



Inform!

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FIPA Specifications voted to Standard Status

An important milestone in the history of FIPA was reached last December, when its principal members voted to approve the move of a set of experimental specifications to standard status.

At the 27th Meeting in Pensacola, the FIPA Architecture Board (FAB) invited all principal members to approve the promotion of 23 experimental specifications to standard status so they may be used in both business and academic environments. The FAB strongly believed those specifications to be stable, mature, well understood and ready for commercial implementation and deployment.

Each principal member organization was invited to cast a vote. The vote was open from November 4 to December 2, 2002. A total of 20 votes were received and the move to standard specification was overwhelmingly approved with 19 votes in favor and only one vote to disapprove with comments.

FIPA was established in 1996 as an international non-profit association of companies, which agree to share efforts to produce standard specifications of generic agent technologies in a timely fashion, internationally agreed, usable across a large number of applications, so that a high level of interoperability across applications is

achieved. Since then, FIPA counted more than 60 members from more than 20 different countries-worldwide and generated a set of specifications that went through 3 cycles of review: FIPA97, FIPA98, FIPA 2000. Many distinct agent platforms, applications, and collaborative projects have been, and are continuing to be, based upon the FIPA specifications (for a list of platforms and their deployment see the FIPA Resources Page <http://www.fipa.org/resources/index.html>); the core set of the specifications have been used for a number of years and they are robust and effective enough to be promoted to Standard. For a complete list of the standard specifications go to <http://www.fipa.org/repository/standardspecs.html>

With the maturing of its standards, FIPA has realized a significant part of its mission. Now that the IT community at large is becoming aware of the need for advanced interoperability standards between (web) services, there are outstanding opportunities for FIPA - and agent technology in general - to pull through into industrial mainstream technology. The careful strategy of balancing between innovation and market acceptance this requires will be a main topic of discussion at the next FIPA Meet-

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News in Brief

After election by the General Assembly at the 27th Meeting in Pensacola, Florida, the new FIPA Board of Directors is structured as follows:

- Menno Jonkers, Tryllian—President
- Michael Kerstetter, The Boeing Co.—Vice President
- Stefan Poslad, Queen Mary, University of London—Secretary
- Michael Berger, Siemens—Chair, Finance and Audit Committee and Chair, Membership and Nominating Committee
- Monique Calisti, Whitestein Technologies AG—Chair, Image Committee.

The position of Treasurer was appointed to the FIPA Secretariat, Jacquie Kelly.

The FIPA Principal Members recently voted to promote 23 experimental specifications to standard status. This vote represents a major milestone in FIPA's history and with it FIPA has realized a significant part of its mission. For a complete story and a link to the approved standard specifications see:

<http://www.fipa.org/resources/pr0004.html>

The 28th FIPA meeting will be held at Engineering Ingegneria Informatica SpA in Palermo from 10 to 12 February, 2003. For more details see:

<http://www.fipa.org/activities/meetings.htm>

J. Kelly

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Pensacola Workshop Report

A very interesting overview of various agent-related activities within the IHMC group was given during the workshop that was held during the FIPA meeting in Pensacola. We had the four following presentations.

Jerry Pratt, Ph.D. who recently came to IHMC from MIT and is also involved in a startup company called "Yobotics", spoke on **"Exploiting Inherent Robustness and Natural Dynamics in the Control of Bipedal Walking Robots"**.

Niranjan Suri, Ph.D., who is well known for his work at IHMC on strong mobility and safe execution for agents, spoke on **"Mobile Agents and Agile Computing"**.

Anil Raj, an MD, who is best known for his

work at IHMC on tactile and multi-modal interfaces, spoke on IHMC's recent agent-based DARPA-sponsored research on **"Augmented Cognition"**.

Andrzej Uszok, Ph.D., who joined IHMC in 2001 after being CTO for an agent-startup company in Poland and whose previous experience was as a University Professor and Consultant for IONA, together with Jeffrey M. Bradshaw, Ph.D., spoke about **"Lessons learned in the development and application of DAML-based ontologies for agent policy representation and reasoning"**.

FIPA would like to thank all the speakers for their valuable input and most of all for animating very interesting discussions.

The FIPA Board

Pensacola Meeting Report

The 27th FIPA meeting was held in Pensacola, Florida, USA, October 14th to 18th, hosted by The Institute for Human-Machine Cognition (IHMC). Our IHMC hosts were gracious and helpful, their facilities were pleasant and convenient. The social event was held at the very impressive Naval Air Museum and was thoroughly entertaining to the FIPA attendees as well as the IHMC Advisory Board who were visiting IHMC during the same week. The recent pattern of moderate FIPA attendance continued, reflecting the continued difficult economic climate in the industry. Nevertheless, considerable productive work was accomplished.



The FIPA Board of Directors, left to right: Stefan Poslad, Michael Berger, Monique Calisti, Menno Jonkers, Michael Kerstetter

Meetings for most Technical Committees and some Working Groups and SIGs were held throughout the week.

The most significant event of the week was the completion by **TC X2S** of the promotion of a suite of experimental specifications to Standard status. More than 20 specifications were recommended be sent to the FIPA membership for formal adoption as standards including the Abstract Architecture Spec, SL Content Language Spec, several Interaction Protocol Specs,

several Message Specs and the QoS Spec. At the time of writing the FIPA membership has voted the proposed specifications to standard, establishing an important milestone for FIPA. With the completion of their work-plan, TC X2S was dissolved.

TC Ad Hoc is writing a white paper about FIPA agents in mobile ad-hoc environments. This includes a description of relevant ad-hoc and P2P technologies, possible approaches for FIPA, concrete implementations, and other important issues like security and profiles. The focus concerning the relevant ad-hoc and P2P technologies will be on BT-SDP, JXTA, JINI, and UPnP. TC Ad Hoc resolved to change status from a Technical Committee to a Working Group. They will deliver a modified work-plan at the next FIPA meeting.

TC Semantics focused on the semantics of contracts. They explored two very simple contracts: the 'cash and carry' contract and the 'school janitor' contract. The former contract is a commitment to pay for goods and to receive them and the latter is a commitment to keep a schoolyard clean. They looked in some detail how one would actually construct such a contract using a labeled theory approach and using elements of event calculus. TC Semantics also looked

at recent work by Sergot et al on reasoning about roles and institutional facts. This work was judged interesting but flawed from a performance perspective. The reason for focusing on contracts is that agreements between agents is a critical part of the relationships between agents and it is required to be able account for agreements in any semantic framework.

TC Services continued their efforts in a very important area for FIPA to address.

They have chosen to investigate DAML-S as a suitable meta-service description/modeling language for FIPA services. Margaret Lyell will be leading this effort. Jonathan Dale is coordinating the production of an outline/structure of a white paper on requirements for FIPA services.

Security WG was very busy, completing its current work-plan. The WG examined security issues in the current (2002) FIPA specifications. It has recommended removing the encryption field in The Message Transport Specification (done by X2S) and no changes to the Agent Management Specification to add security – as a security model is needed first.

Further, the group analyzed and proposed models to address issues raised by its white paper on MAS security (f-out-000113), the deliverable of its first work plan. The basis of a new security model has been proposed in an update to the white paper that is to be published in a Springer-Verlag LNAI volume. This new abstract security model is called the Asset Security Model. It is intended that a new work plan for the security WG will develop a specification for security based on this model.

Finally, they enhanced the Policies and Domains Specification (FIPA00089) to support trust, security and privacy policies. Security WG is developing a new work-plan and will produce specification(s) for MAS security so that it will form a new TC called TC "Security, Trust and Privacy". The work-plan will call for a white paper to capture the motivation for MAS security and that analyses the different design choices for ACL security and makes recommendations for specifying ACL and MAS security, the specification of abstract security model (the asset model) that can be mapped to a FIPA MAS framework, and the reification of the model in one or more application domains.

M. Kerstetter, M. Jonkers

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ing in Palermo, Italy February 10-12, 2003.

The X2S (Experimental to Standard) Technical Committee was created at the 24th FIPA meeting in Lausanne and went through 3 iterations of accepting comments from the membership and approving the specifications to ready them for vote to standard status. X2S has herewith fulfilled its duties and has been dissolved. For additional information on the X2S history and

this process please visit the X2S Archive at http://www.fipa.org/activities/experimental_to_standard.html

The FIPA Board would like to thank all the FIPA community and, in particular, Fabio Bellifemine (TILab) and Jonathan Dale (Fujitsu) for their precious work and valuable contributions for the achievement of this important FIPA milestone.

The FIPA Board

Edited by the FIPA Image Committee
Comments and opinions are those of the authors, not necessarily of FIPA or its members.
All correspondence, including submissions for "News in Brief" should be addressed to image@fipa.org

If you have a story or article that may be of interest to the agent or FIPA community, please submit it to inform@fipa.org for inclusion in future issues of FIPA Inform!

Technology Overview: AUML—An Update

At the Agents 1999 conference in Seattle, there was little indication of a common notation to express agents. It was still a jungle of notations. That conference was a turning point for many of us who had witnessed the progress that object-oriented (OO) modelers had experienced two years prior with the Unified Modeling Language (UML). With OO, its tower of notational Babel was suddenly and successfully turned into a common language for thousands of developers. We reasoned that a similar result could occur for the agent-based world. FIPA lead by proposing a way to extend UML for agents (AUML) and then by re-expressing its interaction protocol standards using this AUML notation. Since that time, many of the Agents and AAMAS conference papers have begun using these early AUML notations.

Where is AUML now?

As with many early standards, getting a critical mass of participants and supporters can be slow at first. Knowledgeable graphical-language designers are needed to develop a modeling language that is clear, formal, and consistent. Software companies are necessary to build tools that will support the new language. Without both of these, a language cannot be successful.

At FIPA, workplans will be proposed to specify a FIPA standard for several AUML notations. The first ones will include Interaction Diagrams, Class Diagrams, and Ac-

tivity Diagrams. Others will follow as soon as there is interest. These new standards will be based on the diagrams and meta-models proposed in the forthcoming UML 2.0 due in January 2003. In this way, we can build on top of an already adopted standard by using a "profile" technique. Profiling is a technique that was standardized by the Object Management Group (OMG) which formally extends languages and their meta-models.

Many will question the wisdom of OMG involvement because it is "old school." However, if we can successfully extend a language that is already supported by many modeling tools, AUML could have a higher probability of success. This does not mean that the usefulness of AUML will be compromised by employing this approach. None of the AUML developers are willing to risk quality for expediency. AUML research experience over the last two years indicates that extending UML 2.0 can yield the beginnings of a sound AUML.

Where is AUML going?

Many papers and agent-based methodologies are already proposing new agent-based notations. Some can be seen as extensions to UML; some are entirely new. For example, some are working on extending UML Deployment Diagrams for mobile agents. Others are examining extensions to represent areas such as agent goals, environments, organization, delegation, and do-

main views. Companies active in the AUML process include organizations such as: Fujitsu, Intelligent Automation, James Odell Associates, Telcordia, Siemens, Università degli Studi di Parma, University of Liverpool, and University of Otago.

Agent-based methodologies can also help to identify various notations that can best specify and document the requirements for agent-based systems. Methodologies currently involved in identifying possible agent-based modeling notations include: MESSAGE, PASSI, Prometheus, and Styx.

How can you participate?

Currently, AUML needs individuals who can define and document the various kinds of AUML diagrams. These diagrams can be extensions to current UML diagrams or completely new forms of diagramming notation. AUML also needs the support of software companies that can provide the technology to support one or more of the AUML notations. Anybody wishing to participate in some way in the AUML process can subscribe at <http://groups.yahoo.com/group/auuml>. Joining FIPA and participating in the FIPA AUML workplans are options that I'd also highly recommend.

An AUML session will be held at the 28th FIPA meeting in Palermo. Please send any questions or comments to auuml@fipa.org

Jim Odell



FIPA Member Profile—ADETTI

ADETTI, Associação para o Desenvolvimento das Telecomunicações e Técnicas de Informática, is a non-for-profit research institution created in 1989, aiming at the development of Information Technologies, contributing to enhance Quality in Management and Business Competitiveness.

ADETTI is an associate Research Centre of the Department of Information Sciences and Technologies of ISCTE (Instituto Superior das Ciências do Trabalho e da Empresa), a public University in Lisbon.

ADETTI has an active group in agent-related research, involving University teachers, University students and hired researchers.

The agent group of ADETTI includes Rui Marinheiro, Joaquim Reis and Luís Botelho, plus seven other researchers.

The group current emphasis is twofold: first, the study, definition and implementation of agent architectures; and second, the development of conceptual and computational frameworks and software tools to assist the tasks of agent and multi-agent

systems implementation and deployment.

Regarding the definition and implementation of agent architectures, ADETTI has been developing the Salt & Pepper architecture for intelligent autonomous agents. This architecture is inspired in cognitive models of decision-making, and in recent findings of the neural sciences. The Salt & Pepper architecture is currently available as two software components implemented in Java, JESS and Prolog: the Appraisal Component and Em-PSys (Emotional Production System), which can be integrated to build agents, using a development toolkit.

With respect to multi agent systems frameworks and tools, ADETTI has been very active with respect to communication-related issues, in particular content languages, ontologies, and interaction protocols. ADETTI has developed or is developing several software tools, including:

- FIPA++, a FIPA compliant platform that may be used to deploy agents that are independent of the platform, implemented in any programming language.
- The Pagoda of Creation, a web-based system that allows non specialized users

to create Personal Assistants for Agent Network Applications.

- SL2SQL translator that converts SL contents into SQL commands
- AnyAgent and AnyOOAgent, two generic information agents that maintain relational databases – the first one relies on a relational ontology and communicates in ACL using SL contents, the second relies on an Object Oriented ontology and communicates in ACL using Extended-SL contents. (AnyAgent |AnyOOAgent) + Specific Ontology = Simple Specific Information Agent.
- A content language translation agent that can translate content expressions from and to any of the three languages FIPA-SL, Ansi-KIF and Prolog (Content Language?). This is presently being initiated.
- A SL parser and reasoning system for C++ programs.
- Nazgûl Prolog, a Java Prolog that can be used to create Prolog applications, and can be embedded into Java Programs,

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Member Profile—Tryllian

Tryllian was founded in 1998 and currently employs about 40 people. We have our corporate headquarters in Amsterdam, The Netherlands and a US office in Oakland, California. Tryllian offers a commercial-strength platform for mobile agents, the Agent Development Kit.

Platform

The ADK uses FIPA-modeled messages over JXTA for its communication. JXTA is an open peer-to-peer standard that takes care of platform discovery, tunneling through firewalls etc. Tryllian has added layers for reliable and secure message transport. We offer a task-based behavior framework that allows an average Java programmer to develop advanced and hierarchically structured agent behavior, without worrying about the low-level issues of parallel and asynchronous computing. A 3rd party inference engine can also be plugged-in.

The industrial focus of Tryllian has resulted in a platform that excels in:

- Security, both at agent and platform level
- Scalability (e.g. tens of thousands of active agents on a single machine)
- Reliability (graceful handling of high loads, transparent swapping of inactive

agents, hot backup and recovery)

- Interfacing with industry standards (e.g. JNDI/LDAP, management via SNMP, web services, J2EE/JMS bridges)
- Tested on a wide range of platforms (from Windows to IBM mainframe)
- Extensive documentation and support

On the other hand, as the target audience of the development kit consists of commercial Java developers, some functions that one typically finds in a more academic toolkit have been included to a lesser degree, because they were considered not sufficiently matured.

Mobile Agents

Tryllian supports mobile agents as we strongly believe that in the future of ubiquitous computing, secure runtime deployment and relocation of components are essential, as is secure and manageable co-existence of components from different parties. Today already, decentralized execution of business logic to reduce functional complexity, overcome network latency or increase system autonomy is recognized as crucial for specific application scenarios. Tryllian partner Global IDs (www.globalids.com) offers a next-generation integration suite for very large scale, adaptive, real-time data integration;

mobile agents are their enabling technology.

Business Focus

Along similar lines Tryllian is focused on dynamic business process integration. Mobile agents are positioned as dynamic smart components, to emphasize the natural evolution from current component-models to more agent-like models by increasing dynamism or adaptability and smartness - intelligence being an overloaded term. With an organic and partly decentralized approach to process integration, enterprises can quickly achieve business value while safeguarding the autonomy of individual organizational units. The adaptability and loose coupling of agents, allows the infrastructure to gradually evolve and grow, and keep up with the pace of changes in the enterprise. Now more than ever, this is recognized as a highly attractive proposition compared to the classic, centralized solutions that typically have a long development time and force organizational integration beyond what's effective.

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Special Announcements

FIPA sponsored the first international workshop on "Agent Interoperability" (MAI'02) which was held in September in Aachen together with the German AI conference. More than 40 people from Europe and the US were attending the very successful workshop, and discussed topics like: Standards and Specifications supporting Agent Interoperability, Agent to non-Agent Interoperability, as well as Design, Models and Methodologies that support Interoperability. For more details and the proceedings, please have a look at <http://ki2002.rwth-aachen.de/>

AgentLink II Agent Technology Conference: Agents for Commercial Applications will be held in Barcelona, Spain on the 5th February, 2003.

<http://www.agentlink.org/agents-b>

The joint Conference of Autonomous Agents and Multi-Agent Systems (AAMAS 2003) will be held in Melbourne, Australia from 14 to 18 July 2003. Further details can be obtained from the conference website at: <http://www.aamas-conference.org/>

(ADETTI Profile, continued from Page 3)

and can use any Java class and methods. This Prolog allows the easy development of Prolog Agents that can use the JADE, FIPA-OS, and other Java platforms.

ADETTI is currently or has recently been engaged in several EU research agent projects:

SAFIRA. Project on Affective Computing whose results are an integration framework, a development toolkit and a set of components for the creation of affective agents. SAFIRA has developed components for affective input, for affective expression and for affective processing.

UNITE. The Project focuses on collaborative work environments (both virtual and real) for flexible, mobile and remote working in project teams and virtual organisations. The main goal of the project is to provide an advanced and affordable integrated software platform for Internet-based collaborative work to support in-house or within business consortia commercial and research project teams.

art.live. This project aimed at the development of an architecture and a set of tools, both generic and application dependent, for

the enhancement of narrative spaces, virtual worlds and augmented reality. To this aim, art.live gathered image processing engineers, AI computer scientists and multimedia authors.

Modest. This project goal was to define and develop a framework for analysing video sequences in order to extract high-level semantic scene interpretation, based on the segmentation, tracking and indexing of moving objects in video scenes. This was accomplished by experimenting this framework in a highway surveillance system, which included tracking down objects, classifying those objects and predicting their next moves.

Agentcities.RTD Project whose main goal is the deployment of a global network of interconnected multi-agent systems, organised as agent cities, providing basic information and representation services as well as value added complex services. The agents in each city mirror actual activity and content of that city.

For more information, see <http://www.adetti.pt>

L. Botelho, A. Lopes, A. Rita