

Autonomic Computing

*Concepts, Infrastructure,
and Applications*

Edited by

Manish Parashar

Salim Hariri



CRC Press
Taylor & Francis Group

Contents

Part I	The Autonomic Computing Paradigm	1
1	Overview of Autonomic Computing: Origins, Evolution, Direction	3
	<i>Alan Ganek</i>	
2	A Requirements Engineering Perspective on Autonomic Systems Development	19
	<i>David W. Bustard and Roy Sterritt</i>	
3	Autonomic Computing: A System-Wide Perspective	35
	<i>Robbert van Renesse and Kenneth P. Birman</i>	
4	Autonomic Grid Computing: Concepts, Requirements, and Infrastructure	49
	<i>Manish Parashar</i>	
5	Architecture Overview for Autonomic Computing	71
	<i>John W. Sweitzer and Christine Draper</i>	
Part II	<i>Self-*</i> Properties — Approaches and Infrastructures	99
6	A Taxonomy for <i>Self-*</i> Properties in Decentralized Autonomic Computing	101
	<i>Tom De Wolf and Tom Holvoet</i>	
7	Exploiting Emergence in Autonomic Systems	121
	<i>Richard Anthony, Alun Butler, and Mohammed Ibrahim</i>	
8	A Control-Based Approach to Autonomic Performance Management in Computing Systems	149
	<i>Sherif Abdelwahed and Nagarajan Kandasamy</i>	
9	Transparent Autonomization in Composite Systems	169
	<i>S. Masoud Sadjadi and Philip K. McKinley</i>	

10	Recipe-Based Service Configuration and Adaptation <i>Peter Steenkiste and An-Cheng Huang</i>	189
Part III Achieving <i>Self-*</i> Properties — Enabling Systems, Technologies, and Services		209
11	A Programming System for Autonomic Self-Managing Applications <i>Hua Liu and Manish Parashar</i>	211
12	A Self-Configuring Service Composition Engine <i>Thomas Heinis, Cesare Pautasso, and Gustavo Alonso</i>	237
13	Dynamic Collaboration in Autonomic Computing <i>David M. Chess, James E. Hanson, Jeffrey O. Kephart, Ian Whalley, and Steve R. White</i>	253
14	AutoFlow: Autonomic Information Flows for Critical Information Systems <i>Karsten Schwan, Brian F. Cooper, Greg Eisenhauer, Ada Gavrilovska, Matt Wolf, Hasan Abbasi, Sandip Agarwala, Zhongtang Cai, Vibhore Kumar, Jay Lofstead, Mohamed Mansour, Balasubramanian Seshasayee, and Patrick Widener</i>	275
15	Scalable Management — Technologies for Management of Large-Scale, Distributed Systems <i>Robert Adams, Paul Brett, Subu Iyer, Dejan Milojicic, Sandro Rafaeli, and Vanish Talwar</i>	305
16	Platform Support for Autonomic Computing: A Research Vehicle <i>Lenitra Durham, Milan Milenkovic, Phil Cayton, and Mazin Yousif</i>	329
Part IV Realization of <i>Self*</i> Properties		351
17	Dynamic Server Allocation for Autonomic Service Centers in the Presence of Failures <i>Daniel A. Menascé and Mohamed N. Bennani</i>	353
18	Effecting Runtime Reconfiguration in Managed Execution Environments <i>Rean Griffith, Giuseppe Valetto, and Gail Kaiser</i>	369

19	Self-Organizing Scheduling on the Organic Grid	389
	<i>Arjav Chakravarti, Gerald Baumgartner, and Mario Lauria</i>	
20	Autonomic Data Streaming for High-Performance Scientific Applications	413
	<i>Viraj Bhat, Manish Parashar, and Nagarajan Kandasamy</i>	
21	Autonomic Power and Performance Management of Internet Data	435
	<i>Bithika Khargharia and Salim Hariri</i>	
22	Trace Analysis for Fault Detection in Application Servers	471
	<i>Guofei Jiang, Haifeng Chen, Cristian Ungureanu, and Kenji Yoshihira</i>	
23	Anomaly-Based Self Protection against Network Attacks	493
	<i>Guangzhi Qu and Salim Hariri</i>	
	Index	523