

Table of Contents

Foreword	xvii
Preface	xix
Acknowledgment	xxv

Section 1 Theory

Chapter 1

Toward Cloud Federation: Concepts and Challenges.....	1
<i>Antonio Celesti, Università Degli Studi di Messina, Italy</i>	
<i>Francesco Tusa, Università Degli Studi di Messina, Italy</i>	
<i>Massimo Villari, Università Degli Studi di Messina, Italy</i>	

Chapter 2

Interoperable Resource Management for Establishing Federated Clouds.....	18
<i>Gabor Kecskemeti, Laboratory of Parallel and Distributed Systems of the MTA-SZTAKI, Hungary</i>	
<i>Attila Kertesz, Laboratory of Parallel and Distributed Systems of the MTA-SZTAKI, Hungary</i>	
<i>Attila Marosi, Laboratory of Parallel and Distributed Systems of the MTA-SZTAKI, Hungary</i>	
<i>Peter Kacsuk, Laboratory of Parallel and Distributed Systems of the MTA-SZTAKI, Hungary</i>	

Chapter 3

Understanding Decentralized and Dynamic Brokerage in Federated Cloud Environments.....	36
<i>Nicolò Maria Calcavecchia, Politecnico di Milano, Italy</i>	
<i>Antonio Celesti, Universit Degli Studi di Messina, Italy</i>	
<i>Elisabetta Di Nitto, Politecnico di Milano, Italy</i>	

Chapter 4

Implementing Distributed, Self-Managing Computing Services Infrastructure using a Scalable, Parallel and Network-Centric Computing Model.....	57
<i>Rao Mikkilineni, Kawa Objects Inc., USA</i>	
<i>Giovanni Morana, DIEEI, University of Catania, Italy</i>	
<i>Ian Seyler, Return Infinity Inc., Canada</i>	

Chapter 5	
The Cloud@Home Volunteer and Interoperable Cloud through the Future Internet.....	79
<i>Salvatore Distefano, Politecnico di Milano, Italy</i>	
<i>Antonio Puliafito, Università degli Studi di Messina, Italy</i>	
Chapter 6	
Cloud Monitoring.....	97
<i>Peer Hasselmeyer, NEC Laboratories Europe, Germany</i>	
<i>Gregory Katsaros, National Technical University of Athens, Greece</i>	
<i>Bastian Koller, High Performance Computing Centre Stuttgart, Germany</i>	
<i>Philipp Wieder, Gesellschaft fuer wissenschaftliche Datenverarbeitung mbH Goettingen, Germany</i>	
Chapter 7	
Monitoring in Federated and Self-Manageable Clouds	117
<i>Stefanos Koutsoutsos, National Technical University of Athens, Greece</i>	
<i>Spyridon V. Gogouvitis, National Technical University of Athens, Greece</i>	
<i>Dimosthenis Kyriazis, National Technical University of Athens, Greece</i>	
<i>Theodora Varvarigou, National Technical University of Athens, Greece</i>	
Chapter 8	
Availability Analysis of IaaS Cloud Using Analytic Models.....	134
<i>Francesco Longo, Università degli Studi di Messina, Italia</i>	
<i>Rahul Ghosh, Duke University, USA</i>	
<i>Vijay K. Naik, IBM T. J. Watson Research Center, USA</i>	
<i>Kishor S. Trivedi, Duke University, USA</i>	
Chapter 9	
The Security of Cloud Infrastructure	158
<i>Massimo Civilini, Cisco Systems® Inc., USA</i>	
Chapter 10	
Security Issues in Cloud Federations.....	176
<i>Massimiliano Rak, Second University of Naples, Italy</i>	
<i>Massimo Ficco, Second University of Naples, Italy</i>	
<i>Jesus Luna, TU Darmstadt, Germany</i>	
<i>Hamza Ghani, TU Darmstadt, Germany</i>	
<i>Neeraj Suri, TU Darmstadt, Germany</i>	
<i>Silviu Panica, Institute e-Austria Timisoara, Romania</i>	
<i>Dana Petcu, Institute e-Austria Timisoara, Romania</i>	

Section 2 Practice

Chapter 11

On the use of the Hybrid Cloud Computing Paradigm..... 196

Carlos Martín Sánchez, Complutense University of Madrid, Spain

Daniel Molina, Complutense University of Madrid, Spain

Rafael Moreno Vozmediano, Complutense University of Madrid, Spain

Ruben S. Montero, Complutense University of Madrid, Spain

Ignacio M. Llorente, Complutense University of Madrid, Spain

Chapter 12

CLEVER: A Cloud Middleware Beyond the Federation..... 219

Francesco Tusa, Università degli Studi di Messina, Italy

Maurizio Paone, Università degli Studi di Messina, Italy

Massimo Villari, Università degli Studi di Messina, Italy

Chapter 13

Monitoring Services in a Federated Cloud: The RESERVOIR Experience 242

Stuart Clayman, University College London, UK

Giovanni Toffetti, University College London, UK

Alex Galis, University College London, UK

Clovis Chapman, University College London, UK

Chapter 14

Achieving Flexible SLA and Resource Management in Clouds 266

Vincent C. Emeakaroha, Vienna University of Technology, Austria

Marco A. S. Netto, IBM Research, Brazil

Rodrigo N. Calheiros, The University of Melbourne, Australia

César A. F. De Rose, PUCRS, Brazil

Chapter 15

Resource Management Mechanisms to Support SLAs in IaaS Clouds 288

David Breitgand, IBM Haifa Research Lab, Israel

Amir Epstein, IBM Haifa Research Lab, Israel

Benny Rochwerger, IBM Haifa Research Lab, Israel

Chapter 16

Economic Analysis of the SLA Mapping Approach for Cloud Computing Goods 308

Michael Maurer, Vienna University of Technology, Austria

Vincent C. Emeakaroha, Vienna University of Technology, Austria

Ivona Brandic, Vienna University of Technology, Austria

Chapter 17	
Deploying and Running Enterprise Grade Applications in Federated Cloud	328
<i>Benoit Hudzia, SAP, UK</i>	
<i>Jonathan Sinclair, SAP, UK</i>	
<i>Maik Lindner, SAP, UK</i>	
Chapter 18	
Towards Energy-Efficient, Scalable, and Resilient IaaS Clouds	350
<i>Eugen Feller, INRIA Centre Rennes - Bretagne Atlantique, France</i>	
<i>Louis Rilling, Kerlabs, France</i>	
<i>Christine Morin, INRIA Centre Rennes - Bretagne Atlantique, France</i>	
Chapter 19	
Self-Management of Applications and Systems to Optimize Energy in Data Centers	372
<i>Frederico Alvares de Oliveira Jr., ASCOLA Research Team (INRIA-Mines Nantes, LINA), France</i>	
<i>Adrien Lèbre, ASCOLA Research Team (INRIA-Mines Nantes, LINA), France</i>	
<i>Thomas Ledoux, ASCOLA Research Team (INRIA-Mines Nantes, LINA), France</i>	
<i>Jean-Marc Menaud, ASCOLA Research Team (INRIA-Mines Nantes, LINA), France</i>	
Chapter 20	
Access Control in Federated Clouds: The Cloudgrid Case Study	395
<i>Valentina Casola, University of Naples “Federico II”, Italy</i>	
<i>Antonio Cuomo, University of Sannio, Italy</i>	
<i>Umberto Villano, University of Sannio, Italy</i>	
<i>Massimiliano Rak, Second University of Naples, Italy</i>	
Compilation of References	418
About the Contributors	445
Index	460