CORE

Security of Self-Organizing Networks MANET, WSN, WMN, VANET

Edited by Al-Sakib Khan Pathan



Security of Self-Organizing Networks

MANET, WSN, WMN, VANET

Edited by Al-Sakib Khan Pathan



CRC Press is an imprint of the Taylor & Francis Group, an Informa business AN AUERBACH BOOK Auerbach Publications Taylor & Francis Group 6000 Broken Sound Parkway NW, Suite 300 Boca Raton, FL 33487-2742

© 2011 by Taylor and Francis Group, I.I.C. Auerbach Publications is an imprint of Taylor & Francis Group, an Informa business

No claim to original U.S. Government works

Printed in the United States of America on acid-free paper 10 9 8 7 6 5 4 3 2 1

International Standard Book Number: 978-1-4398-1919-7 (Hardback)

This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the author and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The authors and publishers have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, please access www.copyright.com (http:// www.copyright.com/) or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. CCC is a not-for-profit organization that provides licenses and registration for a variety of users. For organizations that have been granted a photocopy license by the CCC, a separate system of payment has been arranged.

Trademark Notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Library of Congress Cataloging-in-Publication Data

Security of self-organizing networks : MANET, WSN, WMN, VANET / editor, Al-Sakib Khan Pathan. p. cm.

Includes bibliographical references and index.

ISBN 978-1-4398-1919-7 (hardcover : alk. paper)

1. Ad hoc networks (Computer networks)--Security measures. 2. Self organizaing

systems--Security measures. I. Pathan, Al-Sakib Khan.

TK5105.77.843 2011 005.8--dc22

2010028807

Visit the Taylor & Francis Web site at http://www.taylorandfrancis.com

and the Aucrbach Web site at http://www.auerbach-publications.com

Contents

Preface	ix
Acknowledgments	xi
Editor	
Contributors	
Contributors	····· A *

PART I GENERAL TOPICS: SECURITY OF WIRELESS AND SELF-ORGANIZING NETWORKS

1	Secure Device Association: Trends and Issues YASIR ARFAT MALKANI, DAN CHALMERS, and IAN WAKEMAN	3
2	Securing Route and Path Integrity in Multihop Wireless Networks	5
3	Handling Security Threats to the RFID System of EPC Networks	5
4	Survey of Anomaly Detection Algorithms: Toward Self-Learning Networks	5
5	Reputation- and Trust-Based Systems for Wireless Self-Organizing Networks	1
РА	RT II MOBILE AD HOC NETWORK AND VEHICULAR AD HOC	

PART II MOBILE *AD HOC* NETWORK AND VEHICULAR *AD HOC* NETWORK SECURITY

6	Security Threats in Mobile Ad Hoc Networks	127
	SEVIL ŞEN, JOHN A. CLARK, and JUAN F. TAPIADOR	
7	Key Management in Mobile Ad Hoc Networks	147
	SUDIP MISRA and SUMIT GOSWAMI	

	<i></i>
VI –	Contents

8	Combating against Security Attacks against Mobile <i>Ad Hoc</i> Networks (MANETs)
9	Classification of Attacks on Wireless Mobile <i>Ad Hoc</i> Networks and Vehicular <i>Ad Hoc</i> Networks: A Survey
10	Security in Vehicular <i>Ad Hoc</i> Networks
11	Toward a Robust Trust Model for Ensuring Security and Privacy in VANETs 251 UNE THOING ROSI and SYED ISHTIAQUE AHMED
12	Sybil Attack in VANETs: Detection and Prevention
PA	RT III WIRELESS SENSOR NETWORK SECURITY
13	Key Management Schemes of Wireless Sensor Networks: A Survey
14	Key Management Techniques for Wireless Sensor Networks: Practical and Theoretical Considerations
15	Bio-Inspired Intrusion Detection for Wireless Sensor Networks
16	Biological Inspired Autonomously Secure Mechanism for Wireless Sensor Networks
17	Controlled Link Establishment Attack on Key Pre-Distribution Schemes for Distributed Sensor Networks and Countermeasures
18	Proactive Key Variation Owing to Dynamic Clustering (PERIODIC) in Sensor Networks
19	Secure Routing Architectures Using Cross-Layer Information for Attack Avoidance (with Case Study on Wormhole Attacks)
20	Reputation-Based Trust Systems in Wireless Sensor Networks

	Major Works on the Necessity and Implementations of PKC in WSNs: A Beginner's Note AL-SAKIB KHAN PATHAN	525
PAF	RT IV WIRELESS MESH NETWORK SECURITY	
	Secure Access Control and Authentication in Wireless Mesh Networks BING HE, BIN XIE, DAVID ZHAO, and RANGA REDDY	545
	Misbehavior Detection in Wireless Mesh Networks MD. ABDUL HAMID and MD. SHARIFUL ISLAM	571
Inde	×	595