IEEE FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS STANDARDS COMMITTEE (FIPA SC)

Working Group: P2P Nomadic Agents[1]
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Problem Statement:

Current peer-to-peer (P2P) standards (UPnP Forum www.upnp.org) need an additional level to deploy and manage applications automatically. Agent technology is uniquely well-suited for this task, because it is intrinsically P2P capable of managing configurations and leading negotiations in serverless environments (also called *pure P2P* in the following).

Current FIPA Specs have started work in this domain; however, these specifications need to be generalized, extended and updated. No generic P2P Nomadic Agents exist anywhere in the world, and FIPA will make a breakthrough by providing the first complete specifications and fostering implementations. The goal of this WG is to provide a specification for P2P Nomadic Agents as well as a reference implementation capable of running on small nomadic devices.

Potential impact: P2P networks represent an unparalleled growth opportunity for the agent community to push FIPA specifications into pervasive products ranging from telephony to consumer electronics. The P2P market is growing fast; for example Skype has 47 million users and adds 150,000 new ones every day (details at www.skype.com), with an average 2.5 million Skype users online at any time. Other well known examples are bitTorrent (.com) and eDonkey2000 (.com). In total, P2P network traffic may account for up to 85% of Internet bandwidth usage (see reference).

Objective:

Starting from existing FIPA specifications (in particular, FIPA JXTA Discovery Middleware Specification PC00095A and the experience acquired during its implementation), the objective is to define a specification for P2P Nomadic Agents, capable of running on small or embedded devices, and to support distributed implementation of applications for consumer devices, cellular communications and robots, etc. over a pure P2P network. This specification will leverage presence and search mechanisms of underlying P2P infrastructures such as JXTA, Chord, Bluetooth, etc. In addition, this working group will propose the minimal required modifications of existing FIPA specifications to extend their reach to P2P Nomadic Agents.

Potential application fields for P2P Nomadic Agents are healthcare, industry, offices, home, entertainment, transport / traffic…

Documents Generated:

- Experimental IEEE FIPA P2P Nomadic Agents specifications by September 2006
- One reference implementation (developed by submitters) by October 2006
- Standard IEEE FIPA P2P Nomadic Agents specifications by December 2006

Technology:

- Extend existing FIPA spec PC00095A (JXTA Discovery Middleware Specification) towards general support of P2P, allowing leveraging of presence mechanisms, directories and search capabilities and linking to the existing FIPA search mechanisms in a seamless manner
- Define a lower-level API connecting this FIPA P2P Nomadic Agents to P2P networks
- Use the FIPA ACL
- Enable ad-hoc connections to small networks of peers (PAN, LAN…) and across these networks Extension to the whole Internet or very large scales is not the focus of this Working Group.
- Allow the self-organization and management of a set of devices in a pure P2P network

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[1] *P2P Nomadic Agents* are autonomous agents capable of running on nomadic devices in a P2P world, without need for a connection to a server or a container. Mobile code and Mobile agents are outside the scope of this working group.

- Ensure the ability to run on a small footprint platform or an embedded device (consumer electronics, nomadic devices, cellular phones, etc.)
  Optional:
- Extend the FIPA search mechanism towards more generic searches. Provide a layered approach to semantic searches
- Define a higher-level API linking this P2P Nomadic Agents to existing FIPA-compliant tools

Plan for Work and Milestones:

This working group aims to produce experimental P2P Nomadic Agents specifications by September 2006, provide at least one reference implementation, and finalize the standard by end of 2006.
Most of the work will be done by email and conference calls in between face-to-face meetings. Meetings are devoted to decision making and solving hard issues that cannot be solved by any other means.

- Creation of the working group, definition of modus operandi, definition of precise work agenda, technical work, September 13-14, 2005, Budapest, HU.
- Call for Proposal (CFP), September 30, 2005
- Study of the CFP answers, finalization of workplan, draft of the specification outline, draft of initial technical specification elements, December 2005
- Draft of preliminary specs, establishment of a list of open issues, and their solutions, March 2006
- First version of the reference implementation, June 2006
- Publication of experimental IEEE FIPA specs, September 2006
- Publication of the reference implementation, October 2006
- Publication of standard IEEE FIPA specs, December 2006

Dependencies:

FIPA specs, 23, 95 (www.fipa.org)
UPnP specifications (www.upnp.org)
Bluetooth (www.bluetooth.com)
JXTA (http://spec.jxta.org)

Synergies with EU projects, CASCOM etc.
Synergies with IETF `P2P-SIP Bar BOF, and P2PRG CORE`
Strong industrial support for the reference implementation and trial of technology in P2P application prototypes, in particular from the telecommunication and the consumer electronics industries. Academic support from four continents.

Participants:

Submitters:

Michael Berger (Siemens, DE),
Bernard Burg (Panasonic, US), (attends Budapest meeting)
Heikki Helin (Telia Sonera, FI), (attends Budapest meeting)

Supporters (confirmed on August 19 05)

Stephen Cranefield (U. Otago, NZ),	Philippe Morin (Panasonic, US)
Yoshiharu Dewa (Sony, JP),	Itsuki Noda (AIST, JP)
Martin Griss (CMU-West, US),	Michal Pechoucek (Gerstner Labs, CZ),
Oleg Karsayev (SPIIRAS, RU),	Michael Pirker (Siemens, DE),
Alberto Y.B. Kim (Samsung, KR),	Martin Purvis (U. Otago, NZ),
Matthias Klusch (DFKI, DE),	Sergi Robles (UAB, SP),
Ryszard Kowalczyk (Swinburne U. AU),	Santtu Toivonen (VTT, FI),
Alan Messer (Samsung, US),	Arkady Zaslavsky (Monash U., AU).

EU IST CASCOM project (www.ist-cascom.org)

Supporters (we are waiting answers from about ten additional supporters and 2 EU projects)