## **CONTENTS IN DETAIL**

FOREWORD TO THE FIRST EDITION	XV
ACKNOWLEDGMENTS	xix
SPECIAL THANKS	xxi
INTRODUCTION	xxiii
Why Do a Penetration Test?	xxiv
Why Metasploit?	
About This Book	
What's New to This Edition	
A Note on Ethics	XXVII
1	
THE ABSOLUTE BASICS OF PENETRATION TESTING	1
The Phases of the PTES	2
Preengagement Interactions	
Intelligence Gathering	
Threat Modeling	
Vulnerability Analysis	
Exploitation	3
Post Exploitation	3
Reporting	
Types of Penetration Tests	
Overt	4
Covert	
Vulnerability Scanners	
Installing Kali, Metasploit, and Metasploitable	
Wrapping Up	
, , , , , , , , , , , , , , , , , , ,	
2	
METASPLOIT FUNDAMENTALS	7
Terminology	8
Exploit	
Payload	
Shellcode	
Module	
Listener	
Metasploit Interfaces.	
MSFconsole	
Resource Scripts	
Armitage and Cobalt Strike	
Metasploit Utilities	
MSFvenom	
NASM Shell	12

Metasploit Pro	
3	
INTELLIGENCE GATHERING	15
Passive Information Gathering	16
Whois Lookups	16
Netcraft	
DNS Analysis	
Active Information Gathering	
Port Scanning with Nmap	19
Port Scanning with Metasploit	
Targeted Scanning	
Scanning for Server Message Block	
Hunting for Poorly Configured Microsoft SQL Servers	28
Scanning for S3 Buckets	
Scanning for SSH Server Version	
Scanning for FTP Servers	
Sweeping for Simple Network Management Protocol	
Writing a Custom Scanner	
vvrapping op	34
4 VULNERABILITY ANALYSIS	35
The Basic Vulnerability Scan	
Scanning with Nexpose	
Configuring Nexpose	
Importing Reports into Metasploit	
Running Nexpose in MSFconsole	
Configuring Nessus	
Creating Scans	
Creating Scan Policies	
Viewing Reports	
Importing Results into Metasploit	45
Nessus Scanning in Metasploit	
Specialty Vulnerability Scanners	
Validating SMB Logins	
Finding Scanners for Recent Exploits	
Wrapping Up	50
5	
THE JOY OF EXPLOITATION	51
Basic Exploitation	50
Searching for an Exploit	52
searchsploit	
info	53

Selecting an Exploit	56
show payloads	57
show targets	58
set and unset	58
setg and unsetg	59
save	59
exploit	
Exploiting a Windows Machine	
Exploiting an Ubuntu Machine	63
Wrapping Up	65
6	
METERPRETER	67
Compromising a Windows Virtual Machine	67
Port Scanning with Nmap	
Brute-Forcing MySQL Server Authentication	
Uploading User-Defined Functions	69
Basic Meterpreter Commands	70
Capturing Screenshots	71
Finding Platform Information	71
Capturing Keystrokes	71
Extracting Password Hashes	
Passing the Hash	74
Mimikatz and Kiwi	75
Privilege Escalation	
Lateral Movement Techniques	
Token Impersonation	
DCSync and Golden Ticket Attacks	82
Other Useful Meterpreter Commands	84
Enabling Remote Desktop Services	
Viewing All Traffic on a Target	
Scraping a System	
Establishing Persistence	
Manipulating Windows APIs with Railgun	
Pivoting to Other Systems	
Wrapping Up	90
7	
AVOIDING DETECTION	91
Creating Stand-Alone Binaries with MSFvenom	92
Encoding with MSFvenom	
Packing Executables	
Custom Executable Templates	97
Launching Payloads Stealthily	
Evasion Modules	
	101
7	104
Wrapping Up	105

8		
SOCIAL	. ENGINEERING	107
	and Configuring the Social-Engineer Toolkit	
Spear-Phi	shing Attacks	109
	Setting Up an Email Server	
	Sending Malicious Email	
	Username and Password Harvesting	
	Tabnabbing	116
	Bypassing Two-Factor Authentication	
	Media Generation Attacks	
Wrappin	g Up	119
9		
-	SIDE ATTACKS	121
Browser-F	Based Exploits	122
	Finding Exploits in Metasploit	
	Automating Exploitation with AutoPwn2	
	Finding Even More Recent Exploits	
	at Exploits	
	Exploiting Word Documents	
	Sending Payloads	
vviappini	j ορ	127
10		
WIRELE	SS ATTACKS	131
	ng to Wireless Adapters	
	ng Wi-Fi Traffic	
	nd DoS Attacks	
Capturing	g and Cracking Handshakes	135
	Attacks	136
	raffic with Metasploit	138
Harvestin	g Credentials with the Wi-Fi Pineapple	138 139
Harvestin		138 139
Harvestin	g Credentials with the Wi-Fi Pineapple	138 139
Harvestin Wrapping	g Credentials with the Wi-Fi Pineapple	138 139
Harvestin Wrapping 11 AUXILI	g Credentials with the Wi-Fi Pineapple	138 139 143
Harvestin Wrapping  11  AUXILI  Exploring	g Credentials with the Wi-Fi Pineapple	138 139 143 145
Harvestin Wrapping  11  AUXILI  Exploring Searching Creating	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES Auxiliary Modules g for HTTP Modules an Auxiliary Module	138 139 143 145 145 148 149
Harvestin Wrapping 11 AUXILI Exploring Searching Creating	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module	138 139 143 143 145 148 149 149
Harvestin Wrapping 11 AUXILI Exploring Searching Creating	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module Running the Module	138 139 143 145 145 149 149 151
Harvestin Wrapping 11 AUXILI Exploring Searching Creating	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES  Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module Running the Module Debugging the Module	138 139 143 145 145 149 149 151 153
Harvestin Wrapping 11 AUXILI Exploring Searching Creating	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module Running the Module	138 139 143 145 145 149 149 151 153
Harvestin Wrapping 11 AUXILI Exploring Searching Creating	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES  Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module Running the Module Debugging the Module	138 139 143 145 145 149 149 151 153
Harvestin Wrapping  11  AUXILI  Exploring Searching Creating  Wrapping	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES  Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module Running the Module Debugging the Module g Up	138 139 143 145 145 149 149 151 153
Harvestin Wrapping  11  AUXILI  Exploring Searching Creating  Wrapping  12  PORTIN	g Credentials with the Wi-Fi Pineapple g Up  ARY MODULES  Auxiliary Modules g for HTTP Modules an Auxiliary Module Writing the Module Running the Module Debugging the Module g Up	138 139 143 145 145 149 149 151 153 154

The JMP Instruction Set	
NOPs and NOP Slides	
Porting Buffer Overflows	
Stripping Existing Exploits	 150
Configuring the Exploit Definition	
Testing the Base Exploit	
Implementing Features of the Framework	
Adding Randomization	
Removing the NOP Slide	
Removing the Dummy Shellcode	 164
Porting an SEH Overwrite Exploit.	
Wrapping Up	
13 BUILDING YOUR OWN MODULES	173
Getting Command Execution on MS SQL	
Enabling Administrator-Level Procedures	
Running the Module	
Exploring the Module Code	
Creating a New Module	
Editing an Existing Module	
Running the Shell Exploit	
Defining the Exploit	 . 180
Uploading PowerShell Scripts	
Running the Exploit	
Wrapping Up	 . 104
14	
CREATING YOUR OWN EXPLOITS	185
The Art of Fuzzing	186
Downloading the Test Application	
Writing the Fuzzer	
Testing the Fuzzer	
Controlling the Structured Exception Handler	 . 190
Hopping Around Restrictions	
Getting a Return Address	
Including Backward Jumps and Near Jumps	
Adding a Payload	
Bad Characters and Remote Code Execution	 . 198
Wrapping Up	
15	
A SIMULATED PENETRATION TEST	203
Preengagement Interactions	 . 204
Intelligence Gathering	
Threat Modeling	
Exploitation	
Executing the Exploit	
Establishina Persistence	. 207

Post Exploitation	. 208
Scanning the Linux System	. 209
Identifying Vulnerable Services	
Attacking Apache Tomcat	
Attacking Obscure Services	. 214
Covering Your Tracks	
Wrapping Up	
16	
PENTESTING THE CLOUD	219
Cloud Security Basics	. 220
Identity and Access Management	
Serverless Functions	. 221
Storage	
Docker Containers	
Setting Up Cloud Testing Environments	
Container Takeovers	
Escaping Docker Containers	
Kubernetes	
Wrapping Up	. 231
A	
CONFIGURING YOUR LAB ENVIRONMENT	233
x86 and AMD64	234
ARM and Apple Silicon	
Installing Kali Meta Packages	
В	
CHEAT SHEET	239
MSFconsole	. 239
Meterpreter	
MSFvenom	
Meterpreter Post Exploitation	
INDEX	245