis of studies conducted amongst companies that support electronic commerce transactions based in both advanced and developing economies. It presents insights into the validity and credibility of current risk assessment methods that support electronic transactions in the global economy. The book focuses on a number of case studies of IT companies in selected countries in West Africa, Europe, Asia and United States of America. The foundations of this work have been based on previous studies by Williams G., Avudzivi P.V (Hawaii 2002) on the retrospective view on information security management and the impact of Tele-banking on the End-user. Most leading IT companies in developing economies, purchase expensive equipment to ensure that services provided to organisations that exchange funds through electronic means become fully secured during transactions. The rational behind this hypothesis is based on the strong competition that exists among these leading IT companies. Contrary to companies in developing economies there has been a certain level of complacency amongst advanced economies, although some academics and practitioners might disagree with this view. The irony of this analysis is that, while investments in security amongst IT companies in advanced economies are not that high in budget, the methods employed for assessing possible risks in the application of technologies are normally high in cost. These investigations depict that elements and factors for risk assessment in developing and advanced economies are not usually met with appropriate counter measures or methods. I strongly believe that readers of this book will gain a detailed insight into the issues involved. A proposed guideline for ensuring the synchronisation of electronic security is also outlined. audience of this book is postgraduate students undertaking research in internet security policies, algorithm design, risk assessment methods and strategic information systems planning. Final year courses in issues in distributed systems and internet engineering. Issues in information systems development and practice could be enhanced by some of the issues addressed in this book. It will also be an appropriate source of reference for MBA students reading information management, systems management and E-commerce as well as practitioners.

ACKNOWLEDGEMENTS

Thanks to my Editors Susan and Sharon for their consistent reminders and useful comments.

Many thanks to Mr Jamil Ampomah (Audit Consultant -Deutsche Telekom), for his detailed comments and diligent feedback on the entire manuscript. The personal sacrifice, commitment and diligence displayed were priceless. It is scintillating to note that after a period of 20 years when we were at high school, you have maintained such thoroughness in your approach to work.

My sincere thanks to Mr Paul-Victor Avudzivi(CEO-Dayspring Conglomerate), who contributed to the foundations of this work. Your input in the security of electronic business processes was very useful.

I will like to thank Mr. Murgesh of Manipal International Ltd, India for providing leads to information sources; AT&T Global networks South Africa, Mr. Bernard Bonney (CEO-NOBA research),Mr. Raymond Ankobia (ex Chief Programmer/Analyst SOFT Ltd), Mr. Mike Kagya(Systems Engineer –NCR/AT&T), AOL and all the anonymous reviewers and contributors

I will also like to acknowledge past experiences gained from my team members on the World Bank AMISU project. These experiences gave me insights into security issues related to the application of computers in a global context. They also served as motivations whilst pursuing this research work. Mr. Bruce Smith, Mr John Anthony, and Mrs Tay (Consultants-International Development Association of the World Bank – AMISU project), Dr. Gershon Adzadi (External Consultant-World Bank - AMISU project). Gershon, the word "procedures" always rung a bell and kept me going.

A special thank you to Mr A.Beckley of the European Union Agency for international fund disbursement.

My gratitude to colleagues at University of East London UK for their comments, especially, Dr. David Preston; your initial comments were helpful. Dr. Hossein Jahankhani; words like "this thing does not look nice" gave me second thoughts. Dr. Hamid Jahankhani, "How far with the book?" Mr. Kwame Kyei "I think human ware in network security is crucial".

Dr.Chris Imafidon, "whiz kid in MS tools", Mr Solomon Alexis and Mr Joseph Annan for your support. To Linda and Elaine your patience in answering some of my questions in word processing were appreciative. Thanks to Elyas, my BSc. final year project student who collected data on students' profile.

Thanks to Professor Moti Yung (Adjunct research scientist -Columbia State University, New York USA) for useful suggestions and pointers, Professor Adel Elmargraby(University of Louisville, Kentucky, USA) ,Don Anderson (President - Quantum International Corporation, Louisville, Kentucky USA) for their keen interest and enthusiasm shown in this research work. I would like to thank Dr.Shukri Wakid (Senior Scientist-Hewlett-Packard, Gaithersburg, Maryland, USA) for comments on intelligent security in high performance computing.

My appreciation to my mother in law who babysat my daughter Maxine whilst writing this book.

To my mum, I say a big thank you for your inspiration, and to the special memories of my Father.