Preface

Over the past three decades, software engineers have derived a progressively better understanding of the characteristics of complexity in software. It is now widely recognised that *interaction* is probably the most important single characteristic of complex software. Software architectures that contain many dynamically interacting components, each with their own thread of control, and engaging in complex coordination protocols, are typically orders of magnitude more complex to correctly and efficiently engineer than those that simply compute a function of some input through a single thread of control.

Unfortunately, it turns out that many (if not most) real-world applications have precisely these characteristics. As a consequence, a major research topic in computer science over at least the past two decades has been the development of tools and techniques to model, understand, and implement systems in which interaction is the norm. Indeed, many researchers now believe that in future computation itself will be understood as chiefly a process of interaction.

Since the 1980s, software agents and multiagent systems have grown into what is now one of the most active areas of research and development activity in computing generally. There are many reasons for the current intensity of interest, but certainly one of the most important is that the concept of an agent as an autonomous system, capable of interacting with other agents in order to satisfy its design objectives, is a natural one for software designers. Just as we can understand many systems as being composed of essentially passive objects, which have state, and upon which we can perform operations, so we can understand many others as being made up of interacting, semiautonomous agents.

This recognition has led to the growth of interest in agents as a new paradigm for software engineering. As its very successful predecessors, AOSE 2000 and AOSE 2001 (Lecture Notes in Computer Science, Volumes 1957 and 2222), the AOSE 2002 workshop seeked to examine the credentials of agent-based approaches as a software engineering paradigm, and to gain an insight into what agent-oriented software engineering will look like. AOSE 2002 was held at the First International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS) in Bologna, Italy, in July 2002. Some 49 papers were submitted to AOSE 2002, and 15 of them were accepted for presentation (which is an acceptance rate of 30 %). The submissions followed a call for papers on all aspects of agent-oriented software engineering, and particularly the following:

- Methodologies for agent-oriented analysis and design
- Relationship of AOSE to other SE paradigms (e.g., OO)
- UML and agent systems
- Agent-oriented requirements analysis and specification
- Refinement and synthesis techniques for agent-based specifications

- Verification and validation techniques for agent-based systems
- Software development environments and CASE tools for AOSE
- Standard APIs for agent programming
- Formal methods for agent-oriented systems, including specification and verification logics
- Model checking for agent-oriented systems
- Engineering large-scale agent systems
- Experiences with field-tested agent systems
- System deployment using standards such as FIPA
- Best practice in agent-oriented development
- Market and other economic models in agent systems engineering
- Practical coordination and cooperation frameworks for agent systems
- Standardisations for AOSE
- Reuse approaches for agent-oriented software, including design patterns, frameworks, components, and architectures
- Integration of agent-oriented software into existing business processes and implications for business process reengineering
- Implications of agent-oriented software on organizational and social structures within and between companies (e.g., changes in roles, responsibilities, transparency, business processes, and decision schemes)

This volume contains revised versions of the 15 papers presented at the workshop. Additionally, it contains two invited contributions, by Massimo Benerecetti and Alessandro Cimatti on "Validation of multiagent systems by symbolic model checking," and Jörg Müller and Bernhard Bauer on "Agent-oriented software technologies: flaws and remedies." We believe that this thoroughly prepared volume is of particular value to all readers interested in key topics and most recent developments in the very exciting field of agent-oriented software engineering.

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