FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

Document title:	AUML Work Plan		
Document number:	f-in-00085	**Document source:**	(see authors below)
Document status:	Draft	**Date of this status:**	2003/01/14
Change history:			
2003/01/14	Initial draft		

James Odell
email@jamesodell.com

Marian Nodine
nodine@research.telcordia.com

Problem Statement:

Multi-Agent Systems (MAS) are often characterized as extensions of object-oriented systems. This overly simplified view has often troubled system designers as they try to capture the unique features of MAS systems using OO tools. In recent years, we have seen MAS systems slowly transit from experimental "toy problems" in universities to real-life applications. Real-life implementations of complex MAS systems will not be successful if the means to model and represent these systems fail to capture and communicate their underlying meaning and complexity. A major research topic in computer science over at least the past two decades has been the development of tools and techniques to model and understand automated systems, in general. With the advent of large multiagent systems, similar techniques should be explored for MAS.

Objective

This work plan will focus on problems and notations needed to support an agent-based unified modeling language (AUML) and has the following goals:

1. Gain an insight into how agent-oriented software engineering can benefit from UML and other modeling languages. New approaches have already emerged already based on work done in software engineering. For example, designers have begun to use and to extend the Unified Modeling Language (UML) to represent agents and their interactions. At present, there exist different alternatives all based on UML: Agent UML (AUML), AOR, PASSI, and Tropos.
2. Focus on problems and notations that are deemed necessary to support modeling of autonomous agents systems. Specifying the internal features of agents and agent interaction protocols is an obvious starting point. We need to also address other issues, such as:
   • Considering solutions for business processes management, as well as Web Services and Web Service composition languages.
   • Addressing the fact that (unlike other non-agent systems) agent conversations may unfold in a more dynamic manner, so you cannot rely on a fixed set of predefined conversations. This kind of situation rules out using one of the emerging process languages for conversations.
   • Understanding that in the future agents may need to converse on how they will communicate in a given task, and this communication structure may vary depending on the nature of the task.
   • Exploring more flexibility within the messages in an ACL than in other types of coordination messages such as remote method invocations, messages, etc.
3. Adopt notations that graphically express various aspects of agent-base modeling by extending UML and/or by using other notations.
4. Address standards for AUML class and sequence diagrams in the first phase of this work plan. As other types of diagrams (such as deployment, goal, and activity

diagrams) will be added to this work plan over time as the need and participation level reaches an appropriate level for a FIPA work plan.

Technology

The primary sources of technology are:

- FIPA Interaction Protocol documents XC00025 through XC00036
- OMG UML 2.0 Superstructure document
- Extant documents recommending agent-based modelling languages, such as (but not limited to) AOR, PASSI, MESSAGE, and Tropos

Documents Generated:

This work plan will create:

- Modeling language specification guide
- Modeling language infrastructure specification

Plan for Work and Milestones:

This work plan will create:

- 05/2003 Initial draft of language specifications for Class and Sequence Diagrams
- 10/2003 Initial draft of modeling language infrastructure specifications for Class and Sequence Diagrams
- 01/2004 Revised drafts of language specifications for Class and Sequence Diagrams
- 03/2004 Final draft of language specifications and infrastructure specifications for Class and Sequence Diagrams.

It should be noted that we expect that significant work on these specifications will be required between FIPA meetings and possibly at interim meetings of the relevant TC.

Future Work:

We envisage further extensions to this work plan that will be targeted at other modeling language specifications, such as deployment, goal, and activity diagrams. These will be added to this work plan over time as the need and participation level reaches an appropriate level for a FIPA work plan.

Dependencies: The specification will depend on UML 2.0 specifications. Furthermore, close coordination and alignment between the FIPA methodology and AUML work plan efforts is mandatory.

Support:

- Bernhard Bauer, University of Augsburg (considering FIPA membership)
- Monique Calisti, Whitestein
- Massimo Cossentino, ICAR-CNR (considering FIPA membership)
- Stephen Cranefield, University of Otago
- Marc-Philippe Huget, University of Liverpool (non-member)
- Renato Levy, Intelligent Automation, Inc. (will become a FIPA member)
- James Odell, James Odell Associates
- Makoto Okada, Fujitsu
- Marian Nodine, Telcordia
- Paola Turci, Universita` degli Studi di Parma (considering FIPA membership)

FAB Comments: