

Fipa Introduction

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We give an overview of the Foundation for Intelligent Physical Agents (FIPA¹). This talk is based on

- Jonathan Dale and Ebrahim Mamdani. Open Standards for Interoperating Agent-Based Systems.² *Software Focus*, 1(2), 2001.

1 Introduction

- FIPA is the Foundation for Intelligent Physical Agents, with website at www.fipa.org³
- Concerned with *agency* as it relates to
 1. Autonomy (goal-driven)
 2. Communal Integration. Mostly communication, but also cooperation.
- Does **not** dictate how agent is implemented, but agent must obey the BDI semantics FIPA describes. This becomes an issue because it is hard to test for rationality.

2 Motivation

- Before FIPA there were:
- About 60 proprietary agent systems.
- Most of them were closed to outsiders.
- Most of them were incompatible with each other.

3 Mission Statement

- **Mission Statement:** The promotion of technologies and interoperability specifications that facilitate the end-to-end inter-working of intelligent agent systems in modern commercial and industrial settings.
- **Goal:** through a combination of speech acts, predicate logic and public ontologies, FIPA can offer standard ways of interpreting communication between agents in a way that respects the intended meaning of the communication. This is much more ambitious than, for example, XML, which only aims to standardize the syntactic structure of documents.

4 Members

Europe	Americas	Asia
Europe AEGIS British Telecommunications Broadcom France Telecom Hi-Flier Lost Wax Ltd. Minutor Oy Agentscape Robert Bosch GmbH SGI Soluciones Globales Internet SiemensAG Sixth Element Group Ltd. Socit Nationale des Chemins de Fer Sonera Telecom Italia Lab Telia AB Teltec Ireland Tryllian BV Whitestein Technology	Allen Bradley LLC (Rockwell Automation) Hewlett Packard Company IBM Corporation Intel Corporation James Odell Associates MITRE Corporation Motorola NASA-Goddard Space Flight Center Sandia National Lab Sun Microsystems, Inc. Telcordia Technologies The Boeing Company WebV2, Inc.	Communication technologies Electronic and Telecommuni- cations Research Institute Fujitsu Limited Hitachi KDDI R&D Laboratories Inc. Mitsubishi Electric Corp. NEC Corporation Nihon Unisys Ltd. Nippon Hosokawa Nippon Telegraph and Tele- phone Corporation OKI Electronic Industry, Co Ltd Pioneer Electronic Corpora- tion Toshiba Corp. Victor Company of Japan, Co. Ltd

5 FIPA Specifications

1. Preliminary	→	4. Deprecated	→	5. Obsolete
↓				
2. Experimental	→			
↓				
3. Standard	→			

1. Preliminary: Draft under discussion.
2. Experimental: Approved, fixed for 2 years. Stable. Suitable for implementation.
3. Standard: Approved and implemented by 2 or more, successfully.
4. Obsolete: Rendered unnecessary.
5. Deprecated: Potentially unnecessary.

6 Existing FIPA Specifications

- Application-oriented
 - Personal Assistant
 - Personal Travel Assistant
 - Audio/Visual Entertainment and Broadcasting
 - Network Management
 - Nomadic Application Support
- Technology-oriented
 - Message Transport

- Agent Communication Languages
- Semantic Content Languages
- Interaction Protocols
- Platform Management

7 Structure of Specifications

Agent-based Applications	Abstract Architecture
Agent Communication	
Agent Management	
Agent Message Transport	

8 Agent Message Transport

Agent-1	Agent-2		Agent-3	Agent-4
Message Transport Service		Message Transport Service		
Message Transport Protocol				

- The agent platform encompasses the agent and MTS.
- Agent Message Transport (AMT) defines a message as an **envelope** plus a **body**. They handle
 - Guidelines for various transport protocols (e.g., IIOP, HTTP, WAP)
 - Message envelope representation (e.g., XML for HTTP, bit-efficient for WAP).
 - FIPA ACL representations (e.g., string encoding, XML encoding, bit-efficient encoding).

9 Agent Management System

Agent-1	Agent Man- agement System	Directory Facilitator		Agent-2	Agent Man- agement System	Directory Facilitator
Message Transport Service			Message Transport Service			
Message Transport Protocol						

- Handles the creation, registration, location, communication, migration and retirement of agents. It provides the following services:
 - White pages, such as agent location, naming and control access services, which are provided by the Agent Management System (AMS). Agent names are represented by a flexible and extensible structure called an agent identifier, which can support social names, transport addresses, name resolution services, amongst other things.
 - Yellow pages, such as service location and registration services, which are provided by the Directory Facilitator (DF).
 - Agent message transport services.

10 Communications

Message Expressed in an Agent Communication Language
Sender: Agent-name Receiver: Agent-name
Message: content Expressed in a content language May reference an ontology

- Based on communicative acts (performatives) which are illocutionary verbs (i.e., they describe the speaker's intention).
- ACL = ca + msg. ACL provides mechanism for context (e.g., sender, receiver, ontology, protocol).
- FIPA ACL based on ARCOL and KQML.
- Content (msg part) is in a content language such as the FIPA semantic language, constraint choice language, KIF, RDF.
- **FIPA Interaction Protocols** (IPs) describe conversations for the purpose of achieving some interaction or effect (e.g., auction, contract-net, negotiation).

Notes

¹<http://www.fipa.org>

²<http://www.fipa.org/docs/input/f-in-00023/f-in-00023.html>

³<http://www.fipa.org>

This talk is available at <http://jmvidal.cse.sc.edu/talks/fipaintro>

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