Inform!

Vancouver Meeting Report

The 25th FIPA meeting was held in Vancouver, Canada May 6-10, 2002, hosted by the University of Calgary. This meeting allowed FIPA members to meet and work with the Canadian Agent community grouped under the auspices of the GAIN project. The highlights of the meeting are:

- FIPA recognizes the importance of Web Services and creates a Services Technical Committee (TC) dedicated to reshape the way enterprises interact with one another over the Internet
- The work on the promotion of FIPA specifications to standard progresses very well,
- The Ad-hoc TC had lots of input and participation,
- The Ontologies TC refocused its workplan in the light of the experience gained in deployment of services in Agentcities,

Detailed results of the meeting:

FIPA Architecture Board Approved an updated Ontology Work Plan (f-wp-00012A), providing more focus on the agent specific ontologies. The work on ontologies begins to show an overlap with the work on semantics and a common session is planned between both TCs in Helsinki.

TC Ad-hoc Discussed four contributions to the 1st CfT of TC Ad-hoc in detail and defined basic framework to fit all contributions. Focuses on writing a white paper about relevant technologies for FIPA agents in mobile ad-hoc environments and possible solutions in: platform discovery mechanisms, service discovery mechanisms (needed infrastructure, message exchange at agent level and service discovery protocols), and additional features, to support policies and security in ad-hoc environments.

TC Ontology The main goals of the new workplan are:

- To identify the requirements of agent technology for ontologies which are not addressed by existing efforts
- To define existing FIPA ontologies (in a publicly accessible-repository) and model in a choice of ontology representation language(s), e.g. DAML+OIL,
- To review and update the former work on ontologies by FIPA [FIPA00086].
- To define or adopt a set of ontologies to describe common concepts, such as a policy ontology, a security ontology, a service ontology, etc.

TC Semantics Drafts a white paper identifying the form and features of the FIPA Semantic Framework, and capturing the relevant features of, primarily Andrew Jones, Marek Sergot's, Marco Colombetti's semantic framework.

TC Services There are four main objectives of this work plan:

- Define requirements for services and their use (abstract notion of service), including a service composition language. This should be done through a generalized approach to services, focused by the specific requirements of Web Services.

Inside this issue:

News in Brief

The remaining two FIPA meetings in 2002 will take place July 22—26 in Helsinki, Finland and October 14—19 in Pensacola, Florida. The meeting in Helsinki will introduce phone and video conference facilities, allowing remote participation.

FIPA is pleased to support the upcoming Fourth European Agent Systems Summer School (EASSS'02) and the International Conference on Autonomous Agents and Multiagent Systems (AAMAS), both to be held in Bologna Italy, 8—12 July and 15—19 July, 2002, respectively.

The new Job Corner is now up and running. Please visit http://www.fipa.org and be the first to submit an available job for posting.

J. Kelly

FIPA and GAIN attendees were kept company by Beluga Whales during the shared social event at the Vancouver Aquarium.

Vancouver Workshop Report

GAIN put together for FIPA a showcase of the best Canadian industry and research featured in two Sessions. The industrial section started with a plenary address by CISCO Systems Canada: **"Internet Business Solutions - accelerating customer success and agility in the Internet-enabled economy"**. Mr. Mike MacDonald, Major Account Manager, Cisco Systems Canada Co., presented the long term goals of their Internet Business Solutions Group. Although not built up with agents, Cisco's success story in the internet enabled enterprise world is one of the most powerful testimonies proving the phenomenal results of embracing an Internet business model. Cisco has used Internet technology to transform and integrate its core processes and culture. Their solutions are targeting individual company needs and specialized expertise in a variety of sectors, among which are: energy and utilities, financial services, healthcare, manufacturing and public sector.

Dr. Michael Levy, VP Research at NewHights Corporation Vancouver, BC tackled the intriguing topic of **privacy and security in web-centric environments**. He proposed a 'client-side intelligence' paradigm that embraces several levels of resolution unveiling degrees of privacy tailored to the 'customer needs'. This 'intelligence' is embedded in dynamic smart web-based components that monitor the client's needs from behind the web application when the user's chosen privacy level is threatened. The live demonstration of the 'Helix agents' – in fact smart Web Services developed by NewHights – has proven their dynamism and proactive features.

The last talk of this section made the transi-

(Continued from Page 1)

tion to the academic part of the workshop by illustrating a successful collaboration: industry-academia. Professor Ahmed Karmouch from Ottawa University and Dr. Ramiro Liscano from Mitel presented the results of their projects aiming to enable **virtual-teams & ad hoc communications with Agent Technology**.

The academic section debuted with one of the most popular Canadian contributors to the agent research. Prof. Bernard Moulin from Laval University in Quebec presented an innovative **solution to distributed continual planning using stationary and mobile agents**. The approach was illustrated on a very interesting case study as it applies to the planning of patient itineraries in the domain of aeromedical evacuation. The technique to design the architecture of multi-agent systems composed of static and mobile agents in distributed environments, which Prof. Moulin has developed, is an important contribution to the agent research.

A **state-of-the-art negotiation model based on bargaining** and its innovative implementation in FIPA-OS for a peer help system example based on modeling student preferences in a university campus context was presented by Prof. Julita Vassileva from the University of Saskatchewan.

Next, the Canada Research Chair in Cooperative Intelligent Systems, Prof. Mohamed Kamel from University of Waterloo reported on the adaptive aggregation methods and architectures, **use of agents and multi-learning with applications in classification**, sensor planning and robotics developed in the Pattern Analysis and Machine Intelligence led by him. Several real-life implementations were illustrated by spectacular video presentations of his 'robot teams' that performed different coordinated tasks from soccer playing to manufacturing

In the third academic talk, Prof. Ralph Deters tackled the problem (so far underestimated in importance by the agent community) of dependability in MAS. In his talk, the concept of **transparent agent replication** and its major challenges were investigated as a solution to increase reliability of critical MAS solutions. The FIPA-OS implementation of transparent agent replication was presented and evaluated. The marathon of innovative MAS approaches was continued by Prof. Soumaya Cherkaoui from Sherbrooke University in Quebec who presented a **solution to automated product technical specifications verification in CAD environments**. In this concurrent engineering problem multi-objective agents coordinate their operations in order to attain a global optimization both at the product and process levels.

Dr. Pavel Vrba representing both Rockwell Automation and the Cybernetics Department at the University of Prague presented their extremely successful model of industrial-oriented academic research – showing **how to integrate industry and academia into a successful Agentcities Node**. The demonstration of their FIPA compliant implementation for a material handling system designed within the Holonic Manufacturing Systems (HMS) Consortium has proven the success of their research performed at the cutting technological edge between FIPA and HMS within the Agentcities context. This talk received loud applause from the representatives of HMS, Agentcities and PABADIS (Plant Automation Based on Distributed Systems – an Intelligent Manufacturing Systems international Project).

All participants were invited at the joint Banquet, hosted at the Beluga Gallery in the Vancouver Aquarium, where the high note on which the Workshop ended set the tone for further fruitful networking between GAIN, FIPA, HMS, PABADIS and all guests present.

M. Ulieru

Special Announcement

A large community of agent-oriented Canadian organizations gathered together within the FIPA Group. This initial meeting gave rise to a national Canadian initiative that aims to create a research network focusing on ad-hoc service models, distributed negotiation models, and knowledge representation and management. For more information see http://www.fipa.org/resources/press_releases.html

TC X2S Report

The technical activity of the FIPA group officially started in 1996. One year later, in October 1997, the first set of specifications was publicly released covering two main areas: the agent platform (e.g., agent management, transport services) and the agent communication aspects (e.g., ACL definition). Since then, several things have changed: the specifications have been organized into categories and divided into small components (e.g. Message Transport Protocols, codecs, Interaction Protocols), bugs have been fixed, general improvements have been made, however, the essence and the technical basis of the specifications remained the same of 1997. Today, these specifications have been implemented and have formed the basis for several agent platforms, middle-wares, tools, applications, and field trials: many researchers and early adopters have used the FIPA specs, and, in some cases, these specs were also the premises for commercial exploitations, including companies spin-off and start-ups, as reported in the 'Member's Profile' column of some FIPA Image Issues.

Since FIPA2000, most specs have remained stable without any significant change. Despite this stability and the fact that the specs are being used extensively, they are still at the status of 'Experimental' ('X') i.e. "*deemed suitable for implementation within FIPA-compliant agent platforms*". However, a standardization body is expected to produce standards and not only experimental documentation!

During the 24th FIPA meeting in Lausanne, a general consensus was reached that FIPA is now ready to release standards, and a new Technical Committee was established, named after its goal: 'X2S', experimental to standard. The main mission is indeed to identify, and promote to Standard status a core set of FIPA specifications. This means that no new specification will be generated, but existing ones will be refined, and ambiguities and inconsistencies will be resolved.

In Vancouver, the X2S TC had its first - and very fruitful - meeting, with a large number of comments already analyzed and finalized. A preliminary version of the modified FIPA specifications and the minutes of the meeting are available for public review on the FIPA website at: http://www.fipa.org/activities/experimental_to_standard.html

A legitimate question now arises: when 'S'? The milestone has been set to October 2002, when the TC will release the specs to the FIPA membership, which, according to the FIPA statutes, must vote for the final approval of the standards.

A standard is an asset for the entire community, both scientific and industrial, and, as such, requires and benefits from the effort and the contribution of the entire community. Subscribe to x2s@fipa.org mailing list to give voice to your experience in using FIPA documents and implementing the specs, and to e-mail your comments to the proper forum. A web-based form is also available at http://www.fipa.org/html/x2s_template.html for simplifying the submission of comments that, even when trivial (e.g. typos or mistakes in the examples), at this stage are surely very important and welcome. Continue investing in FIPA standards: the agents of your competitors might be just around the corner and use the FIPA technology!

F. Bellifemine

Technology Overview: FIPA and Web Services

FIPA and Web Services In the past year, the computing world has focused a lot of attention on web services. Although there is no formal definition of a web service, we can pragmatically define a web service as functionality delivered through a trio of specific protocols, UDDI, WSDL and SOAP. These three services provide the ability to locate, describe and invoke simple services across most standard internet environments.

Web Services UDDI (Universal Description, Discovery and Integration) provides a simple scheme for locating business oriented services on the internet. A business can publish itself in a UDDI repository, along with descriptive keys about the types of business it performs and then attaches one or more descriptions of how to specifically interact with it electronically. These descriptions are often published using WSDL (Web Services Description Language). A WSDL description describes the precise bindings of a service to a specific protocol and serialization bindings. In general, for most web services, the WSDL description will describe a SOAP (Simple Object Access Protocol) binding for a set of methods which may be called on a notional object. SOAP floats RPC style method invocations across the HTTP plumbing, routing XML encoding requests to supporting code.

At first glance, Web Services would not appear to overlap strongly with FIPA's agent technology. In fact, there are some important areas of overlap, and these areas of overlap are increasing over time.

The Web Services approach provides a service location scheme akin to FIPA's Directory Facilitator. This is coupled with the use of WSDL and SOAP to permit a weak coupling between clients and services. A web service client can dynamically search for appropriate services to invoke and create bindings to those services based on their WSDL descriptions. While this is significantly less flexible than using semantically based descriptions to locate services, as can be done through FIPA agents, it is closely related.

Web services based purely on UDDI, SOAP and WSDL are limited to fairly simple single request/response pairs. However, the Web Services model is evolving beyond these limitations. Microsoft has proposed an extension in the form of it's XLANG flow markup, IBM has proposed a workflow markup known as WSFL (Web Services Flow Language), Hewlett Packard has proposed a WSCL (Web Services Conversation Language). All of these proposals focus on knitting together sets of simple web service interactions into composite flows. These flows permit the choreography of complex business workflows across multiple enterprises and multiple messages. This extends the basic Web Services model closer to FIPA agent interaction protocols.

As proposals are being made to markup complex interactions patterns; other proposals, most notably those within W3C's Web Ontology (WebOnt) working group seek to significantly deepen the semantic capabilities of web services (and more generally web delivered content) This has the potential of permitting an increase in the semantic complexity of the terms being used within the web services environment, positioning future web-services squarely within the scope of agent technology.

Limits to the Web Services model There are several important areas in which the Web Services model is more limited than FIPA's agent based technologies. Most significantly, web services provide fixed function interfaces. Web Service clients can only invoke those methods exposed by a web service. This makes it impossible to invoke interactions which were not contemplated by the provider of the web service interface. Further, as web services are primarily implemented as method invocations against notional objects, a precise match is required when using a web service. This presents a set of problems similar to those found when building large projects on top of OMG's CORBA technology. Versioning is difficult, binding libraries require complex agreements among all the parties sharing an interface, and certain interactions are difficult to model as invocations of methods on objects. Some of these problems may be finessed, but only by bypassing the strong typing and providing a generic "acceptMessage" method, which explicitly subverts the object-model being provided.

Responding to Web Services in an agent's context Recognizing the developing overlaps between Agents and Web Services, FIPA has created a Technical Committee on Services and Web Services. This TC will focus on four closely related tasks. First, it will provide FIPA specifications for the simple use of web services within FIPA platforms. This will likely include specifications on how to use SOAP to transport agent messages and UDDI to publish descriptions of FIPA platforms. Secondly, the TC intends to address specifications for exposing appropriate parts of standard FIPA platforms as Web Services. This appears likely to provide a useful set of tools to leverage existing Web Services tooling to access and bootstrap FIPA environments. Thirdly, the TC intends to provide a usecase to demonstrate both the overlap between the two environments, and the areas where agents provide

- Integrate existing service technologies, such as Web Services and DAML-S into a coherent service model (concrete notion of service).
- Produce a mapping between FIPA services and services in other service technologies (the relationship between DF/UDDI DS, representing FIPA services in Web Services, etc.)
- Produce input to other standardization activities (W3C, UDDI-F, etc) to close the conceptual gap between current Web Services and the abstract notion of a service. This includes building shared composition models.

TC X2S Published on the FIPA website (http://www.fipa.org/activities/experimental_to_standard.html) the minutes including the list of approved changes, and all the modified specifications for review by the entire community. The membership is invited to carefully consider and review all the approved changes, which in some cases, break compatibility of the existing implementations. All comments on these modified specifications are welcome. During next meeting, we will study the possibility to introduce lease-time mechanisms for yellow-page subscription to allow a better scaling of agent platforms towards large-scale systems.

Security WG The FIPA Security WG proposed a new work-plan (f-wp-00011) leading to the production of a security white paper, looking into the use of an encryption field in the message transport specification, to be proposed to the X2S TC. In addition the WG wants to take interim ownership of the Policies and Domain Specification (PC00089) in order to add some use-cases for trust and security policies.

Liaison SIG Explores and identifies standard bodies of relevance to FIPA and presents them to the FIPA membership during next meeting in aiming to better position FIPA in this landscape by approaching and liaising with relevant standard bodies.

FIPA for Business Applications SIG (F4BA) F4BA decided to contact several FIPA members and non-members having expressed their interest in relevant business applications.

Planning and Scheduling SIG resolutions Continue gathering knowledge from various organizations that have employed agent-based planning and scheduling.

Image Committee Publishes the FIPA inform! Newsletter, Vol. 3 Issue 2 for the end of May; improves the website with direct link to „What FIPA does" (presentation slides) from the main Web page; and circulates a list of all relevant initiatives in the Agent community.

B. Burg

Member Profile—Queen Mary University of London

The Department of Electronic Engineering at Queen Mary, University of London (QMUL) has an active group of faculty, research assistants and students involved in agent-related research. Queen Mary is one of the few campus-based universities in London and is situated 15 minutes from Oxford Street. At Queen Mary, agent research is undertaken in the Intelligent Communications Lab, which is a cross-group activity between the Telecoms group and the Digital Signal processing and Multimedia group.

Academic members of the Lab with an interest in agent technology include John Bigham, Rachel Bourne, Laurissa Touchburuk Tokarchuk and Stefan Poslad, plus 12 researchers.

The group is well known for its early work on agent theories and models. The current emphasis is on the development of agent and intelligent systems technology for communication services, survivability, e-markets and negotiation and adaptive distributed security and trust models.

We are currently engaged in several EU research projects that use agents, these include: SHUFFLE: resource management and negotiation of Telecom 3G services in an open market-place; SAFEGUARD: network dependability, security and survivability of large scale critical infrastructures; CRUMPET: location-aware tourism services for the mobile user; AGENTCITIES: a global test-bed of interconnected multi-agent systems to offer interlinked information services; EDEN-IW project: a distributed shared semantic workspace for environmental data; TORRENT: intelligent home network and services. Queen Mary is also active in the following research networks: iTrust, AgentLink and OntoWeb. Past intelligent system projects have included IMPACT, UNITE and ARCHON.

For more information, see http://www.elec.qmul.ac.uk/research/intellsys/index.html

S. Poslad

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!

Member Profile—Whitestein Technologies AG

Whitestein Technologies was founded in January 1999 with the mission to become a leading provider of advanced software agent technologies, products, solutions, and services for various applications in several industrial domains. We strongly believe that agent-based technologies and agent-oriented software engineering methodologies will be the foundation of a next generation of distributed information systems and network infrastructures, in particular in combination with other leading-edge technologies such as web services and mobile wireless computing.

On the other hand, based on our hands-on experience in the real IT-world, we also know that software agent technologies will only thrive in the marketplace if they reach industry-grade quality and applicability, and are well integrated with "traditional" technologies and products. Consequently, Whitestein pursues a well-focused, integrated and balanced approach on two paths in order to realize the agents technologies' potential for better, stable solutions and thus additional customer benefits and profits:

- Customer projects: Whitestein works on concrete development and consulting projects for customers and business partners, where software agent technologies have the potential to play a decisive role. One example is roaming support for mobile users across multi-technology/multi-vendor wireless networks.
- Product and solution development: in parallel, and in tight cooperation with strategic partners, Whitestein works on the concepts and implementation of own products and solutions. Examples include planning and scheduling support for Agile Collaboration Networks in highly dynamic and people-driven environments like hospitals, and a J2EE application server based agent platform.

Whitestein research activities include exploration programs, prototyping, and international collaborations, with both industrial and academic partnerships. The main research directions cover:

- Dynamic coordination and automated negotiation: integration of constraint satisfaction for enforcing coordination, flexible modeling of strategic behavior, dynamic contracts and agreements.
- Security and trust frameworks for open, distributed systems.
- Integration of security mechanisms within agent based environments for highly constrained environments.
- Security policies definition: the impact/constraints on system/solution design and implementation. IT constraints/requirements versus high-level mechanisms definition.

- Intelligent services: dynamic and effective service provisioning (from creation to deployment), dynamic service composition, smart Web services.

Based in Switzerland, Whitestein has a team of 50+ highly skilled people, with offices in Zurich (Switzerland), Bratislava (Slovakia), and Sophia Antipolis (France).

S. Brantschen and M. Calisti

functionality which cannot be easily implemented through web services. The final work area will address infusing agent notions into the web services arena, ideally allowing a seamless integration of Web Services with Agents, permitting FIPA implementers to harness Web Services tooling and business penetration when building and selling agent platforms and agent based solutions.

The Services TC intends to engage the W3C, OASIS and other relevant standards organization as both a consumer of technology and a provider of focused, use case driven requirements. If you are interested in helping FIPA with this work, please contact the TC-Chair, David W. Levine (dwl@watson.ibm.com) or the co-chair, Jonathan Dale (jdale@fla.fujitsu.com).

D. Levine