

# Contents

<b>1</b>	<b>Introduction</b>	1
1.1	Software Testing	1
1.1.1	Regression Testing	2
1.1.2	Unit Testing	4
1.1.3	Distributed Testing	5
1.2	Cloud Computing	5
1.2.1	Cloud Services	7
1.2.2	Cloud Providers	8
1.2.3	Cloud Types	10
1.3	System Migration	11
1.3.1	Legacy Systems	11
1.3.2	Migration Techniques	12
1.3.3	SMART	13
1.4	The Problem of Lengthy Test Execution Times	15
1.5	Software Testing in the Cloud	16
<b>2</b>	<b>SMART-T: Migrating Testing to the Cloud</b>	19
2.1	SMART-T	19
2.2	Why Migrate Testing to the Cloud	21
2.2.1	Making Testing Faster	22
2.2.2	Making Testing Cheaper	23
2.2.3	Making Testing Better	24
2.3	When to Migrate Testing to the Cloud	26
2.3.1	Characteristics of the Application	27
2.3.2	Types of Testing	28
2.3.3	Cloud-Based Test Execution Environment	30
2.4	How to Migrate Testing to the Cloud	31
2.4.1	Trial Migration	32
2.4.2	Actual Migration	33
2.5	Summary	34

- 3 HadoopUnit: Test Execution in the Cloud** . . . . . 37
  - 3.1 Hadoop . . . . . 37
    - 3.1.1 Hadoop Distributed File System . . . . . 39
    - 3.1.2 MapReduce . . . . . 40
    - 3.1.3 How Hadoop Works . . . . . 43
  - 3.2 Design of HadoopUnit . . . . . 45
    - 3.2.1 Test Case Extraction . . . . . 46
    - 3.2.2 The Map Function. . . . . 46
    - 3.2.3 The Reduce Function. . . . . 47
  - 3.3 Implementation of HadoopUnit . . . . . 47
  - 3.4 Using HadoopUnit. . . . . 49
    - 3.4.1 Install HadoopUnit on Master. . . . . 49
    - 3.4.2 Configure HadoopUnit for Test Execution . . . . . 50
    - 3.4.3 Execute Test Cases Using HadoopUnit . . . . . 51
  - 3.5 Summary . . . . . 52
  
- 4 Case Studies** . . . . . 55
  - 4.1 JUnit . . . . . 56
    - 4.1.1 Generated Test Cases . . . . . 56
    - 4.1.2 Hadoop . . . . . 59
    - 4.1.3 Spring . . . . . 63
  - 4.2 GCC . . . . . 64
    - 4.2.1 Business Drivers . . . . . 64
    - 4.2.2 Technical Factors . . . . . 65
    - 4.2.3 Trial Migration . . . . . 65
    - 4.2.4 Actual Migration. . . . . 68
    - 4.2.5 Results. . . . . 68
  - 4.3 XYZ . . . . . 70
    - 4.3.1 Business Drivers . . . . . 70
    - 4.3.2 Technical Factors . . . . . 70
    - 4.3.3 Discussion . . . . . 73
  - 4.4 Threats to Validity. . . . . 74
    - 4.4.1 The Application Under Test . . . . . 74
    - 4.4.2 The Type of Tests Executed. . . . . 76
    - 4.4.3 Changes Made During Migration . . . . . 77
  - 4.5 Summary . . . . . 78
  
- 5 Conclusions** . . . . . 79
  - 5.1 Summary of Results. . . . . 79
    - 5.1.1 Migrating to the Cloud . . . . . 80
    - 5.1.2 Test Execution in the Cloud. . . . . 80
  - 5.2 Lessons Learned . . . . . 82
    - 5.2.1 Migrating Testing to the Cloud. . . . . 82
    - 5.2.2 Test Execution in the Cloud. . . . . 83
  - 5.3 Closing Remarks . . . . . 85

Contents	xv
<b>Appendix: SMART-T Questionnaire</b> .....	87
<b>References</b> .....	95
<b>About the Authors.</b> .....	103



<http://www.springer.com/978-3-642-32121-4>

Software Testing in the Cloud

Migration and Execution

Tilley, S.; Parveen, T.

2012, XV, 103 p. 40 illus., Softcover

ISBN: 978-3-642-32121-4