Exploiting Software: How To Break Code

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How To Break Code

Greg Hoglund • Gary McGraw

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Foreword by Ariel D. Rubin

Software Security Series

"It's hard to protect yourself if you don't know what you're up against. This book has the details you need to know about how attackers find software holes and exploit them—details that will help you secure your own systems."

— Ed Felten, Ph.D., Professor of Computer Science, Princeton University

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The book was found
Praise for Exploiting Software

"Exploiting Software highlights the most critical part of the software quality problem. As it turns out, software quality problems are a major contributing factor to computer security problems. Increasingly, companies large and small depend on software to run their businesses every day. The current approach to software quality and security taken by software companies, system integrators, and internal development organizations is like driving a car on a rainy day with worn-out tires and no air bags. In both cases, the odds are that something bad is going to happen, and there is no protection for the occupant/owner. This book will help the reader understand how to make software quality part of the design—a key change from where we are today!"  —Tony Scott  
Chief Technology Officer, IS&S  
General Motors Corporation

"It's about time someone wrote a book to teach the good guys what the bad guys already know. As the computer security industry matures, books like Exploiting Software have a critical role to play."

—Bruce Schneier  
Chief Technology Officer, Counterpane

"Exploiting Software cuts to the heart of the computer security problem, showing why broken software presents a clear and present danger. Getting past the "worm of the day" phenomenon requires that someone other than the bad guys understands how software is attacked. This book is a wake-up call for computer security."

—Elinor Mills Abreu  
Reuters' correspondent

"Police investigators study how criminals think and act. Military strategists learn about the enemy's tactics, as well as their weapons and personnel capabilities. Similarly, information security professionals need to study their criminals and enemies, so we can tell the difference between popguns and weapons of mass destruction. This book is a significant advance in helping the "white hats" understand how the "black hats" operate. Through extensive examples and "attack patterns," this book helps the reader understand how attackers analyze software and use the results of the analysis to attack systems. Hoglund and McGraw explain not only how hackers attack servers, but also how malicious server operators can attack clients (and how each can protect themselves from the other). An excellent book for practicing security engineers, and an ideal book for an undergraduate class in software security."

—Jeremy Epstein  
Director, Product Security & Performance, webMethods, Inc.

"A provocative and revealing book from two leading security experts and world class software exploiters, Exploiting Software enters the mind of the cleverest and wickedest crackers and shows you how they think. It..."
illustrates general principles for breaking software, and provides you a whirlwind tour of techniques for finding and exploiting software vulnerabilities, along with detailed examples from real software exploits. Exploiting Software is essential reading for anyone responsible for placing software in a hostile environment—that is, everyone who writes or installs programs that run on the Internet.

—Dave Evans, Ph.D.  
Associate Professor of Computer Science  
University of Virginia  

The root cause for most of today’s Internet hacker exploits and malicious software outbreaks are buggy software and faulty security software deployment. In Exploiting Software, Greg Hoglund and Gary McGraw help us in an interesting and provocative way to better defend ourselves against malicious hacker attacks on those software loopholes. The information in this book is an essential reference that needs to be understood, digested, and aggressively addressed by IT and information security professionals everywhere.

—Ken Cutler, CISSP, CISA  
Vice President, Curriculum Development & Professional Services, MIS Training Institute  

This book describes the threats to software in concrete, understandable, and frightening detail. It also discusses how to find these problems before the bad folks do. A valuable addition to every programmer’s and security person’s library!

—Matt Bishop, Ph.D.  
Professor of Computer Science  
University of California at Davis  

Whether we slept through software engineering classes or paid attention, those of us who build things remain responsible for achieving meaningful and measurable vulnerability reductions. If you can’t afford to stop all software manufacturing to teach your engineers how to build secure software from the ground up, you should at least increase awareness in your organization by demanding that they read Exploiting Software. This book clearly demonstrates what happens to broken software in the wild.

—Ron Moritz, CISSP  
Senior Vice President, Chief Security Strategist  
Computer Associates  

Exploiting Software is the most up-to-date technical treatment of software security I have seen. If you worry about software and application vulnerability, Exploiting Software is a must-read. This book gets at all the timely and important issues surrounding software security in a technical, but still highly readable and engaging, way. Hoglund and McGraw have done an excellent job of picking out the major ideas in software exploit and nicely organizing them to make sense of the software security jungle.

—George Cybenko, Ph.D.  
Dorothy and Walter Gramm Professor of Engineering, Dartmouth  

Founding Editor-in-Chief,
IEEE Security and Privacy “This is a seductive book. It starts with a simple story, telling about hacks and cracks. It draws you in with anecdotes, but builds from there. In a few chapters you find yourself deep in the intimate details of software security. It is the rare technical book that is a readable and enjoyable primer but has the substance to remain on your shelf as a reference. Wonderful stuff.” —Craig Miller, Ph.D. Chief Technology Officer for North America Dimension Data “It's hard to protect yourself if you don’t know what you’re up against. This book has the details you need to know about how attackers find software holes and exploit them—details that will help you secure your own systems.” —Ed Felten, Ph.D. Professor of Computer Science Princeton University “If you worry about software and application vulnerability, Exploiting Software is a must-read. This book gets at all the timely and important issues surrounding software security in a technical, but still highly readable and engaging way.” —George Cybenko, Ph.D. Dorothy and Walter Gramm Professor of Engineering, Dartmouth “Exploiting Software is the best treatment of any kind that I have seen on the topic of software vulnerabilities.” —From the Foreword by Aviel D. Rubin Associate Professor, Computer Science Technical Director, Information Security Institute, Johns Hopkins University How does software break? How do attackers make software break on purpose? Why are firewalls, intrusion detection systems, and antivirus software not keeping out the bad guys? What tools can be used to break software? This book provides the answers. Exploiting Software is loaded with examples of real attacks, attack patterns, tools, and techniques used by bad guys to break software. If you want to protect your software from attack, you must first learn how real attacks are really carried out. This must-have book may shock you—and it will certainly educate you. Getting beyond the script kiddie treatment found in many hacking books, you will learn about Why software exploit will continue to be a serious problem When network security mechanisms do not work Attack patterns Reverse engineering Classic attacks against server software Surprising attacks against client software Techniques for crafting malicious input The technical details of buffer overflows Rootkits Exploiting Software is filled with the tools, concepts, and knowledge necessary to break software.

Book Information
Anyone who’s been in network security long enough will tell you that the current state of products and ‘solutions’ to security problems are woefully inadequate. Firewalls, intrusion detection systems, content filters and anti-virus solutions are all reactive technologies, and as a result, they fail to address the primary cause of security vulnerabilities. This root cause is bad software. Viruses, worms and hackers exploit vulnerabilities in the design and logic of software applications to compromise, destroy and otherwise take control of important information. Once you accept this fact, you’ll realize that the only path to good security is to write better code. ‘Exploiting Software - How to Break Code’ is a book that fires up the hacker in me. It does not aim to teach you about the latest scanning tool, instead, it teaches you how to find and exploit vulnerabilities in systems. While many of the ideas in the book (such as the omnipresent buffer overflow) are not new, there is simply no literary comparison to the treatment given to them in this book. Application security is one of the highest regarded and specialized technical services in the security industry, and thus, finding people (let alone books) that delve in-depth into the topic is rare and refreshing. The first day I used this book, I was on an application security project. The target application was a distributed database application running on SQL server with a web front-end. I happened to have this book along with me, and while reading through it, the section on equivalent requests was something I hadn’t tried - sure enough, 20 minutes later I had full control of the application and a very good impression of this book.

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