

Contents

1	Assessing Agent Applications — r&D vs. R&d	1
	<i>Tina Balke, Benjamin Hirsch, Marco Lützenberger</i>	
1	The Case	1
2	Application Papers	3
3	Agent-Centered Conferences	4
3.1	AAMAS	4
3.2	PAAMS	7
3.3	ICAART	7
3.4	MATES	8
3.5	Summary of Conferences	9
4	The Agent Technology Journal Landscape	9
4.1	The Autonomous Agents and Multi-Agent Systems Journal	9
4.2	The General Agent Technology Journal Landscape	11
5	The Stakeholders	11
5.1	The Industry View: The Technology Adoption Life-Cycle	13
5.2	The Research View	16
5.3	The Reviewers View	16
6	Summary	17
	References	19
2	The Jadex Project: Programming Model	21
	<i>Alexander Pokahr, Lars Braubach, Kai Jander</i>	
1	Introduction	21
2	Agent Programming: BDI Architecture	22
2.1	Related Work	23
2.2	Approach	23
2.3	Application: MedPage	29
2.4	Summary	33

3	BDI in Workflows: GPMN	34
3.1	Related Work	35
3.2	Approach	36
3.3	Application	40
3.4	Summary	41
4	Agents, Components and Services: Active Components	42
4.1	Related Work	43
4.2	Approach	44
4.3	Application: JadexCloud	47
4.4	Summary	48
5	Conclusion and Outlook	49
	References	50
3	Extensible Java EE-Based Agent Framework – Past, Present, Future	55
	<i>Milan Vidaković, Mirjana Ivanović, Dejan Mitrović, Zoran Budimac</i>	
1	Introduction	55
2	An Overview of Existing <i>MAS</i> Architectures	57
2.1	ABLE	58
2.2	Aglets	58
2.3	DimaX	59
2.4	FUSION@	59
2.5	JADE	60
2.6	Voyager	60
2.7	Comparisons with <i>XJAF</i>	61
3	The <i>XJAF</i> Architecture	62
3.1	Agent Management	63
3.2	Managing Tasks	64
3.3	Agent Communication	65
3.4	Connecting Distributed <i>XJAF</i> Instances	67
3.5	Security Features of <i>XJAF</i>	68
3.6	Service Manager	69
4	Practical Applications of <i>XJAF</i>	70
4.1	Example: <i>Factorial</i> Agent	70
4.2	Distributed Library Catalogues	72
4.3	Metadata Harvesting	74
4.4	The Benefits of Using <i>XJAF</i>	76
5	Recent Improvements of the Architecture	78
5.1	Fault-Tolerant Networks of <i>XJAF</i> Instances	78
5.2	Agent Tracking Improvements	80
5.3	<i>SOM</i> : <i>SOA</i> -Based <i>MAS</i>	82
6	Conclusion and Future Work	83
	References	84

4	Agent-Based XDSL Monitoring and Optimization	89
	<i>Giovanni Caire</i>	
1	WADE	89
1.1	Distribution	90
1.2	Workflows	94
2	The xDSL Domain	97
2.1	xDSL Connectivity	98
2.2	Line Quality Management	98
3	Agent Based xDSL Monitoring and Management	99
3.1	Event Based xDSL Monitoring	100
3.2	Wants Assurance Internal Architecture	101
3.3	Dynamic Line Management	103
4	Conclusions	105
	References	105
5	The Jadex Project: Simulation	107
	<i>Lars Braubach, Alexander Pokahr</i>	
1	Introduction	107
2	Simulation Clocks	108
2.1	Related Work	109
2.2	Approach	110
2.3	Applications	113
2.4	Summary	117
3	Virtual Environments	118
3.1	Related Work	119
3.2	Approach	119
3.3	Agent-Based Simulation: City Bikes	122
3.4	Summary	125
4	Conclusion and Outlook	126
	References	127
6	Agents in Simulation of Cyberattacks to Evaluate Security of Critical Infrastructures	129
	<i>Rafał Leszczyna</i>	
1	Introduction	129
1.1	Cybersecurity of Critical Infrastructures	129
1.2	Cybersecurity Evaluation	130
1.3	Need for a Malware Simulator	131
2	Developing MAISim	132
2.1	The Choice of Agent Paradigm	132
2.2	MAISim Design	133
2.3	Design Changes during the Implementation	134

3	Completed Project	135
3.1	Attack Scenario	135
3.2	Malware Templates	135
3.3	MAISim Toolkit	138
3.4	The Life Cycle of the Experiments with MAISim	141
4	Application	141
5	Lessons Learned	142
6	Perspectives	142
	References	144
7	Simulated Multi-robot Tactical Missions in Urban Warfare	147
	<i>Peter Novák, Antonín Komenda, Michal Čáp, Jiří Vokřínek, Michal Pěchouček</i>	
1	Multi-robotics in Urban Warfare	147
2	The Project Cluster: Tactical AgentFly, Tactical AgentScout	149
2.1	Tactical AgentFly	150
2.2	Tactical AgentScout	152
3	Analysis and Design of the System	154
3.1	Initial System Requirements	155
3.2	Initial Technological Infrastructure: AgentFly	158
3.3	Initial System Architecture	163
4	System Implementation and Experiences	164
4.1	Simulation and Environment Modeling	165
4.2	Evaluation of Multi-agent Coordination Techniques	166
4.3	Scripting and Agent Control	168
4.4	User Interface and Visualization	168
4.5	Alite	169
4.6	Architectural Changes of the Technological Infrastructure Over Time	172
5	Critical Analysis of the Experience and Lessons Learned	172
5.1	Multi-agent Platform	173
5.2	Environment Simulation and Scenario Modeling	174
5.3	Experiments and Configuration	175
5.4	Agent Behavior Control	176
5.5	User Interface and Visualization	177
5.6	Towards AgentFly-In-Air	177
6	Future Perspectives and Final Remarks	180
	References	181
8	On the Development of Mobile Agent Systems for Wireless Sensor Networks: Issues and Solutions	185
	<i>Giancarlo Fortino, Stefano Galzarano</i>	
1	Introduction	186
2	Background and Related Work	187
2.1	Network Routing	187

2.2	Data Dissemination and Fusion	188
2.3	Energy-Aware Coordination	188
2.4	System Architectures, Services and Applications	189
2.5	Programming Frameworks	190
3	Requirements for MAS Development on WSNs	192
3.1	On the Use of Mobile Agents for WSN Applications	192
3.2	Requirements and Issues	194
4	MAPS and TinyMAPS	197
4.1	MAPS: Mobile Agent Platform for Sun SPOT	197
4.2	TinyMAPS	199
5	A Comparison among Java-Based MAS	200
5.1	Java-Based MASS' Characteristics Comparison	200
5.2	Performance Test Comparison between MAPS and TinyMAPS	202
5.3	Performance Test Comparison between MAPS and AFME	204
6	Lessons Learned and Open Challenges	208
7	Conclusion	211
	References	212
9	Argumentative Agents for Service-Oriented Computing	217
	<i>M. Morge, J. McGinnis, S. Bromuri, P. Mancarella, K. Stathis, F. Toni</i>	
1	Introduction	218
2	Motivation: An E-Procurement Scenario	221
3	Background on Argumentation and Protocol Language	224
3.1	MARGO	225
3.2	Protocol Language	231
4	Agent Architecture	232
4.1	Individual Decision Making	233
4.2	Social Decision Making	236
4.3	Social Interaction	238
5	Case Run	243
6	Deployment and Implementation	244
7	Related Work	247
8	Conclusion and Future Work	250
	References	251
10	Public Administration Workflows Re-engineering: An Agent-Based M&S Approach	257
	<i>Emiliano Casalicchio, Salvatore Tucci</i>	
1	Introduction	257
2	Basic Concepts	261
2.1	Workflow and WfMS	261
2.2	WF-Net	261
2.3	Agent-Based Modeling and Simulation	262

3	The Wf-Simulator	263
3.1	The Architecture	263
3.2	The Modeling Approach	266
4	Practical Experiences	268
4.1	The SABS Case Study	268
4.2	The Day Hospital Surgery Admission Case Study	270
4.3	The Blood Examination Case Study	273
5	Perspectives and Concluding Remarks	275
	References	276
	Author Index	279