NETDEMO: openNet Networked Agents Demonstration

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ABSTRACT

One of the most significant challenges in applying agent technologies lies in deployment of agent systems in large-scale open environments. The objective of the NETDEMO demonstration is to show a range of agent applications which have been deployed and made accessible over multiple sites accessible via the public Internet. Demonstration are based on FIPA Agent, W3C Web Services and Semantic Web standards - covering a range of application areas from experimental games to travel/tourism and e-Business supply chains.

Systems are visualized together using the openNet network infrastructure.

Categories and Subject Descriptors

I.1.2 **Artificial Intelligence**, I.2.11 **Distributed Artificial Intelligence**. Agent systems, Web Services, Semantic Web, distributed networked applications.

1. INTRODUCTION

Whilst Agent, Web Services, Semantic Web and related technologies have advanced significantly over the past few years it remains a huge challenge to deploy systems in open, global environments such as the public Internet. The NETDEMO demonstration aims to showcase a number of current systems which have been publicly deployed and complete at least the following requirements:

– The systems must span multiple (at least 3) geographical locations and be demonstrated live.

– The systems must be deployed on publicly accessible machines/servers using well specified interfaces (e.g. GRID, Web Services, FIPA Agents, etc.) so they could be accessed by others.

– The systems must show agent or multi-agent technologies at work.

From the submissions received in the open call teams and systems listed in this overview participated in the live demonstration at AAMAS.

2. INDIVIDUAL DEMONSTRATIONS

The systems shown during the NETDEMO cover a range of application areas (game playing, e-Business supply chains, healthcare and travel/tourism for example) and technologies (FIPA Agent standards, SOAP/WSDL, OWL and others). Each is designed and managed by a separate team and described in more detail on the NETDEMO web site at http://x-opennet.org/netdemo/.

Agent Based Travel and Tourism Planning *(RMIT University, University of Western Australia, Middle Eastern Technical University)*

This demonstration shows the ability to combine web and agent services in the domain of tourism and travel, to provide complex services such as creation of a complete itinerary. User input can direct the composed service to choose appropriate providers. The application locates information providers at different sites to provide particular information items, such as events and attractions, accommodation, or distances between locations.

Technologies used: WSDL, SOAP, FIPA ACL, BDI Agents, Jack Agent Toolkit

CAPA: The CAPA Mobile Chat Agent & Web Services Gateway Agent *(University of Hamburg)*

This demonstration shows a personalized chat system based on mobile agents. A virtual "parking house" provides an environment for agents to migrate to and provide chat functionality. The demonstration also includes a related Web Services gateway based on the Mulan and AXIS frameworks - using the framework developers can integrate a web service into networks of FIPA compliant agents and vice versa.

Technologies used: FIPA standards, Agent Platform CAPA, ACE network service, Mulan, AUML, Reference Nets and Java, AXIS and SOAP.

Settler: AgentBased Settler Game *(University of Hamburg)*

This demonstration shows an update of the Settler game first demonstrated at the Agentcities event in Barcelona in 2003. The system allows agents of five different types to be deployed remotely, communicate via a shared ontology and play the Settler game according to fixed roles. Two different player agents exist as well as a user player interface.

Technologies used: FIPA standards, Agent Platform CAPA, ACE network service, Mulan, AUML, Reference Nets and Java.

WSIG: Distributed Coordination of Web Services using the JADE Web Service Integration Gateway *(Whitestein Technologies AG)*

The JADE Web Service Integration Gateway (WSIG) is plugin for JADE platforms that transparently connects JADE agents with externally published Web services. The WSIG offers fully automatic, bidirectional operation allowing JADE agents to invoke Web services and vice versa. The demonstration consists of three geographically distributed locations, one offering Web services (Bratislava) , one offering both Web services and JADE agent services (Zurich), and one offering services and acting as the demonstration coordinator (local to Demo). The demonstration itself features a local coordination system consisting of a WSIG enabled JADE application, capable of discovering full and partial agent and Web service descriptions from all three locations and then using these descriptions to construct dynamically variable composed services. The system will operate under live conditions.

Technologies Used: JADE Agent Platform, JADE Web Services Integration Gateway (WSIG), Apache Axis Web Server

A Distributed Services based conference planner application using Software Agents, Grid Services and Web Services *(National University of Sciences and Technology Pakistan, Communication Technologies Japan)*

This demonstration highlights the applications of our research work i.e. second generation (Scalable Fault Tolerant Agent Grooming Environment – SAGE) Multi Agent System, AgentWeb Gateway for integration of FIPA Multi Agent System and Web Services Framework and Autonomous Agent Architecture in the Agent Platform. It is a conference planner application that uses collaborative effort of services deployed geographically wide in different technologies i.e. Software Agents, Grid computing and Web services to perform useful tasks as required.

Technologies used: FIPA Agent Platform SAGE, Globus toolkit, Apache web server and SOAP engine

INCA Intelligent Community Alarm *(Sheffield Hallam University / UK)*

This demonstrator shows the INCA platform for cost effective community health care [5] developed further from previous demonstrations as part of the Agentcities project. This demonstrator has been developed to show how the different types of agents forming part of a care routine can work effectively together to provide coordinated and efficient care under a range of realistic operating conditions. The demonstration is based on a number of home and care agents which are hosted on local machines and a set of management agents that are hosted remotely and connected through the openNet network.

Technologies used: FIPA Agents, INCA application platform.

www.AgentEnterprise.net - a Multi-Multiagent System-based Web-Portal for Planning and Control of Complex Manufacturing Supply Chains *(DispoWeb, ControMAS, IntaPS, ATT/SCC, ASCML groups from the German DFG SPP1083 Agent technology research program. Contact: Thorsten Scholz, TZI, Bremen.)*

The working groups manufacturing logistics and agent technology of the German priority research program SPP1083 "Intelligent Agents in Real-World Business Applications" [4] will jointly show a multi-multiagent system based web portal to demonstrate agent technology applied to complex manufacturing supply chains, called "www.AgentEnterprise.net". The demonstration will show a large-scale prototypical implementation of the portal that incorporates three types of individual multiagent systems: one for supplychain-wide planning of orders (by DispoWeb), one specialized for intra-organizational production planning and scheduling (by ControMAS and IntaPS) and one for supply chain tracking (ATT/SCC) that is responsible for supply chain event management. The four participating MASs and their interaction is visualized within the portal website in the context of the whole supply chain. The technical management of the MMAS is done using ASCML (Agent Software Configurator Manager and Launcher).

Technologies used: Apache, Tomcat, RDBMS, Jade, OpenNet, ASCML, Protege, Beangenerator.

@lis technology net (EuropeAid @lis technology net project)

This demonstration will show the results of the EuropeAid @lis technology net project [1] including a distributed tourism scenario in which FIPA based Agents compose component tourism services from several Latin America countries including Chile, Costa Rica and Mexico. The scenario shows live access to remote services, discovery and composition. A range of simple services are also demonstrated on wireless devices.

Technologies used: FIPA Agents, JADE Agent platform, openNet network tools, APACHE AXIS.

3. INTEGRATED DEMONSTRATION

Platforms and services from each of the individual demonstrations will be live and connected to the openNet network infrastructure (see http://x-opennet.org/netdemo/) during July 2005 and possibly beyond. See the web site for updates.

4. ADDITIONAL INFORMATION AND ACKNOWLEDGMENTS

Please see http://x-opennet.org/netdemo/ for more details of the demonstrations, as well as the funding agencies and teams supporting work on each.

5. REFERENCES

[1]   @lis technology net project homepage http://www.alis-technet.org/

[2]   Agentcities Homepage http://www.agentcities.org/

[3]   NETDEMO Homepage http://x-opennet.org/netdemo/

[4]   SPP 1083 Joint working groups on manufacturing Logistics and Agent technology http://www.realagents.org/

[5]   Beer, M. D. and Huang, W. and Sixsmith, A, "Using Agents to Build Practical Implementation of the INCA System", in Jain, L. C. and Chen, Z, and Ichalkaranje, N. "Intelligent Agents and the Applications", Spring, 2002.

[6]   Greenwood, D. and Calisti, M. "Engineering Web Service – Agent Integration" in Proceedings of the IEEE Conference on Systems, Man and Cybernetics, The Hague, The Netherlands, 2004.