

Real-World Solutions for Developing High-Quality PHP Frameworks and Applications

REAL-WORLD SOLUTIONS FOR DEVELOPING HIGH-QUALITY PHP FRAMEWORKS AND APPLICATIONS

FOREWORD .	xxi
INTRODUCTIO	N xxiii
► PART I	FOUNDATIONS
CHAPTER 1	Software Quality
CHAPTER 2	Software Testing
► PART II	BEST PRACTICES
CHAPTER 3	TYPO3: The Agile Future of a Ponderous Project
CHAPTER 4	Unit Testing Bad Practices
CHAPTER 5	Quality Assurance at Digg Inc
► PART III	SERVERS AND SERVICES
CHAPTER 6	Testing Service-Oriented APIs115
CHAPTER 7	Testing a WebDAV Server131
► PART IV	ARCHITECTURE
CHAPTER 8	Testing symfony and symfony Projects
CHAPTER 9	Testing the ezcGraph Component
CHAPTER 10	Testing Database Interaction
► PART V	Q&A IN THE LARGE
CHAPTER 11	Quality Assurance at studiVZ225
CHAPTER 12	Continuous Integration
CHAPTER 13	swoodoo: A True Agile Story
► PART VI	NON-FUNCTIONAL ASPECTS
CHAPTER 14	Usability
CHAPTER 15	Performance Testing

CHAPTER 16	Security	341
CHAPTER 17	Conclusion	357
BIBLIOGRAPH	Y	359
INDEX		365

Real-World Solutions for Developing High-Quality PHP Frameworks and Applications

Real-World Solutions for Developing High-Quality PHP Frameworks and Applications

Sebastian Bergmann Stefan Priebsch



Real-World Solutions for Developing High-Quality PHP Frameworks and Applications

Published by Wiley Publishing, Inc. 10475 Crosspoint Boulevard Indianapolis, IN 46256 www.wiley.com

Copyright © 2011 by Sebastian Bergmann and Stefan Priebsch

Published by Wiley Publishing, Inc., Indianapolis, Indiana

Published simultaneously in Canada

ISBN: 978-0-470-87249-9 ISBN: 978-1-118-09822-6 ISBN: 978-1-118-09824-0 ISBN: 978-1-118-09823-3

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at http://www.wiley.com/go/permissions.

Limit of Liability/Disclaimer of Warranty: The publisher and the author make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation warranties of fitness for a particular purpose. No warranty may be created or extended by sales or promotional materials. The advice and strategies contained herein may not be suitable for every situation. This work is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional services. If professional assistance is required, the services of a competent professional person should be sought. Neither the publisher nor the author shall be liable for damages arising herefrom. The fact that an organization or Web site is referred to in this work as a citation and/or a potential source of further information does not mean that the author or the publisher endorses the information the organization or Web site may provide or recommendations it may make. Further, readers should be aware that Internet Web sites listed in this work may have changed or disappeared between when this work was written and when it is read.

For general information on our other products and services please contact our Customer Care Department within the United States at (877) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Control Number: 2010939958

Trademarks: Wiley, the Wiley logo, Wrox, the Wrox logo, Programmer to Programmer, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates, in the United States and other countries, and may not be used without written permission. All other trademarks are the property of their respective owners. Wiley Publishing, Inc., is not associated with any product or vendor mentioned in this book.

ABOUT THE AUTHORS

SEBASTIAN BERGMANN (thePHP.cc) holds a degree in computer science and is a pioneer in the field of quality assurance in PHP projects. His test framework, PHPUnit, is a de facto standard. He is actively involved in the development of PHP and is the creator of various development tools. Sebastian Bergmann is an internationally sought-after expert. As an author, he shares his long-standing experience in books and articles. He is a frequent speaker at conferences around the world.

STEFAN PRIEBSCH (thePHP.cc) is a co-founder and Principal Consultant with thePHP.cc. He holds a degree in computer science and is the author of various books and technical articles. As a consultant, he helps customers to improve development processes and make better use of PHP, with a focus on software architecture, OOP, design patterns, and tools and methods. Stefan is a frequent speaker at IT conferences around the world.

CREDITS

EXECUTIVE EDITOR

Carol Long

PROJECT EDITOR

Tom Dinse

CONSULTING AND TECHNICAL EDITOR

Elizabeth Naramore

PRODUCTION EDITOR

Daniel Scribner

COPY EDITOR

Gwenette Gaddis

EDITORIAL DIRECTOR

Robyn B. Siesky

EDITORIAL MANAGER

Mary Beth Wakefield

FREELANCER EDITORIAL MANAGER

Rosemarie Graham

ASSOCIATE DIRECTOR OF MARKETING

Ashley Zurcher

PRODUCTION MANAGER

Tim Tate

VICE PRESIDENT AND EXECUTIVE GROUP

PUBLISHER

Richard Swadley

VICE PRESIDENT AND EXECUTIVE PUBLISHER

Barry Pruett

ASSOCIATE PUBLISHER

Jim Minatel

PROJECT COORDINATOR, COVER

Katherine Crocker

PROOFREADER

Louise Watson, Paul Sagan,

Word One New York

INDEXER

Ron Strauss

COVER DESIGN

Michael E. Trent

COVER IMAGE

© istockphoto.com/Dmitry Mordvintsev

CONTENTS

FOREWORD	XXI
INTRODUCTION	xxiii
PART I: FOUNDATIONS	
CHAPTER 1: SOFTWARE QUALITY	3
External Quality	4
Internal Quality	5
Technical Debt	5
Constructive Quality Assurance	7
Clean Code	8
Explicit and Minimal Dependencies	9
Clear Responsibilities	9
No Duplication	9
Short Methods with Few Execution Branches	9
Software Metrics	10
Cyclomatic Complexity and npath Complexity	10
Change Risk Anti-Patterns (CRAP) Index	11
Non-Mockable Total Recursive Cyclomatic Complexity	11
Global Mutable State	11
Cohesion and Coupling	12
Tools	12
PHPUnit	12
phploc	12
PHP Copy-Paste-Detector (phpcpd)	12
PHP Dead Code Detector (phpdcd)	13
PHP_Depend (pdepend)	13
PHP Mess Detector (phpmd)	13
PHP_CodeSniffer (phpcs)	13
bytekit-cli	13
PHP_CodeBrowser (phpcb)	13
CruiseControl and phpUnderControl	13
Hudson	14
Arbit	14
Conclusion	14

CHAPTER 2: SOFTWARE TESTING	15
Black Box and White Box Tests	15
How Many Tests Are Needed?	16
System Tests	17
Browser Testing	17
Automated Tests	18
Test Isolation	19
Acceptance Tests	20
Limits of System Tests	20
Unit Tests	21
Return Values	23
Dependencies	24
Side Effects	25
Real-Life Example	25
Analyzing the Code to Test	28
Setting Up a Test Environment	29
Avoid Global Dependencies	31
Test Independently from Data Sources	32
Testing Asynchronous Events	37
Storing Changes in the Database	41
Unpredictable Results	42
Encapsulating Input Data	44
Further Reflections	45
Conclusion	46
PART II: BEST PRACTICES	
OLIABTED A TYPOS THE AGUE FUTURE	
CHAPTER 3: TYPO3: THE AGILE FUTURE OF A PONDEROUS PROJECT	49
Introduction	49
The History of TYPO3: Thirteen Years in Thirteen Paragraphs	49
Daring to Start Over!	51
Our Experience with Testing	51
Policies and Techniques	52
Bittersweet Elephant Pieces	53
Test-Driven Development	53
Tests as Documentation	54
Continuous Integration	55

Clean Code	56
Refactoring	57
Programming Guidelines	58
Domain-Driven Design	59
Course of Action in Development	60
Developing New Code	60
Extending and Modifying Code	61
Optimizing Code	61
Speed	61
Readability	63
Finding and Fixing Bugs	63
Disposing of Old Code	63
Test Recipes	64
Inadvertently Functional Unit Test	64
Access to the File System	64
Constructors in Interfaces	65
Testing Abstract Classes	66
Testing Protected Methods	66
Use of Callbacks	68
Into the Future	69
CHAPTER 4: UNIT TESTING BAD PRACTICES	71
Why Test Quality Matters	71
Bad Practices and Test Smells	72
Duplication in Test Code	73
Assertion Roulette and Eager Test	74
Fragile Test	76
Obscure Test	78
Problems with Global State	78
Indirect Testing	80
Obscure Test Names	82
Lying Test	83
Slow Test	84
Conditional Logic in Tests	85
Self-validating Tests	87
Web-surfing Tests	87
Mock Overkill	88
Skip Epidemic	90

CHAPTER 5: QUALITY ASSURANCE AT DIGG INC.	91
Problems We Are Facing	91
Legacy Code Base	92
How Do We Solve These Problems?	93
Size Does Matter	93
Team Size	94
Project Size	94
Code Size	94
Unit Testing and You	94
Choosing a Testing Framework	95
Working with an Expert	95
One Week in a Room	95
Training Our Team	95
Writing Testable Code	98
Avoid Static Methods	98
Dependency Injection	100
Mock Objects	100
Overview	100
Database	101
Loosely Coupled Dependencies	101
Subject/Observer for Testing Class Internals	102
Memcached	103
Mocking a Service-Oriented Architecture	104
Model	104
Service Query	105
Service Endpoint	105
The Base Classes	105
Digg's Quality Assurance Process	107
Testing	108
Planning the Testing Effort	108
Tasks	108
Automation	108
Benefits	109
Testing Early	109
Testing Often	109
Challenges	110
Conclusion	111

PART III: SERVERS AND SERVICES	
CHAPTER 6: TESTING SERVICE-ORIENTED APIS	115
The Problems	117
Solutions	118
API Credentials	118
API Limits	121
Offline Testing of Service Protocols	122
Offline Testing of Concrete Services	126
Conclusion	130
CHAPTER 7: TESTING A WEBDAV SERVER	131
About the eZ WebDAV Component	131
WebDAV	131
Architecture	133
Development Challenges	135
Requirements Analysis	135
TDD after RFC	136
Testing a Server	137
Automated Acceptance Tests with PHPUnit	139
Capturing Test Trails	140
Test Recipe	141
Integration into PHPUnit	142
A Custom Test Case	142
The Acceptance Test Suite	146
Acceptance Tests by Example	147
Conclusion	149
PART IV: ARCHITECTURE	
CHAPTER 8: TESTING SYMFONY AND SYMFONY PROJECTS	153
Testing a Framework	154
The symfony Release Management Process	154
Long-term Support	154
Code Coverage	155
Tests versus Real Code	155