## Contents

Introduction		xiv
Part I	Anatomy of Vulnerabilities	1
Chapter 1	That Horrible Sinking Feeling	3
	Avoiding That Sinking Feeling	4
	It's Up to You	4
	What Is Web Application Security?	5
	Security Is a Balance	5
	Common Ways Drupal Gets Cracked	5
	Authentication, Authorization, and Sessions	6
	Command Execution: SQL Injection and Friends	12
	Cross-Site Scripting	16
	Cross-Site Request Forgery	17
	The Big Scary World	19
	The Most Common Vulnerabilities	19
	Summary	20
Chapter 2	Security Principles and Vulnerabilities outside	
	Drupal	21
	Server and Network Vulnerabilities	22
	Weaknesses across the Stack	22
	Denial of Service—Generic and Specific	23
	Defense in Depth	23

## x Contents

Web Server File System Permissions	24
Least Privilege—Minimum Permissions for the Task	25
Least Privilege for Database Accounts	25
Social and Physical Vulnerabilities	26
The Vendor Password Please?	26
This Is IT; Can I Help?	27
Let's Get Physical	28
Sanitizing a Typical Drupal Database	28
Summary	29
Protecting against Vulnerabilities	31
<b>Protecting Your Site with Configuration</b>	33
Stay Current with Code Updates	33
Staying Informed about Code Updates	34
Updating Your Site's Code	36
Know Your Attack Surface	38
Best Practices for Contributed Modules	38
Performing a Quick Security Scan	40
Using Extra Security Modules	40
Login and Session-Related Modules	41
Password-Related Modules	42
Visitor Analysis	44
Smart Configuration of Core	45
User Permissions	45
Input Formats and Filters	45
Summary	48
<b>Drupal's User and Permissions System</b>	49
Using the API	49
What Are Hooks, Form Handlers, and Overrides?	51
Defining Permissions: hook_perm	52
Checking Permission: user_access and Friends	53
Menu Callback Permissions	54
Input Format Access: filter_access	56
Common Mistakes with Users and Permissions	57
Insufficient or Incorrect Menu Access	57
Overloading a Permission	58
Access Definitely Denied	58
	Least Privilege—Minimum Permissions for the Task Least Privilege for Database Accounts  Social and Physical Vulnerabilities The Vendor Password Please? This Is IT; Can I Help? Let's Get Physical Sanitizing a Typical Drupal Database  Summary  Protecting against Vulnerabilities  Protecting Your Site with Configuration  Stay Current with Code Updates Staying Informed about Code Updates Updating Your Site's Code  Know Your Attack Surface Best Practices for Contributed Modules Performing a Quick Security Scan  Using Extra Security Modules Login and Session-Related Modules Password-Related Modules Visitor Analysis  Smart Configuration of Core User Permissions Input Formats and Filters  Summary  Drupal's User and Permissions System  Using the API What Are Hooks, Form Handlers, and Overrides? Defining Permission: user_access and Friends Menu Callback Permissions Input Format Access: filter_access  Common Mistakes with Users and Permissions Insufficient or Incorrect Menu Access Overloading a Permission

		Contents	xi
	Acting as Another User—and Getting Stuck	59	
	Summary	61	
Chapter 5	Dangerous Input, Cleaning Output	63	
	Database Sanitizing: db_query and Friends	63	
	Queries for Drupal 6.x and Earlier	64	
	Improper Use of db_query	65	
	Queries for Drupal $7.x$ and Newer	66	
	Translation and Sanitizing: t	67	
	Improper Use of t	68	
	Linking to Content: l and url	69	
	The Form API	70	
	Semantic Protection: Invalid Form Data	71	
	Form API: Sanitizing Options and Labels	73	
	Filtering Content: check_plain, check_markup,		
	filter xss admin	74	
	Escaping Everything: check_plain	75	
	Filtering HTML-Formatted Code: check_markup	77	
	Basic Filtering for Admins: filter_xss_admin	77	
	Summary	78	
Chapter 6	Safety in the Theme	79	
	Quick Introduction to Theming in Drupal	79	
	Overridable Templates and Functions	80	
	Providing Variables for Templates	82	
	Common Mistakes	83	
	Printing Raw Node Data	83	
	Best Practice: Filter Data Prior to Using Templates	86	
	Summary	88	
Chapter 7	The Drupal Access System	89	
	Respecting the Access System	90	
	Modifying Queries for Access: db_rewrite_sql	90	
	Testing Access for a Single Node: node_access	92	
	Case Study: Private Module	93	
	Node Access Storage Explained	93	
	Summary	97	
Chapter 8	Automated Security Testing	99	
-	Test Drupal with Drupal: Coder Module	100	

	More Testing Drupal with Drupal Security Scanner	102
	Testing Drupal with Grendel-Scan	105
	Summary	107
Part III	Weaknesses in the Wild	109
Chapter 9	Finding, Exploiting, and Avoiding Vulnerabilities	111
	Strategies to Crack Drupal	112
	Searching Core and Contrib for Vulnerabilities	112
	Using Grep to Search for Common Mistakes	112
	Finding Sites Vulnerable to the Stock Weakness	115
	Finding Vulnerabilities by Happenstance	116
	Exploiting the Talk Module XSS Vulnerability	120
	How to Report Vulnerabilities	123
	Summary	124
Chapter 10	Un-Cracking Drupal	127
	Step 1: Secure the Menu	128
	Step 2: Secure the User Search	130
	Step 3: Secure the Node List	131
	Step 4: Disable Users Safely	133
	Drupal Un-cracked	134
Part IV	Appendixes	135
Appendix A	Function Reference	137
	Text-Filtering Functions	137
	Link and URL Building Functions	139
	Users and Permissions	142
	Database Interaction	144
Appendix B	Installing and Using Drupal 6 Fresh out of the Box	147
	Step 1: Installing Drupal—Easier Than Ever Before	149
	Downloading Drupal	150
	Unzipping and Preparing Files for Upload	150
	Uploading Files	150
		151
	Creating the Database and User for the Drupal Installation Running the Drupal Installation Wizard Alternate Method: Managing Drupal with CVS	151 151 155

		Contents	xiii
	Updating Drupal Core and Running the Update		
	Script	156	
	Step 2: Designing and Building the Architecture	158	
	Application Scope and Domain	158	
	Creating Roles and Users	160	
	Installing and Enabling Modules	161	
	Making the Site Bilingual	162	
	Step 3: Creating the Business Objects	167	
	Step 4: Creating the Workflows	172	
	Implementing the Registration Workflow	172	
	Implementing the Client's Workflow	177	
	Implementing the Translator Team Leader's		
	Workflow	184	
	Implementing the Translator's Workflow	188	
	Installing the Vulnerable.module	195	
	Summary	196	
Appendix C	<b>Leveraging Community Resources</b>	197	
••	Resources from the Drupal Security Team	197	
	General Security Resources	199	
	PHP.net	199	
	OWASP	199	
	Google Code University	200	
	Heine Deelstra	200	
	Groups.Drupal.org	201	
	Robert Hansen—rsnake	201	
	Bruce Schneier	201	
	CrackingDrupal.com	202	
	Summary	202	
Glossary		203	
Index		213	