

PROCEEDINGS

13TH ANNUAL
COMPUTER SECURITY
APPLICATIONS CONFERENCE

San Diego, California
December 8-12, 1997

Sponsored by

Applied Computer Security Associates

in cooperation with

ACM Special Interest Group on Security, Audit, and Control



Los Alamitos, California

Washington • Brussels • Tokyo

PRINTED BY AT&T BELL

QA76.9
.A25C65
1997

Copyright © 1997 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries may photocopy beyond the limits of US copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or republication requests should be addressed to: IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 133, Piscataway, NJ 08855-1331.

The papers in this book comprise the proceedings of the meeting mentioned on the cover and title page. They reflect the authors' opinions and, in the interests of timely dissemination, are published as presented and without change. Their inclusion in this publication does not necessarily constitute endorsement by the editors, the IEEE Computer Society, or the Institute of Electrical and Electronics Engineers, Inc.

IEEE Computer Society Order Number PR08274
ISBN 0-8186-8274-4
ISBN 0-8186-8275-2 (case)
ISBN 0-8186-8276-0 (microfiche)
IEEE Order Plan Catalog Number 97TB100213
ISSN 1063-9527

Additional copies may be ordered from:

IEEE Computer Society
Customer Service Center
10662 Los Vaqueros Circle
P.O. Box 3014
Los Alamitos, CA 90720-1314
Tel: + 1-714-821-8380
Fax: + 1-714-821-4641
E-mail: cs.books@computer.org

IEEE Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
Tel: + 1-908-981-1393
Fax: + 1-908-981-9667
mis.custserv@computer.org

IEEE Computer Society
13, Avenue de l'Aquilon
B-1200 Brussels
BELGIUM
Tel: + 32-2-770-2198
Fax: + 32-2-770-8505
euro.ofc@computer.org

IEEE Computer Society
Ooshima Building
2-19-1 Minami-Aoyama
Minato-ku, Tokyo 107
JAPAN
Tel: + 81-3-3408-3118
Fax: + 81-3-3408-3553
tokyo.ofc@computer.org

Editorial production by Bookmark Media

Cover art production by Joe Daigle/Studio Productions

Printed in the United States of America by Technical Communication Services

IEEE 
COMPUTER
SOCIETY



2020 09-12-23

TABLE OF CONTENTS

13th Annual Computer Security Applications Conference—ACSAC'97

Conference Committee	ix
Program Committee	x
Tutorial Committee	x
Reviewers	x

TRACK A, WEDNESDAY, DECEMBER 10

VIRTUAL MONEY

SESSION CHAIR: K. Keus

Micro-Digital Money for Electronic Commerce	2
<i>K. Nguyen, Y. Mu, V. Varadharajan</i>	
Secure and Efficient Digital Coins	9
<i>K. Nguyen, Y. Mu, V. Varadharajan</i>	
The Secure Distribution of Digital Contents	16
<i>E. von Faber, R. Hammelrath, F. Heider</i>	

ASSURANCE

SESSION CHAIR: J. Adams

Simple Assured Bastion Hosts	24
<i>C. Cant, S. Wiseman</i>	
Kernel and Shell-Based Applications Integrity Assurance	34
<i>G. Mohay, J. Zellers</i>	
Risk Assessment for Large Heterogeneous Systems	44
<i>J. Freeman, T. Darr, R. Neely</i>	

PANEL: PRODUCT ASSURANCE	54
---------------------------------------	----

MODERATOR: J. Adams

Panelists: D. Gambel, E. Weiss, M. Aldrich

TRACK B, WEDNESDAY, DECEMBER 10

FORUM: EVOLVING THE EVALUATION PARADIGM56

MODERATOR: M. Schanken

Speakers: K. Britton, G. Copeland

DATABASE SECURITY

SESSION CHAIR: L. Notargiacomo

Securing an Object Relational Database59
S. Lewis, S. Wiseman

Supporting Secure Canonical Upgrade Policies in Multilevel Secure Object Stores69
S. Foley

Incremental Assurance for Multilevel Applications81
D. Thompson, M. Denz

NETWORK SECURITY

SESSION CHAIR: S. LaFountain

An Efficient Message Authentication Scheme for Link State Routing90
S. Cheung

Detection and Classification of TCP/IP Network Services99
K. Tan, B. Collie

Achieving User Privacy in Mobile Networks108
B. Askwith, M. Merabti, Q. Shi, K. Whiteley

TRACK A, THURSDAY, DECEMBER 11

PLENARY PANEL SESSION: CRITICAL INFRASTRUCTURE PROTECTION— THE CYBER/INFORMATION DIMENSION: REPORT ON NATIONAL INFRASTRUCTURE COORDINATION INITIATIVES118

MODERATOR: S. League

Panelists: D. Keyes, D. Knauf, M. Woods

GUARDS AND FIREWALLS

SESSION CHAIR: E. Siarkiewicz

Domain and Type Enforcement Firewalls122
K. Oostendorp, L. Badger, C. Vance, W. Morrison, D. Sherman, D. Sterne

A Reference Model for Firewall Technology133
C. Schuba, E. Spafford

Using Type Enforcement to Assure a Configurable Guard146
P. Greve, J. Hoffman, R. Smith

FORUM: ASSURANCE LESSONS LEARNED155

MODERATOR: J. Adams

Speakers: B. Dawson, D. Baker, T. Filsinger, K. Ferraiolo, R. Hefner

ACCESS CONTROL

SESSION CHAIR: E. Coyne

Implementing RBAC on a Type Enforced System158
J. Hoffman

Lattice Based Models for Controlled Sharing of Confidential Information in the
Saudi Hajj System164
T. Himdi, R. Sandhu

Using Kernel Hypervisors to Secure Applications175
T. Mitchem, R. Lu, R. O'Brian

TRACK B, THURSDAY, DECEMBER 11

SECURITY ARCHITECTURE

SESSION CHAIR: J. Heaney

Applying the DoD Goal Security Architecture as a Methodology for the
Development of System and Enterprise Security Architectures183
T. Lowman, D. Mosier

An Architecture for Multilevel Secure Interoperability194
M. Kang, J. Froscher, I. Moskowitz

Using Web Technologies in Two MLS Environments:A Security Analysis205
R. Niemeyer

CRYPTOGRAPHY AND KEY MANAGEMENT

SESSION CHAIR: M. Bishop

On the Key Recovery of the Key Escrow System216
Y. Lee, C. Liah

Threshold and Generalized DSS Signatures without a Trusted Party221
C. Wang, T. Hwang

An Improved E-Mail Security Protocol227
B. Schneier, C. Hall

FORUM: PKI

MODERATOR: A. Friedman

Speakers: T. Burke, P. Mellinger, B. Thompson, G. Moore

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.