

Table of Contents

Preface	ix
Chapter 1. Introduction	1
1.1. Motivation	1
1.2. The problems	4
1.3. Summary of contributions	9
1.4. The organization of this book	11
Chapter 2. Current Approaches for Resource Optimization and Security	13
2.1. Service availability	14
2.2. Trustworthiness	16
2.3. Performance	18
2.4. The resource optimization problem subject to an SLA	20
2.5. Public-key cryptography-based authentication	22
Chapter 3. Single Class Customers	27
3.1. The percentile of response time	28
3.2. A resource optimization problem for service models with single-class customers	29
3.3. Approaches for the resource optimization	31

3.4. Numerical validations	38
3.5. The balanced condition	43
3.6. Services Performance Modeling and Analysis in a Simple Scenario of Cloud Computing	49
3.6.1. Overview	50
3.6.2. A computer service performance model	54
3.6.3. A numerical validation	62
3.6.4. Discussions	65
3.7. Concluding remarks	66
Chapter 4. Multiple-Class Customers	69
4.1. The SLA performance metric in the case of multiple class customers	70
4.2. The resource optimization problem for multiple customer services	71
4.2.1. Resource optimization problem for multiple class customers	72
4.3. Approaches for resource optimization	72
4.3.1. The LSTs of response time distributions for two priority customers	72
4.3.2. Algorithms for the resource optimization problem	77
4.4. Numerical validations	86
4.5. Concluding remarks	93
Chapter 5. A Trustworthy Service Model	95
5.1. The trust-based resource optimization problem	96
5.2. A framework for solving the trust-based resource provisioning problem	99
5.3. The calculation of SLA metrics	104
5.3.1. The trustworthiness of resource sites	104
5.3.2. The percentile response time	108
5.3.3. The service availability	110
5.4. An approach for solving the trust-based resource provisioning problem	111

5.4.1. Single-class customers	112
5.4.2. Multiple priority customers	120
5.5. Numerical examples	130
5.5.1. Single-class customers	130
5.5.2. Multiple priority customers	134
5.6. Concluding remarks	138
Chapter 6. Performance Analysis of Public-Key Cryptography-Based Group Authentication	141
6.1. Public-key cryptography-based authentication	142
6.2. PKCROSS and PKTAPP	144
6.2.1. Protocol analysis	145
6.2.2. The calculation of the response time via queuing networks	150
6.3. A new group authentication technique using public-key cryptography	156
6.3.1. A single remote realm	156
6.3.2. Multiple remote realms	161
6.4. Performance evaluation of the new proposed technique	163
6.4.1. The operations of encryption and decryption	163
6.4.2. The calculation of the response time via a queuing network	167
6.4.3. Discussions	170
6.5. Concluding remarks	171
Chapter 7. Summary and Future Work	173
7.1. Research summary of the book	173
7.2. Future research directions	176
Bibliography	181
Index	193