

# Contents

- 1 Introduction** ..... 1
- 2 Cloud Computing**..... 9
  - 2.1 Definitions ..... 9
  - 2.2 Related Technologies for Cloud Computing ..... 11
  - 2.3 Cloud Service Models..... 14
  - 2.4 Cloud Deployment Models ..... 15
  - 2.5 Public Cloud Platforms: State-of-the-Art ..... 16
  - 2.6 Business Benefits of Cloud Computing ..... 19
- 3 Cloud-Hosted Data Storage Systems** ..... 21
  - 3.1 Introduction..... 21
  - 3.2 NoSQL Key Systems..... 23
  - 3.3 NoSQL Open Source Projects ..... 29
  - 3.4 Database-as-a-Service..... 32
  - 3.5 Virtualized Database Servers ..... 39
  - 3.6 Web Scale Data Management: Trade-Offs ..... 39
  - 3.7 Discussion and Conclusions ..... 42
- 4 Performance Evaluation Framework of Cloud Platforms** ..... 47
  - 4.1 The CARE Framework..... 48
  - 4.2 Application of CARE to Cloud Platform Evaluation ..... 54
  - 4.3 Experiment Results and Exception Analysis..... 55
  - 4.4 Discussion ..... 65
- 5 Database Replication of NoSQL Database-as-a-Service** ..... 67
  - 5.1 Architecture of Benchmark Application ..... 67
  - 5.2 Staleness of Data on Different Cloud Platforms ..... 69
  - 5.3 Trade-Off Analysis of Amazon SimpleDB ..... 74
  - 5.4 Discussion ..... 78

<b>6</b>	<b>Replicating Virtualized Database Servers</b>	81
6.1	Design of Benchmark Application	82
6.2	Implementation of Benchmark Application	86
6.3	Trade-Off Analysis of Virtualized Database Servers	87
6.4	Discussion	95
<b>7</b>	<b>SLA-Driven Database Replication on Virtualized Database Servers</b>	97
7.1	SLA Management for Virtualized Database Servers	98
7.2	Architecture of SLA Management Framework	101
7.3	Implementation of SLA Management Framework	105
7.4	Evaluation of SLA Management Framework	107
7.5	Provisioning the Database Tier Based on SLA of Transaction Response Times	114
7.6	Related work	117
7.7	Discussion	118
<b>8</b>	<b>QoS-Aware Service Compositions in Cloud Computing</b>	119
8.1	Preliminaries	120
8.2	QoS-Aware Service Composition in Cloud Computing	124
8.3	Experiment and Evaluation	128
8.4	Related Work	131
8.5	Conclusion	133
<b>9</b>	<b>Big Data Processing Systems</b>	135
9.1	Introduction	135
9.2	MapReduce Framework: Basic Architecture	137
9.3	Extensions and Enhancements of the MapReduce Framework	140
9.4	Systems of Declarative Interfaces for the MapReduce Framework	163
9.5	Conclusions	175
<b>10</b>	<b>Conclusions</b>	177
10.1	True Elasticity	177
10.2	Data Replication and Consistency Management	179
10.3	SLA Management	182
10.4	Transaction Support	184
10.5	Summary	186
	<b>References</b>	191

Cloud Data Management

Zhao, L.; Sakr, S.; Liu, A.; Bouguettaya, A.

2014, XIX, 202 p. 86 illus., 50 illus. in color., Hardcover

ISBN: 978-3-319-04764-5