

Palermo Meeting Report

FIPA met for its 28th meeting on February 10-12, in beautiful Palermo, Italy, by invitation of Engineering Ingegneria Informatica. A report on the workshop provided by Engineering Informatica is provided elsewhere in this issue, as is information on the new 3-track structure used to increase synergy and consistency between FIPA's activities.

In the meeting two new Technical Committees started by defining their scope and work plan: TC Modeling and TC Methodology. These related activities will work on methodologies for development of agent-based systems and the notations and use cases supporting them.

TC Modeling will develop FIPA Agent UML. This will be domain independent with the following areas examined initially: service-oriented architecture (SOA), business process management (BPM), simulation, real-time, robotics and information systems. A wide range of source of notations will be considered and twelve modeling areas will be explored.

The **TC Methodology** will work on a method base of formally represented



method fragments along with notations for their constraints and procedural aspects and a meta-model. In addition a glossary of agent development methodologies related concepts will be produced. Existing standards and AOSE contributions will be explicitly referred to.

A third new activity is **TC Interaction Protocols** which will work on extending FIPA's current set of interaction protocols. This TC was to meet offline, via their mail list.

The **TC Services** meeting opened with a presentation on DAML-S vs. WSDL from

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News in Brief

The 2003/2004 membership invoices were mailed in July. While the FIPA membership fees remain at CHF 1,750 for an Associate and CHF 5,000 for a Principal Membership, the rates charged in US Dollars and Euros had to be adjusted to more closely reflect today's currency exchange rates. The adjusted fees are US\$ 3,800 and Euro 3,200 for a Principal Membership and US\$ 1,300 and Euro 1,100 for an Associate Membership, respectively. If you have any questions about your invoice or FIPA membership, in general, please contact the FIPA Secretariat at: secretariat@fipa.org.

As of the 1st of July, 2003 FIPA has moved its domicile from the firm of Jacquemoud & Stanislas in Geneva to a smaller law firm that can more effectively attend to our needs. The new official domicile of FIPA herewith is: Law Offices of Me. Joelle Knopfel, 7, place de la Fusterie, P.O. Box 3362, 1211 Geneva 3, Switzerland.

The next FIPA meeting will be held in Banff, Canada August 20—22, in conjunction with the first IEEE International Conference on Industrial Informatics (INDIN03). More information on this meeting is available at: <http://www.fipa.org/activities/nextmeeting.html>

J. Kelly

Palermo Workshop Report



**ENGINEERING
INGEGNERIA
INFORMATICA**

**RESEARCH & DEVELOPMENT
LABORATORY**



The workshop that was held in Palermo during the FIPA meeting focused on the Te.S.C.He.T. (Technology System for Cultural Heritage in Tourism) project and some related research issues in the field of Agent-Oriented Software Engineering. Vito Morreale from Engineering Ingegneria Informatica, the company that hosted the meeting, gave an overview of the above-mentioned work in progress "**Te.S.C.He.T. project**", which aims at creating a new software architecture based on agent technology for the domain of Cultural Heritage and Tourism. Te.S.C.He.T. is a project supported by MIUR (Ministero dell'Istruzione, dell'Università e della Ricerca). The partners involved in the project are Engineering Ingegneria

Informatica S.p.A., Telecom Italia Lab, and ISUFI-eBMS (Istituto Superiore Universitario di Formazione Interdisciplinare – e-Business Management System). The final infrastructure will enable the dynamic, adaptive and autonomous composition of tourism services to achieve user and business goals, thereby creating compound services to address changing needs and requirements. As a result, a software system that integrates several heterogeneous and distributed information sources, enabling the interoperability of several heterogeneous and distributed information systems is going to be

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Margaret Lyell. Work was done on an Abstract Service Model, based on an analysis of existing service models. The model will be turned into a specification and groundings will be produced for DAML-S and WSDL. The white paper will be folded into a conference submission.

In the **Work Group Ad-hoc** further analysis of relevant existing ad-hoc and P2P technologies, and their relevant use-case scenarios and possible architectures were discussed. They are to post the results in a specification proposal after the meeting.

TC Security started with its renewed work plan. Member organizations presented and discussed several security models, as well as use cases and practical requirements. Work was done on clearance levels, the relationship between security and trust, and the definition of core security profiles.

FIPA's **Image Committee** discussed a more focused set-up and wider distribution of the FIPA Inform! newsletter. Also, the liaisons with related (standard) organizations were inventoried. The Image Committee will support the **FIPA for Business Applications** activity (F4BA) in finalizing its overview of current FIPA deployment. On delivery of this overview F4BA will have completed its activities and will be discontinued. In Palermo it was also decided to discontinue the **Planning & Scheduling SIG** because of reduced interest. **TC Semantics** did not meet due to absence of its key members.

The **Board of Directors** concluded the meeting with the good news that significant cost reductions have brought FIPA into a healthy financial position again. Still there is important work to be done on the strategic positioning of FIPA and its activities with respect to other relevant standards bodies.

The resolutions of the meeting, as well as detailed information on all activities can be found on the FIPA website, www.fipa.org.

M. Jonkers

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!

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

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developed. The distributed agent-based system under development in Te.S.C.He.T. will rely on JADE and mainly benefit mobile devices.

Then Giovanni Caire from Telecom Italia Lab illustrated the "**new functionalities supported by the third release of JADE**", which will be available at the end of February 2003. These additional features concern the LEAP add-in, the security plug-in, and the message content reference model provided by JADE. The solution proposed by Telecom Italia Lab for the content reference model was accepted as the starting point for the definition of the corresponding standard within

TC Ontologies.

Finally, Massimo Cossentino from ICAR/CNR presented the results of his work "**Agent Factory**", concerning the definition of a process to support the direct generation of agent code, starting from the models created using his methodology PASSI and some existing agent design patterns. PASSI assists developers from the requirements analysis to the coding phase and it has been adopting in the Te.S.C.He.T. project as the methodology to develop the agents that carry out the required functionalities.

V.Morreale

Forrester on Software Agents in Business

Forrester Research (see <http://www.forrester.com>) has recently published two briefs in its 'Software Agents in Business series' (lead author Navi Radjou).

In the 1st brief, "*Still an Experiment*", it is envisaged that the limited commercial adoption of applied software agents is poised to grow as firms look to make their business processes more flexible. 20 years after the first wave of expert systems in the 1980s, the knowledge management wave of the 1990s, software agents have now begun a foray into the corporate world. But the full potential of software agents could remain untapped again because:

- *Buyers remain skeptical*: although there are 50 or so start-up firms, they have difficulty in articulating their business offerings leading to the view that agents are a solution looking for a problem;
- *Developers lack tools*: o-o software took off because major vendors rolled out o-o application development tools;
- *Users are suspicious* and feel threatened when vendors over-hype their wares, e. g., agents can mimic human reasoning or fully automate supply-chains;
- *Lack of interoperable semantic Web frameworks*: from established vendors who aren't yet interested.

Although the above barriers to adoption exist, firms' quests for adaptability will drive the adoption of agents to:

1. Sense and filter petabytes of data in real-time;
2. Decide and act swiftly to stay in business by pushing decision-making closer to value chain nodes where business exceptions occur;

3. Learn and transform existing processes by using agents to diagnose flaws in business policies and rules.

The second Forrester Research brief, titled '*Steady Adoption Curve*', explains that the adoption of applied software agents will evolve in stages over the next decade, supported by standards and technologies like Web services and the Semantic Web. It is expected that firms' need for operational flexibility will accelerate mainstream adoption of applied software agents in three steps:

1. *Agent-monitored (2003-2005)*. In the near term, software agents will help sense and interpret environmental data.
2. *Agent-managed (2006-2008)*. By 2006, standards will power Net-resident Web-service infrastructure offerings, enabling more efficient data transformation and business process orchestration.
3. *Agent-optimized (2009+)*. By 2010, 14 billion objects, ranging from a furnace at home to Coke cans on Wal-Mart shelves, will be linked to the Net, paving the way for a network of systems and machines, not people. But users won't be able to take advantage of the Internet of things unless their real-world-aware agent-based apps, compliant with Semantic Web standards, can unambiguously interpret, and swiftly act on the data beamed by these heterogeneous devices.

FIPA makes Tracks

To help improve FIPA's external visibility and also to give a clear indication of the technical work that FIPA is undertaking, all of the current work plans for Technical Committees and Working Groups are being reorganized under a tracks-based system. This system will be very familiar to people who attend academic conferences or technical workshops since it aims to break down a large amount of technical work into a small number of related areas.

At the FIPA meeting at Palermo, Italy held in February, 2003 it was decided that the current technical work of FIPA would be arranged in three main tracks; *Infrastructure*, *Communication* and *Software Engineering*. Other tracks will be created when a critical mass of work in that area is reached.

The *Infrastructure* Track, which currently comprises the Ad-Hoc WG, the Services TC and the Security TC, is focused on areas of core functionality within FIPA agent platforms. As its name suggests, the *Communication* Track deals with aspects of agent communication, from the semantics of content languages to ontology definition and usage, and contains the Ontology TC and the Semantics TC. Finally, the *Software Engineering* Track is responsible for the construction of agent-based systems and includes the Interaction Protocol TC, the Methodology TC and the Modeling TC.

Such a track-based system also naturally fits in with FIPA's regular Call for Proposals, but also will help with cross-specification development, since chairs of the WGs and TCs are also co-chairs of their respective tracks and must therefore cooperate more closely to coordinate their activities.

J. Dale

Special Announcement I

On 9 July 2003, Agentcities.RTD and Agentcities Initiative submitted a Technical Note to FIPA as feedback and input on the FIPA standards and their future development. The input covers usage of the FIPA specifications within Agentcities, giving an overview of the most useful areas of the specifications and areas where further development would be useful. To view the Technical note please go to: <http://www.agentcities.org/rec/00003/>



Telcordia Technologies for FIPA

Telcordia is a leading provider of communications software and consulting services based on world-class research. Telcordia creates the business solutions that make information technology work for telecommunications carriers, businesses and governments worldwide. Telcordia is the world's recognized leader in designing large secure and reliable telecommunications networks, and has played a leading role in the creation and application of the new technologies used in these networks. Much of the agent-related work at Telcordia is done at their Austin Research Lab. This work has two foci: (1) agent infrastructure and agent system management, and (2) agent-based and service-based support for collaboration and group coordination.

Telcordia is in the process of developing an agent platform based on the FIPA abstract architecture and Java Agent Services. The Telcordia Agent Support Platform is intended not only to provide basic FIPA services such as transport and directory services, but also additional services that follow the Java Agent Services (JAS) model, that enrich the semantic underpinnings of the agent system. For example, an ontology service supports a subset of the FIPA ontology service specification, currently providing ontological information from Protégé ontologies to the agent system. Eventually, a second ontology service will support OWL ontologies, once the appropriate tools become available. Another key service, useful to our collaboration applications, is an event publish/subscribe service. Telcordia researchers have extensive experience also with information agents and information processes. The InfoSleuth agent system, developed by a consortial group at the Microelectronics and Computer Technology Corporation, was partially supported by Telcordia Technologies. This project initially allowed users to query for information across a diverse set of information sources. InfoSleuth queries are specified over ontological concepts, making the queries independent from the schemas of the information sources themselves. Each information source has one or more resource agents, which translate the information provided by the agents into ontological concepts. Query agents receive user queries, locate the information required to answer the query in the different resource agents, then assemble the results

onto a single web page.

In addition to supporting ontology-based information retrieval and fusion, InfoSleuth also has a notion of information analysis processes. Users may be interested in information at some other level of abstraction or generality than basic query results. For instance, they may be interested in trends, or in deviations from the norm, or in summaries or statistics. InfoSleuth enabled the users to pipeline their results through analysis tools, processing, analyzing and distilling the information into the form most useful to their work. The requirements that this placed on the agent system have informed the ongoing coordination projects at Telcordia.

Recently, Telcordia agent projects have focused on policy-based coordination issues. Research focused on providing for more flexible coordination approaches as required by many intelligent agent systems. One of our goals was to use agent systems to support more than information processes – expanding to support business processes, project collaborations, and group-oriented activities. This type of application imposes different requirements on how agents work together. For instance, group activities often take place in an organizational or cross-organizational context (consider a FIPA TC as an example of this). Oftentimes organizations constrain both what can or cannot be done, and how things must be done using organizational policies and procedures. These policies impact how a group interacts – what activities the members are able to participate in, what information the members can share with others, etc. Additionally, policies may guide the decisions about which activities (and consequently, agents) are needed to a specific task or accomplish a goal, as well as how the activities are ordered and how they converse and share information with one another.

Telcordia agents work at the Austin Research Center is partially supported by internal Telcordia funding. The material related to policy-based collaboration is based upon work supported by the Air Force Research Laboratory under Contract No. F30602-03-C-0006. Any opinions, findings and conclusions expressed in this material are those of the author and do not necessarily reflect the views of the United States Air Force.

M. Nodine



THE FIPA NODE PROJECT—University of Calgary

The agent-oriented research at the University of Calgary started in the mid '90s in the Intelligent Systems Group (ISG - <http://isg.enme.ucalgary.ca/people.htm>) led by Dr. Douglas Norrie. The Group's successful projects on distributed manufacturing implemented based on holonic principles (ranging from agent-based control of intelligent production systems – research led by Dr. Brennan - to adaptive planning and scheduling of distributed manufacturing production – led by Dr. Xue - and global supply chain management) triggered the initiation of the FIPA-WG on Holonic Manufacturing in January 2000. One of the main contributions of the ISG to agent research is MetaMorph - a multi-agent architecture for intelligent manufacturing addressing system adaptation and extended-enterprise issues at four fundamental levels: virtual enterprise, distributed intelligent systems, concurrent engineering, and agent architectures. The architecture has been named 'metamorphic', since a primary characteristic is its changing form, structure, and activity as it dynamically adapts to emerging tasks and changing environment. The organization of a *metamorphic system* is both virtual and emergent. MetaMorph comprises planning, control and application agents that collaborate to satisfy both local and global objectives. Virtual clusters of agents are dynamically created, modified, and destroyed as needed for collaborative planning and action on tasks. Mediator agents coordinate activities both within clusters and across clusters. This architecture has been extended into the Holonic Enterprise project within the FIPA SIG on Holonic Manufacturing.

A spin-off from the ISG, the Emergent Information Systems (EIS) Laboratory led by Dr. Uliuru in the Electrical and Computer Engineering Department (http://www.enel.ucalgary.ca/People/Uliuru/Projects/Projects_index.htm) was inaugurated in 2002 by University of Calgary's International Center, within the context of her long-lasting collaboration with the University of California at Berkeley. While continuing the legacy (inherited from ISG) of agent-based enabling information infrastructures for global collabo-

orative enterprises (e.g. global supply chain coordination – for which we recently developed an agent model using nested protocols), EIS has undertaken leading research in the area of *emergent virtual organizations*. Based on an original concept integrating self-organizing and evolutionary MAS paradigms, an adaptive Cyberinfrastructure for emergency response management applications is currently being developed. We target automated mechanisms for ad-hoc creation of collaborative organizational structures endowed with highly efficient and cost-effective resource allocation and management for disaster relief, medical or military emergency applications, capable of constantly optimizing and adapting their structure and behavior according to new/emerging needs. The ultimate purpose is to develop a theoretical foundation and the definition of *standards for emergency e-Logistics based on an extended FIPA-compliant layered multi-agent system architecture*. For this we are in the process of initiating a new FIPA-SIG on e-Logistics. To enable coordination of distributed organizations and organizational entities (such as hospital bed planning, rescue crew coordination, remote guidance of the victims by providing them with on-line information - e.g. the map of the building where they may be trapped) we are using pervasive computing technologies. The system is distributed among different actors in our domain (e.g. a policeman with a PDA, a firefighter with a cell phone or even a helicopter sending real-time information about the traffic jams to our planning system, so it can indicate, for example, an optimal or improved route for emergency vehicles to follow), such that they will be able to receive and update the information in real-time. We cooperate with Dr. Joerg Denzinger from the Computer Science Department to incorporate his strategies of learning cooperative behavior in agent teams into our architecture. To put together such a complex communication infrastructure and enable a FIPA compliant platform to run on it we use J2ME (Java 2 Platform, Micro Edition) combined with JADE (Java Agent Development Framework) and LEAP

(Lightweight Extensible Agent Platform). Combining these three platforms results in a system with a small footprint that can run on CLDC-MIDP (Connected, Limited Device Configuration – Mobile Information Device Profile) - compatible devices, such as cell phones and PDAs. The concepts involved in this project are currently adapted to the development of an *immune network* technology for Cybersecurity applications, which we build on Canada's high speed internet backbone - CANARIE.

Another significant area of our research targets the development of innovative telehealth/e-Health solutions to offer distance medical assistance and continuous monitoring of medical conditions for critical needs of (e.g. elderly) patients. A recent project involving CANARIE aims to develop standards of care for the monitoring of glaucoma. For this purpose we are using a cooperative multi-agent architecture involving among others a consensus analyzer to reconcile the opinions of several experts.

EIS is involved in interdisciplinary work with several international consortia: Dr. Uliuru leads the Canadian Team on PABADIS (Plant Automation Based on Distributed Systems) and is founder of the Canadian GAIN (Global Agents Integration Network) which cooperates among others with the Global Agencies Task Force and Planet Lab.

M. Uliuru

Special Announcement 2

"FIPA technology helps power Agentcities to Research success"

Agentcities has been selected as a finalist for the Descartes prize for Outstanding research through transnational collaboration <http://www.cordis.lu/descartes/home.htm>. The prize is supported by the European Commission Science and Society program and highlights collaborative research contributions across all fields of Science.

The Agentcities network is one of the largest users of FIPA technology with over 150 registered platforms each applying a range of FIPA and Semantic Web standards.

The winner from among the finalists will be announced at a prize giving ceremony in November.