

Web Security Testing Cookbook*

Systematic Techniques to Find Problems Fast

Paco Hope and Ben Walther

O'REILLY'
Beijing • Cambridge • Farnham • Koln • Sebastopol • Tokyo

Table of Contents

Foreword.....	xiii
Preface.....	xv
1. Introduction.....	1
1.1 What Is Security Testing?	1
1.2 What Are Web Applications?	5
1.3 Web Application Fundamentals	9
1.4 Web App Security Testing	14
1.5 It's About the How	14
2. Installing Some Free Tools.....	17
2.1 Installing Firefox	17
2.2 Installing Firefox Extensions	18
2.3 Installing Firebug	19
2.4 Installing OWASP's WebScarab	20
2.5 Installing Perl and Packages on Windows	21
2.6 Installing Perl and Using CPAN on Linux, Unix, or OS X	22
2.7 Installing CAL9000	22
2.8 Installing the ViewState Decoder	23
2.9 Installing cURL	24
2.10 Installing Pornzilla	24
2.11 Installing Cygwin	25
2.12 Installing Nikto 2	27
2.13 Installing Burp Suite	28
2.14 Installing Apache HTTP Server	28
3. Basic Observation.....	31
3.1 Viewing a Page's HTML Source	32
3.2 Viewing the Source, Advanced	33
3.3 Observing Live Request Headers with Firebug	36
3.4 Observing Live Post Data with WebScarab	40

3.5	Seeing Hidden Form Fields	43
3.6	Observing Live Response Headers with TamperData	44
3.7	Highlighting JavaScript and Comments	47
3.8	Detecting JavaScript Events	48
3.9	Modifying Specific Element Attributes	49
3.10	Track Element Attributes Dynamically	51
3.11	Conclusion	53
4.	Web-Oriented Data Encoding	55
4.1	Recognizing Binary Data Representations	56
4.2	Working with Base 64	58
4.3	Converting Base-36 Numbers in a Web Page	60
4.4	Working with Base 36 in Perl	60
4.5	Working with URL-Encoded Data	61
4.6	Working with HTML Entity Data	63
4.7	Calculating Hashes	65
4.8	Recognizing Time Formats	67
4.9	Encoding Time Values Programmatically	68
4.10	Decoding ASP.NET's ViewState	70
4.11	Decoding Multiple Encodings	71
5.	Tampering with Input	73
5.1	Intercepting and Modifying POST Requests	74
5.2	Bypassing Input Limits	77
5.3	Tampering with the URL	78
5.4	Automating URL Tampering	80
5.5	Testing URL-Length Handling	81
5.6	Editing Cookies	84
5.7	Falsifying Browser Header Information	86
5.8	Uploading Files with Malicious Names	88
5.9	Uploading Large Files	91
5.10	Uploading Malicious XML Entity Files	92
5.11	Uploading Malicious XML Structure	94
5.12	Uploading Malicious ZIP Files	96
5.13	Uploading Sample Virus Files	96
5.14	Bypassing User-Interface Restrictions	98
6.	Automated Bulk Scanning	101
6.1	Spidering a Website with WebScarab	102
6.2	Turning Spider Results into an Inventory	104
6.3	Reducing the URLs to Test	107
6.4	Using a Spreadsheet to Pare Down the List	107
6.5	Mirroring a Website with LWP	108

6.6	Mirroring a Website with wget	110
6.7	Mirroring a Specific Inventory with wget	111
6.8	Scanning a Website with Nikto	112
6.9	Interpreting Nikto's Results	114
6.10	Scan an HTTPS Site with Nikto	115
6.11	Using Nikto with Authentication	116
6.12	Start Nikto at a Specific Starting Point	117
6.13	Using a Specific Session Cookie with Nikto	118
6.14	Testing Web Services with WSFuzzer	119
6.15	Interpreting WSFuzzer's Results	121
7.	Automating Specific Tasks with cURL	125
7.1	Fetching a Page with cURL	126
7.2	Fetching Many Variations on a URL	127
7.3	Following Redirects Automatically	128
7.4	Checking for Cross-Site Scripting with cURL	128
7.5	Checking for Directory Traversal with cURL	132
7.6	Impersonating a Specific Kind of Web Browser or Device	135
7.7	Interactively Impersonating Another Device	136
7.8	Imitating a Search Engine with cURL	139
7.9	Faking Workflow by Forging Referer Headers	140
7.10	Fetching Only the HTTP Headers	141
7.11	POSTing with cURL	142
7.12	Maintaining Session State	144
7.13	Manipulating Cookies	145
7.14	Uploading a File with cURL	146
7.15	Building a Multistage Test Case	147
7.16	Conclusion	152
8.	Automating with LibWWWPerl	153
8.1	Writing a Basic Perl Script to Fetch a Page	154
8.2	Programmatically Changing Parameters	156
8.3	Simulating Form Input with POST	157
8.4	Capturing and Storing Cookies	158
8.5	Checking Session Expiration	159
8.6	Testing Session Fixation	162
8.7	Sending Malicious Cookie Values	164
8.8	Uploading Malicious File Contents	166
8.9	Uploading Files with Malicious Names	167
8.10	Uploading Viruses to Applications	169
8.11	Parsing for a Received Value with Perl	171
8.12	Editing a Page Programmatically	172
8.13	Using Threading for Performance	175

9.	Seeking Design Flaws.....	.177
9.1	Bypassing Required Navigation	178
9.2	Attempting Privileged Operations	180
9.3	Abusing Password Recovery	181
9.4	Abusing Predictable Identifiers	183
9.5	Predicting Credentials	184
9.6	Finding Random Numbers in Your Application	186
9.7	Testing Random Numbers	188
9.8	Abusing Repeatability	190
9.9	Abusing High-Load Actions	192
9.10	Abusing Restrictive Functionality	194
9.11	Abusing Race Conditions	195
10.	Attacking AJAX.....	.197
10.1	Observing Live AJAX Requests	199
10.2	Identifying JavaScript in Applications	200
10.3	Tracing AJAX Activity Back to Its Source	201
10.4	Intercepting and Modifying AJAX Requests	202
10.5	Intercepting and Modifying Server Responses	204
10.6	Subverting AJAX with Injected Data	206
10.7	Subverting AJAX with Injected XML	208
10.8	Subverting AJAX with Injected JSON	209
10.9	Disrupting Client State	211
10.10	Checking for Cross-Domain Access	212
10.11	Reading Private Data via JSON Hijacking	213
11.	Manipulating Sessions.....	.215
11.1	Finding Session Identifiers in Cookies	216
11.2	Finding Session Identifiers in Requests	218
11.3	Finding Authorization Headers	219
11.4	Analyzing Session ID Expiration	221
11.5	Analyzing Session Identifiers with Burp	225
11.6	Analyzing Session Randomness with WebScarab	227
11.7	Changing Sessions to Evade Restrictions	232
11.8	Impersonating Another User	233
11.9	Fixing Sessions	234
11.10	Testing for Cross-Site Request Forgery	235
12.	Multifaceted Tests.....	.237
12.1	Stealing Cookies Using XSS	237
12.2	Creating Overlays Using XSS	239
12.3	Making HTTP Requests Using XSS	240
12.4	Attempting DOM-Based XSS Interactively	242

12.5	Bypassing Field Length Restrictions (XSS)	244
12.6	Attempting Cross-Site Tracing Interactively	245
12.7	Modifying Host Headers	247
12.8	Brute-Force Guessing Usernames and Passwords	248
12.9	Attempting PHP Include File Injection Interactively	251
12.10	Creating Decompression Bombs	252
12.11	Attempting Command Injection Interactively	254
12.12	Attempting Command Injection Systematically	256
12.13	Attempting XPath Injection Interactively	258
12.14	Attempting Server-Side Includes (SSI) Injection Interactively	261
12.15	Attempting Server-Side Includes (SSI) Injection Systematically	262
12.16	Attempting LDAP Injection Interactively	264
12.17	Attempting Log Injection Interactively	266

Index	269
--------------	-------	------------