Contents at a Glance

Foreword .............................................................................................................................. xxv
About the Authors ........................................................................................................... xxvi
About the Technical Reviewers ..................................................................................... xxvii
Acknowledgments .......................................................................................................... xxviii
Introduction ...................................................................................................................... xxix

Chapter 1: How Drupal Works ..................................................................................... 1
Chapter 2: Writing a Module ....................................................................................... 13
Chapter 3: Hooks, Actions, and Triggers ................................................................. 33
Chapter 4: The Menu System .................................................................................... 57
Chapter 5: Working with Databases ........................................................................... 89
Chapter 6: Working with Users .................................................................................. 115
Chapter 7: Working with Nodes ................................................................................. 137
Chapter 8: Working with Fields .................................................................................. 163
Chapter 9: The Theme System .................................................................................... 185
Chapter 10: Working with Blocks ............................................................................. 223
Chapter 11: The Form API ........................................................................................ 239
Chapter 12: Manipulating User Input: The Filter System ....................................... 295
Chapter 13: Searching and Indexing Content .......................................................... 307
Chapter 14: Working with Files .................................................................................. 323
CONTENTS AT A GLANCE

Chapter 15: Working with Taxonomy ................................................................. 343
Chapter 16: Caching .......................................................................................... 365
Chapter 17: Sessions ......................................................................................... 379
Chapter 18: Using jQuery .................................................................................. 389
Chapter 10: Localization and Translation ......................................................... 417
Chapter 20: XML-RPC ..................................................................................... 451
Chapter 21: Writing Secure Code ..................................................................... 465
Chapter 22: Development Best Practices ......................................................... 487
Chapter 23: Optimizing Drupal ......................................................................... 499
Chapter 24: Installation Profiles ....................................................................... 525
Chapter 25: Testing ............................................................................................ 545
Appendix A: Database Table Reference .............................................................. 565
Appendix B: Resources ..................................................................................... 623

Index .................................................................................................................. 631
## CONTENTS

Processing a Request ............................................................................................................................ 10
Theming the Data ................................................................................................................................... 11
Summary ............................................................................................................................................. 11

### Chapter 2: Writing a Module ........................................................................................................ 13

- Creating the Files ............................................................................................................................ 13
- Implementing a Hook ...................................................................................................................... 15
- Adding Module-Specific Settings ................................................................................................ 17
- Defining Your Own Administration Section .................................................................................. 25
- Presenting a Settings Form to the User .......................................................................................... 26
- Validating User-Submitted Settings ............................................................................................... 29
- Storing Settings .............................................................................................................................. 29
  - Using Drupal’s variables Table ................................................................................................... 29
  - Retrieving Stored Values with variable_get() ........................................................................ 30
- Further Steps .................................................................................................................................... 30
- Summary ........................................................................................................................................ 31

### Chapter 3: Hooks, Actions, and Triggers .................................................................................. 33

- Understanding Events and Triggers ............................................................................................... 33
- Understanding Actions .................................................................................................................... 35
  - The Trigger User Interface .......................................................................................................... 35
  - Your First Action .......................................................................................................................... 38
  - Assigning the Action .................................................................................................................... 39
  - Changing Which Triggers an Action Supports ............................................................................ 40
- Using the Context in Actions .......................................................................................................... 45
  - How the Trigger Module Prepares the Context ........................................................................ 45
  - Changing Existing Actions with action_info_alter() ............................................................... 46
  - Establishing the Context ............................................................................................................ 47
CONTENTS

Altering Menu Items from Other Modules ........................................................................ 80
Altering Menu Links from Other Modules ........................................................................ 82
Kinds of Menu Items .......................................................................................................... 82
Common Tasks .................................................................................................................. 84
  Assigning Callbacks Without Adding a Link to the Menu ............................................. 85
  Displaying Menu Items As Tabs .................................................................................... 85
  Hiding Existing Menu Items .......................................................................................... 87
  Using menu.module ....................................................................................................... 87
  Common Mistakes .......................................................................................................... 88
Summary ............................................................................................................................ 88

Chapter 5: Working with Databases ................................................................................. 89
Defining Database Parameters ........................................................................................ 89
Understanding the Database Abstraction Layer .............................................................. 90
Connecting to the Database ............................................................................................. 91
Performing Simple Queries ............................................................................................. 92
Retrieving Query Results ................................................................................................. 93
  Getting a Single Value .................................................................................................. 94
  Getting Multiple Rows ................................................................................................. 94
  Using the Query Builder and Query Objects ............................................................... 94
  Getting a Limited Range of Results ............................................................................ 95
  Getting Results for Paged Display ............................................................................. 96
  Other Common Queries ............................................................................................... 97
Inserts and Updates with drupal_write_record() ................................................................ 98
The Schema API ................................................................................................................ 99
  Using Module .install Files ....................................................................................... 100
  Creating Tables ........................................................................................................... 100
  Using the Schema Module ......................................................................................... 102
  Field Type Mapping from Schema to Database ......................................................... 103
Creating the .module File ..................................................................................................................... 143
Providing Information About Our Node Type ....................................................................................... 144
Modifying the Menu Callback .................................................................................................................. 145
Defining Node-Type-Specific Permissions with hook_permission()....................................................... 146
Limiting Access to a Node Type with hook__node_access() ........................................................................ 147
Customizing the Node Form for Our Node Type ................................................................................... 148
Validating Fields with hook_validate().................................................................................................. 149
Saving Our Data with hook_insert()....................................................................................................... 149
Keeping Data Current with hook_update() .............................................................................................. 150
Cleaning Up with hook_delete()............................................................................................................... 150
Modifying Nodes of Our Type with hook_load().................................................................................... 151
Using hook_view() ...................................................................................................................................... 151
Manipulating Nodes That Are Not Our Type with hook__node_xxxx()................................................... 153
How Nodes Are Stored.............................................................................................................................. 155
Creating a Node Type with Custom Content Types.................................................................................. 157
Restricting Access to Nodes ..................................................................................................................... 157
    Defining Node Grants ............................................................................................................................ 157
    The Node Access Process ..................................................................................................................... 159
Summary ...................................................................................................................................................... 161

Chapter 8: Working with Fields ............................................................................................................. 163
Creating Content Types ............................................................................................................................ 163
Adding Fields to a Content Type ................................................................................................................ 165
Creating a Custom Field .......................................................................................................................... 169
Adding Fields Programmatically .............................................................................................................. 181
Summary ...................................................................................................................................................... 183
### Chapter 9: The Theme System ......................................................... 185

- Themes .............................................................................................................. 185
  - Installing an Off-the-Shelf Theme ................................................................. 185
  - Building a Theme .......................................................................................... 186
- The .info File ..................................................................................................... 194
  - Adding Regions to Your Theme ...................................................................... 194
  - Adding CSS Files to Your Theme ................................................................. 194
  - Adding JavaScript Files .................................................................................. 195
  - Adding Settings to Your Theme ..................................................................... 195
- Understanding Template Files ........................................................................ 198
  - The Big Picture ................................................................................................. 198
  - The html.php.tpl File .................................................................................... 200
  - Overriding Template Files ............................................................................ 214
  - Other Template Files ..................................................................................... 215
  - Overriding Themable Items .......................................................................... 216
  - Overriding with Template Files ..................................................................... 219
  - Adding and Manipulating Template Variables ............................................. 219
  - Using the Theme Developer Module ............................................................. 221
- Summary ............................................................................................................ 221

### Chapter 10: Working with Blocks ....................................................... 223

- What Is a Block? .................................................................................................. 223
- Block Configuration Options ............................................................................ 226
  - Block Placement .............................................................................................. 227
  - Defining a Block ............................................................................................. 228
  - Using the Block Hooks ................................................................................... 229
- Building a Block ................................................................................................. 230
- Enabling a Block When a Module Is Installed ............................................... 237
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing a Validation Function</td>
<td>258</td>
</tr>
<tr>
<td>Form Rebuilding</td>
<td>262</td>
</tr>
<tr>
<td>Writing a Submit Function</td>
<td>263</td>
</tr>
<tr>
<td>Changing Forms with hook_form_alter()</td>
<td>263</td>
</tr>
<tr>
<td>Submitting Forms Programmatically with drupal_form_submit()</td>
<td>265</td>
</tr>
<tr>
<td>Dynamic Forms</td>
<td>265</td>
</tr>
<tr>
<td>Form API Properties</td>
<td>273</td>
</tr>
<tr>
<td>Properties for the Root of the Form</td>
<td>273</td>
</tr>
<tr>
<td>Properties Added to All Elements</td>
<td>274</td>
</tr>
<tr>
<td>Properties Allowed in All Elements</td>
<td>275</td>
</tr>
<tr>
<td>Form Elements</td>
<td>277</td>
</tr>
<tr>
<td>Summary</td>
<td>293</td>
</tr>
</tbody>
</table>

### Chapter 12: Manipulating User Input: The Filter System

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filters</td>
<td>295</td>
</tr>
<tr>
<td>Filters and Text formats</td>
<td>296</td>
</tr>
<tr>
<td>Installing a Filter</td>
<td>300</td>
</tr>
<tr>
<td>Knowing When to Use Filters</td>
<td>300</td>
</tr>
<tr>
<td>Creating a Custom Filter</td>
<td>301</td>
</tr>
<tr>
<td>Implementing hook_filter_info()</td>
<td>302</td>
</tr>
<tr>
<td>The Process Function</td>
<td>302</td>
</tr>
<tr>
<td>Helper Function</td>
<td>303</td>
</tr>
<tr>
<td>Summary</td>
<td>305</td>
</tr>
</tbody>
</table>

### Chapter 13: Searching and Indexing Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building a Custom Search Page</td>
<td>307</td>
</tr>
<tr>
<td>The Default Search Form</td>
<td>308</td>
</tr>
<tr>
<td>The Advanced Search Form</td>
<td>308</td>
</tr>
<tr>
<td>Adding to the Search Form</td>
<td>309</td>
</tr>
</tbody>
</table>
Using the Search HTML Indexer .................................................................................... 312
  When to Use the Indexer .......................................................................................... 313
  How the Indexer Works .......................................................................................... 313
Summary ....................................................................................................................... 322

Chapter 14: Working with Files ................................................................................. 323
  How Drupal Serves Files........................................................................................ 323
  Managed and Unmanaged Drupal APIs ................................................................ 323
    Public Files ........................................................................................................... 325
    Private Files .......................................................................................................... 325
  PHP Settings .......................................................................................................... 325
  Media Handling....................................................................................................... 326
    Upload Field .......................................................................................................... 327
    Video and Audio .................................................................................................... 328
  File API .................................................................................................................. 328
    Database Schema ................................................................................................. 328
    Common Tasks and Functions ............................................................................. 329
    Authentication Hooks for Downloading ............................................................... 340
Summary ....................................................................................................................... 342

Chapter 15: Working with Taxonomy .................................................................. 343
  The Structure of Taxonomy .................................................................................... 343
  Creating a Vocabulary ......................................................................................... 343
  Creating Terms ....................................................................................................... 344
  Assigning a Vocabulary to a Content Type ........................................................... 344
  Kinds of Taxonomy .................................................................................................. 345
    Flat ....................................................................................................................... 346
    Hierarchical .......................................................................................................... 346
    Multiple Hierarchical ......................................................................................... 347
<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing Content by Term .....................................................................</td>
</tr>
<tr>
<td>.......................................................................................................</td>
</tr>
<tr>
<td>Using AND and OR in URLs ...................................................................</td>
</tr>
<tr>
<td>Specifying Depth for Hierarchical Vocabularies ..............................</td>
</tr>
<tr>
<td>Automatic RSS Feeds .........................................................................</td>
</tr>
<tr>
<td>Storing Taxonomies ...........................................................................</td>
</tr>
<tr>
<td>Module-Based Vocabularies ..................................................................</td>
</tr>
<tr>
<td>Creating a Module-Based Vocabulary ..............................................</td>
</tr>
<tr>
<td>Keeping Informed of Vocabulary Changes with Taxonomy Hooks ............</td>
</tr>
<tr>
<td>Common Tasks ....................................................................................</td>
</tr>
<tr>
<td>Displaying Taxonomy Terms Associated with a Node ...........................</td>
</tr>
<tr>
<td>Building Your Own Taxonomy Queries ..............................................</td>
</tr>
<tr>
<td>Using taxonomy_select_nodes() ......................................................</td>
</tr>
<tr>
<td>Taxonomy Functions ...........................................................................</td>
</tr>
<tr>
<td>Retrieving Information About Vocabularies ......................................</td>
</tr>
<tr>
<td>Adding, Modifying, and Deleting Vocabularies ...................................</td>
</tr>
<tr>
<td>Retrieving Information About Terms ................................................</td>
</tr>
<tr>
<td>Adding, Modifying, and Deleting Terms ............................................</td>
</tr>
<tr>
<td>Retrieving Information About Term Hierarchy ....................................</td>
</tr>
<tr>
<td>Finding Nodes with Certain Terms ..................................................</td>
</tr>
<tr>
<td>Additional Resources ........................................................................</td>
</tr>
<tr>
<td>Summary ............................................................................................</td>
</tr>
</tbody>
</table>

Chapter 16: Caching ...........................................................................

Knowing When to Cache .................................................................
How Caching Works ........................................................................
How Caching Is Used Within Drupal Core ......................................
Menu System ....................................................................................
Caching Filtered Text ........................................................................
Administration Variables and Module Settings ................................
CONTENTS

Starting a New Translation ................................................................. 429
   Generating .pot Files with Translation Template Extractor .................. 429
   Creating a .pot File for Your Module .................................................. 430
   Creating .pot Files for an Entire Site .................................................... 431
Installing a Language Translation ....................................................... 432
   Setting Up a Translation at Install Time ............................................... 432
   Installing a Translation on an Existing Site ......................................... 433
Right-to-Left Language Support ............................................................ 434
Language Negotiation ........................................................................ 435
   Default .................................................................................................. 436
   Path Prefix Only .................................................................................. 438
   Path Prefix with Language Fallback .................................................... 440
   URL Only .............................................................................................. 441
Content Translation ............................................................................. 442
   Introducing the Content Translation Module ....................................... 442
   Multilingual Support ........................................................................... 442
   Multilingual Support with Translation ................................................ 444
Localization- and Translation-Related Files ........................................ 447
Additional Resources .......................................................................... 448
Summary .............................................................................................. 449

Chapter 20: XML-RPC ..................................................................... 451
What Is XML-RPC? ............................................................................. 451
Prerequisites for XML-RPC ................................................................. 451
XML-RPC Clients ................................................................................ 452
   XML-RPC Client Example: Getting the Time ...................................... 452
   XML-RPC Client Example: Getting the Name of a State ..................... 453
   Handling XML-RPC Client Errors ...................................................... 454
A Simple XML-RPC Server ........................................................................................................ 457
  Mapping Your Method with hook_xmlrpc() ............................................................................ 458
  Automatic Parameter Type Validation with hook_xmlrpc() ....................................................... 459

Built-In XML-RPC Methods ........................................................................................................ 461
  system.listMethods .................................................................................................................. 461
  system.methodSignature .......................................................................................................... 462
  system.methodHelp ................................................................................................................... 462
  system.getCapabilities ............................................................................................................ 462
  system.multiCall ...................................................................................................................... 463

Summary ...................................................................................................................................... 463

Chapter 21: Writing Secure Code .............................................................................................. 465

Handling User Input .................................................................................................................... 465
  Thinking About Data Types ...................................................................................................... 465
  Using check_plain() and t() to Sanitize Output ...................................................................... 468
  Using filter_xss() to Prevent Cross-Site Scripting Attacks ..................................................... 470
  Using filter_xss_admin() .......................................................................................................... 472

Handling URLs Securely .............................................................................................................. 472

Making Queries Secure with db_query() .................................................................................... 473

Keeping Private Data Private with hook_query_alter() .............................................................. 476

Dynamic Queries ........................................................................................................................ 477

Permissions and Page Callbacks ............................................................................................... 477

Cross-Site Request Forgeries (CSRF) .......................................................................................... 478

File Security ................................................................................................................................ 478
  File Permissions .......................................................................................................................... 479
  Protected Files ............................................................................................................................ 479
  File Uploads ................................................................................................................................ 480
  Filenames and Paths .................................................................................................................... 480

Encoding Mail Headers ............................................................................................................... 481
Files for Production Environments ................................................................. 482
SSL Support ........................................................................................................ 482
Stand-Alone PHP ............................................................................................... 483
AJAX Security, a.k.a. Request Replay Attack ................................................... 485
Form API Security ............................................................................................. 485
Protecting the Superuser Account ..................................................................... 486
Summary .............................................................................................................. 486

Chapter 22: Development Best Practices ......................................................... 487
Coding Standards ............................................................................................... 487
  Line Indentation and Whitespace ...................................................................... 487
  Operators .......................................................................................................... 487
Casting .................................................................................................................. 487
Control Structures ............................................................................................. 488
  Function Calls .................................................................................................... 488
  Function Declarations ....................................................................................... 489
  Function Names .................................................................................................. 489
  Class Constructor Calls ..................................................................................... 490
Arrays ................................................................................................................... 490
Quotes .................................................................................................................. 491
String Concatenators ......................................................................................... 491
Comments ............................................................................................................ 491
  Documentation Examples ................................................................................... 492
  Documenting Constants .................................................................................... 493
  Documenting Functions ...................................................................................... 493
  Documenting Hook Implementations ............................................................... 495
Including Code .................................................................................................... 495
PHP Code Tags .................................................................................................... 495
Semicolons ............................................................................................................ 496
Example URLs....................................................................................................................................... 496
Naming Conventions.................................................................................................................. 496
Checking Your Coding Style with Coder Module........................................................................ 496
Finding Your Way Around Code with grep ..................................................................... 497
Summary ............................................................................................................................... 498

Chapter 23: Optimizing Drupal ................................................................. 499
Caching Is the Key to Drupal Performance ................................................................. 499
Optimizing PHP .............................................................................................................. 501
  Setting PHP Opcode Cache File to /dev/zero .............................................................. 502
  PHP Process Pool Settings ........................................................................................... 502
Tuning Apache .................................................................................................................. 503
  mod_expires .................................................................................................................. 503
Moving Directives from .htaccess to httpd.conf .............................................................. 504
MPM Prefork vs. Apache MPM Worker ........................................................................... 504
Balancing the Apache Pool Size ................................................................................... 505
Decreasing Apache Timeout .......................................................................................... 505
Disabling Unused Apache Modules ............................................................................... 506
Using Nginx Instead of Apache .................................................................................. 506
Using Pressflow ............................................................................................................. 506
Varnish ............................................................................................................................. 506
  Normalizing incoming requests for better Varnish hits ................................................ 507
  Varnish: finding extraneous cookies ........................................................................... 508
Boost ................................................................................................................................. 508
Boost vs. Varnish ........................................................................................................... 509
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux System Tuning for High Traffic Servers</td>
<td>509</td>
</tr>
<tr>
<td>Using Fast File Systems</td>
<td>510</td>
</tr>
<tr>
<td>Dedicated Servers vs. Virtual Servers</td>
<td>511</td>
</tr>
<tr>
<td>Avoiding Calling External Web Services</td>
<td>511</td>
</tr>
<tr>
<td>Decreasing Server Timeouts</td>
<td>512</td>
</tr>
<tr>
<td>Database Optimization</td>
<td>512</td>
</tr>
<tr>
<td>Enabling MySQL's Query Cache</td>
<td>512</td>
</tr>
<tr>
<td>MySQL InnoDB Performance on Windows</td>
<td>513</td>
</tr>
<tr>
<td>Drupal Performance</td>
<td>513</td>
</tr>
<tr>
<td>Eliminating 404 Errors</td>
<td>513</td>
</tr>
<tr>
<td>Disabling Modules You’re Not Using</td>
<td>514</td>
</tr>
<tr>
<td>Drupal-Specific Optimizations</td>
<td>514</td>
</tr>
<tr>
<td>Page Caching</td>
<td>514</td>
</tr>
<tr>
<td>Bandwidth Optimization</td>
<td>514</td>
</tr>
<tr>
<td>Pruning the Sessions Table</td>
<td>514</td>
</tr>
<tr>
<td>Managing the Traffic of Authenticated Users</td>
<td>515</td>
</tr>
<tr>
<td>Running cron</td>
<td>515</td>
</tr>
<tr>
<td>Architectures</td>
<td>516</td>
</tr>
<tr>
<td>Single Server</td>
<td>516</td>
</tr>
<tr>
<td>Separate Database Server</td>
<td>516</td>
</tr>
<tr>
<td>Separate Database Server and a Web Server Cluster</td>
<td>517</td>
</tr>
<tr>
<td>Multiple Database Servers</td>
<td>518</td>
</tr>
<tr>
<td>Finding the Bottleneck</td>
<td>518</td>
</tr>
<tr>
<td>Summary</td>
<td>523</td>
</tr>
</tbody>
</table>
Chapter 24: Installation Profiles ................................................................. 525
  Creating a New Installation Profile .......................................................... 525
    The enhanced.info File ........................................................................ 526
    The enhanced.profile File ................................................................... 527
    The enhanced.install File .................................................................... 527
  Using hook_install_tasks and hook_install_tasks_alter ...................... 543
  Summary .................................................................................................. 544

Chapter 25: Testing ..................................................................................... 545
  Setting Up the Test Environment ............................................................. 545
  How Tests Are Defined ........................................................................... 550
  Test Functions ........................................................................................ 556
  Test Assertions ....................................................................................... 560
  Summary .................................................................................................. 563

Appendix A: Database Table Reference .................................................... 565

Appendix B: Resources ............................................................................... 623
  Code ......................................................................................................... 623
    The Drupal Source Code Repository on GIT .............................................. 623
    Examples ................................................................................................ 623
    Drupal API Reference ............................................................................ 624
    Security Advisories ............................................................................... 624
    Updating Modules .................................................................................. 624
    Updating Themes .................................................................................. 624
  Handbooks .............................................................................................. 624
  Forums ..................................................................................................... 624
Mailing Lists ................................................................. 625
Development ................................................................. 625
Themes .............................................................................. 625
Translations ..................................................................... 625
User Groups and Interest Groups ....................................... 625
Internet Relay Chat ......................................................... 625
North America ............................................................... 627
Europe ............................................................................. 627
Asia ................................................................................ 628
Latin America / Caribbean ................................................. 629
Oceania .......................................................................... 629
Africa .............................................................................. 629
Videocasts ..................................................................... 629
Weblogs .......................................................................... 629
Conferences ................................................................. 630
Contribute ....................................................................... 630
Index .............................................................................. 631
Four years ago, I wrote the foreword for the first edition of this book. What was missing at that time was a developer book for Drupal. Since then, *Pro Drupal Development* has made an incredible contribution to Drupal's steady growth. I don't think I know a single Drupal developer who doesn't own a copy of the *Pro Drupal Development* book.

Drupal, through its open source nature, has become much greater than I ever imagined it would. What didn’t change is the Drupal developer community’s healthy desire to innovate, to respond to the ever-changing landscape of web development, and to provide web developers an almost infinite amount of flexibility. Change is a constant in the Drupal community and key to our success.

A lot of the success of Drupal today can be attributed to Drupal 6. However, from the day that Drupal 6 was released almost three years ago, we’ve been working really hard on Drupal 7. More than 800 individual contributors have patches included in Drupal 7 core. Drupal 7 will feature some of the biggest architectural changes in the history of Drupal, will ship with many API improvements, and will be able to power bigger sites than ever before. The net result is that Drupal 7 is an even better web application development platform than Drupal 6, and it will fuel a lot of Drupal's growth over the next years.

All these changes also mean that the previous *Pro Drupal Development* books went out of date. Fortunately, the third edition of this book fixes all that. This book covers all of the capabilities and developer facilities in Drupal 7, and provides deep insight into the inner workings and design choices behind Drupal 7.

Armed with this book and a copy of Drupal’s source code, you have everything you need to become a Drupal expert. If, along the way, you have figured out how to do something better, with fewer lines of code or more elegantly and faster than before, get involved and help us make Drupal even better. I’d love to review and commit your Drupal core patches, and I’m sure many of the other contributors would too.

Dries Buytaert
Drupal Founder and Project Lead
Todd Tomlinson is the vice president of eGovernment Solutions at ServerLogic Corporation in Portland, Oregon. Todd’s focus over the past 15 years has been on designing, developing, deploying, and supporting complex web solutions for public and private sector clients all around the world. He has been using Drupal as the primary platform for creating beautiful and feature-rich sites such as http://arapahoelibraries.org/ald/.

Prior to ServerLogic, Todd was the senior director of eBusiness Strategic Services for Oracle Corporation, where he helped Oracle’s largest clients develop their strategic plans for leveraging the Web as a core component of their business. He is also the former vice president of Internet Solutions for Claremont Technology Group, vice president and CTO of Emerald Solutions, managing director for CNF Ventures, and a senior manager with Andersen Consulting/Accenture. Todd has a BS in computer science and an MBA, and he is in the dissertation phase for his PhD.

Todd’s passion for Drupal is evident in his obsession with evangelizing about the platform and his enthusiasm when speaking with clients about the possibilities of what they can accomplish using Drupal. If you want to see someone literally “light up,” stop him on the street and ask him, “What is Drupal and what can it do for me?” He is also the author of Apress’s Beginning Drupal 7.

John K. VanDyk began his work with computers on a black Bell and Howell Apple II by printing out and poring over the BASIC code for Little Brick Out in order to increase the paddle width. Later, he manipulated timing loops in assembly to give Pac-Man a larger time slice than the ghosts. Before discovering Drupal, John was involved with the UserLand Frontier community and used Plone before writing his own content management system (with Matt Westgate) using Ruby.

John is a senior web architect at Lullabot, a Drupal education and consulting firm. Before that, John was a systems analyst and adjunct assistant professor in the entomology department at Iowa State University of Science and Technology. His master's thesis focused on cold tolerance of deer ticks, and his doctoral dissertation was on the effectiveness of photographically created three-dimensional virtual insects on undergraduate learning.

John lives with his wife Tina in Ames, Iowa. They homeschool their passel of children, who have become used to bedtime stories like “The Adventures of a Node Revision in the Land of Multiple Joins.”
About the Technical Reviewers

Joshua Brauer jumped onto the World Wide Web as an aspiring technical journalism student working with content management systems in 1995. Since becoming a member of the Drupal community in 2003, Joshua has been involved with running Drupal sites of all sizes. In 2007 Joshua left work in IT management to devote his full-time professional effort to Drupal.

Joshua is one of the leaders of the Boise Drupal Users Group and can frequently be found giving talks at conferences, camps, local meetups, and anywhere else people are interested in hearing about Drupal. Joshua’s writings about Drupal can be found online at http://joshuabrauer.com.

As a Drupalist at Acquia, Joshua works with customers from small sites to large enterprises on all phases of their Drupal experience, from pre-planning through hosting and operations. Joshua finds great inspiration in the Drupal community and its many significant accomplishments. When disconnected from the Web, Joshua can be found behind a camera, enjoying the wonderful variety of beautiful places on our planet.

Robert Douglass is the senior Drupal advisor at Acquia, Inc., a permanent member of the Drupal Association, and a founding member of Die Drupal-Initiative, Germany’s Drupal-oriented nonprofit. He is active as a module maintainer, core contributor, and speaker at various Drupal events and conferences. His Apress projects include Building Online Communities with Drupal, phpBB, and WordPress (author, 2005), Pro Drupal Development (technical reviewer, 2007), and Pro Drupal Development, Second Edition (technical reviewer, 2008).

Peter M. Wolanin has been working with Drupal since late 2005, when a friend who had been a Howard Dean supporter involved him in a project to build a new Web presence for the local Democratic Party club, and they started building the site on Drupal 4.7 beta. Peter soon became as interested in the challenge of fixing bugs and adding features in Drupal core and contributed modules as he was in actual site building. He became a noted contributor to Drupal 5, 6, and 7, and a member of the Drupal documentation team. He joined the Drupal security team and was elected in 2010 as a permanent member of the Drupal Association. Peter joined the Acquia engineering team in 2008 and enjoys the company of his stellar colleagues. Before all this, Peter graduated cum laude from Princeton University, received a doctoral degree in physics from the University of Michigan, and conducted post-doctoral and industrial research in biophysics and molecular biology.
Acknowledgments

Beth, for your never-ending support, encouragement, love, and laughter—thank you for bringing back the ability to dream big about the future.

My daughters, Anna, Alissa, and Emma, for giving up countless hours of time with Dad while I wrote the book.

My parents, for giving me the tools I needed to embark on the journeys that I’ve traveled.

My grandmother, for sparking the fire to become an author.

Dries, without your vision and passion for the platform, there wouldn’t be a Pro Drupal Development book.

The Aquia team, for jumping in and lending your support while I tackled the tough sections of the book Webchick (a.k.a. Angie Byron), for your dedication to the platform and your relentless efforts to launch Drupal 7.

The thousands of developers who have contributed to the platform to make it what it is today.

My clients, for embracing the technology and sharing the excitement over what it can do.

Jason, Darren, Kathryn, and Steve—my teammates who wake up every morning excited to discover something new that Drupal can do—for putting up with my wild dreams about how Drupal can do anything.
In its relatively short life, Drupal has had a tremendous impact on the landscape of the Internet. As a web content management system, Drupal has enabled the creation of feature- and content-rich web sites for organizations large and small. As a web application framework, Drupal is changing the way that people think about web application development. When I experienced the power of the Drupal platform for the first time, I knew that it was something more than just another content management solution. When I saw how easily and quickly I could build feature-rich web sites, I shifted gears and focused my entire career around Drupal.

I’m often asked the question, “What is Drupal?” The short answer is Drupal is an open source web content management system that allows you to quickly and easily create simple to complex web sites that span everything from a simple blog to a corporate web site, a social networking web site, or virtually anything you can dream up. What you can build with Drupal is limited only to your imagination, the time you have to spend with the platform, and your knowledge about Drupal’s capabilities—which is the impetus behind this book.

As an open source platform, Drupal’s community is constantly improving the platform and extending the functionality of the core platform by creating new and exciting add-on modules. If there’s a new concept created on the Web, it’s likely that there will be a new Drupal module that enables that concept in a matter of days. It’s the community behind the platform that makes Drupal what it is today, and what it will become in the future. I’ll show you how to leverage the features contributed by the community, making it easy for you to build incredible solutions with minimal effort.

The very act of picking up this book is the first step in your journey down the path of learning how to use Drupal. If you will walk with me through the entire book, you’ll have the knowledge and experience to build complex and powerful Drupal-based web sites. You’ll also have the foundation necessary to move beyond the basics, expanding on the concepts I cover in this book.

Learning Drupal is like learning every new technology. There will be bumps and hurdles that cause you to step back and scratch your head. I hope the book helps smooth the bumps and provides you with enough information to easily jump over those hurdles. I look forward to seeing your works on the Web and hope to bump into you at an upcoming DrupalCon.

I will end on a note of carefree abandon—learn to steal! Once you’ve learned the pieces of the puzzle and how to combine them, there is very little new to invent. Every new idea you discover is a mere permutation of the old ideas. And ideas are free! Every cool feature discussed on TV shows or presented in the brochures or web sites of commercial HA companies can be taken, adapted, and implemented with the information presented here using very little effort. And then you will graduate from an automated home to a smart home to a personalized smart home!