

Table of Contents

Part I. Coordination Models and Languages: State of the Art

Introduction	3
1. Coordination Models: A Guided Tour	
Nadia Busi, Paolo Ciancarini, Roberto Gorrieri, and Gianluigi Zavattaro	6
1.1 Introduction and Motivation	6
1.2 The Starting Point: The Dataspace Model for Coordinating Agents	9
1.3 Extending the Coordination Primitives	12
1.4 Reshaping the Coordination Media	17
1.5 Programming the Coordination Rules	21
1.6 Conclusions	23
2. Models and Technologies for the Coordination of Internet Agents: A Survey	
George A. Papadopoulos	25
2.1 Introduction	25
2.2 Basic Coordination Infrastructure	28
2.3 Coordination Frameworks	38
2.4 Logical Coordination	49
2.5 Conclusions	54

Part II. Basic Enabling Technologies

Introduction	59
3. Run-Time Systems for Coordination	
Antony Rowstron	61
3.1 Introduction	61
3.2 Coordination Systems in General	62
3.3 Taxonomy of Tuple-based Run-time Systems	64

XVIII Table of Contents

3.4	LAN and Parallel Computing Implementations: The First and Second Generation	67
3.5	Open Implementation Techniques	69
3.6	Adding Explicit Information to Linda Programs	74
3.7	From LAN to WAN: The Third Generation	75
3.8	The Future: The Tuple Mega-Server?	79
3.9	Conclusions	82
4.	Tuple-based Technologies for Coordination	
	Davide Rossi, Giacomo Cabri, and Enrico Denti	83
4.1	The Origins	83
4.2	Towards Open Distributed Systems: A Taxonomy for Linda-derived Systems	85
4.3	Systems Extending Primitives	88
4.4	Systems Adding Programmability	97
4.5	Systems Modifying the Model	105
4.6	Conclusions	109
5.	Middleware Technologies: CORBA and Mobile Agents	
	Paolo Bellavista and Thomas Magedanz	110
5.1	Middleware Technologies for Open and Global Distributed Systems	110
5.2	Common Object Request Broker Architecture (CORBA)	114
5.3	Mobile Agents	122
5.4	Middleware Technologies: the Integration of MA and CORBA	129
5.5	CORBA/MA Integrated Supports: Grasshopper and SOMA .	139
5.6	Concluding Remarks	151
6.	Agent Coordination via Scripting Languages	
	Jean-Guy Schneider, Markus Lumpe, and Oscar Nierstrasz	153
6.1	Introduction	153
6.2	A Conceptual Framework for Software Composition	155
6.3	Scripting Languages at a Glance	160
6.4	Scripting in Practice	167
6.5	Summary, Conclusions	174

Part III. High-Level Enabling Coordination Technologies

Introduction	179
7. Coordinating Agents using Agent Communication Languages Conversations	
R. Scott Cost, Yannis Labrou, and Tim Finin	183
7.1 Introduction	183
7.2 From Agent Communication Languages to Conversation Protocols	185
7.3 Coordination using Conversation Protocols	187
7.4 Modeling Conversation Protocols with Colored Petri Nets ...	188
7.5 Advantages for Coordination when using CPN-described Conversations	193
7.6 Related Work	194
7.7 Conclusions	195
8. Brokering and Matchmaking for Coordination of Agent Societies: A Survey	
Matthias Klusch and Katia Sycara	197
8.1 Introduction	197
8.2 Coordination of Agent Societies via Middle-Agents	198
8.3 Examples of Coordination via Service Matchmaking and Brokering	212
8.4 Conclusions	223
9. Agent Naming and Coordination: Actor Based Models and Infrastructures	
Gul Agha, Nadeem Jamali, and Carlos Varela	225
9.1 Introduction	225
9.2 Actors and Agents	227
9.3 Naming in Open Systems	230
9.4 World Wide Computer Prototype	234
9.5 Multiagent Coordination	238
9.6 Discussion	245

Part IV. Emerging Issues of Coordination

Introduction	249
10. Coordination and Mobility	
Gruia-Catalin Roman, Amy L. Murphy, and Gian Pietro Picco ...	253
10.1 Introduction	253
10.2 Mobility Issues	255
10.3 Coordination Constructs	263
10.4 Conclusions	272
11. Coordination and Security on the Internet	
Ciarán Bryce and Marco Cremonini	274
11.1 Introduction	274
11.2 A Reference Architecture for Secure Coordination	275
11.3 Security Policies	279
11.4 Cryptographic Protocols in Coordination Models	288
11.5 Security in Existing Coordination Systems	291
11.6 Conclusions	297
12. Scalability in Linda-like Coordination Systems	
Ronaldo Menezes, Robert Tolksdorf, and Alan M. Wood	299
12.1 Introduction	299
12.2 Domain Awareness	301
12.3 Location and Distance Awareness	306
12.4 Fluctuation Awareness	312
12.5 Failure Awareness	315
12.6 Conclusions	318

Part V. Applications of Coordination Technology

Introduction	323
13. Agent-Oriented Software Engineering for Internet Applications	
Franco Zambonelli, Nicholas R. Jennings, Andrea Omicini, and Michael J. Wooldridge	326
13.1 Introduction	326
13.2 Engineering Multi-Agent Systems on the Internet	328
13.3 Software Engineering Methodologies for MAS	333
13.4 Exploiting a Coordination Model	339

13.5	Toward a Coordination-oriented Methodology	343
13.6	Conclusions and Future Work	345
14.	Reusable Patterns for Agent Coordination	
	Dwight Deugo, Michael Weiss, and Elizabeth Kendall	347
14.1	Software Patterns	348
14.2	Global Forces of Coordination	350
14.3	Blackboard Pattern	354
14.4	Meeting Pattern	357
14.5	Market Maker Pattern	361
14.6	Master-Slave Pattern	363
14.7	Negotiating Agents Pattern	365
14.8	Summary	368
15.	Inter-Organizational Workflows for Enterprise Coordination	
	Monica Divitini, Chihab Hanachi, and Christophe Sibertin-Blanc	369
15.1	Inter-Organizational Coordination	369
15.2	Overview of Main Concepts of Workflow	373
15.3	Inter-Organizational Workflow Requirements: A Framework for Studying IOW	380
15.4	Two Comprehensive Approaches for IOW	387
15.5	Conclusions	397
16.	Constraints Solving as the Coordination of Inference Engines	
	Eric Monfroy and Farhad Arbab	399
16.1	A Generic Approach to Coordination-based Constraint Solving	399
16.2	A Solver Cooperation Language	406
16.3	Design of a Constraint Solver	414
16.4	Conclusion	419
<hr/>		
Part VI. Visions		
<hr/>		
	Introduction	423
17.	A Market-Based Model for Resource Allocation in Agent Systems	
	Jonathan Bredin, David Kotz, Daniela Rus, Rajiv T. Maheswaran, Çagri Imer, and Tamer Başar	426
17.1	Introduction	426
17.2	Markets	427

XXII Table of Contents

17.3 Secure Transactions.....	428
17.4 Allocation Mechanism.....	431
17.5 Simulation.....	435
17.6 Related Work.....	440
17.7 Conclusions.....	441
18. Coordination and Control in Computational Ecosystems:	
A Vision of the Future	
Rune Gustavsson and Martin Fredriksson	443
18.1 Introduction	443
18.2 Towards Computational Ecosystems	444
18.3 Smart E-Services to Achieve Customer Satisfaction	446
18.4 Coordination and Control in Ecosystems	454
18.5 Methodological Issues and the Engineering of Ecosystems....	454
18.6 ORA: Merging of the Real and Virtual	458
18.7 SOLACE: A Layered ORA Architecture	465
18.8 Conclusions.....	469
References	471
About the Authors	509
List of Contributors	519

Coordination of Internet Agents

Models, Technologies, and Applications

Omicini, A.; Zambonelli, F.; Klusch, M.; Tolksdorf, R.

(Eds.)

2001, XXVII, 524 p., Hardcover

ISBN: 978-3-540-41613-5