FIPA, Agents and the OMG

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Introduction

- Who and what is FIPA
- What is an agent?
- What is FIPA's contribution?
- The status of FIPA standards

Foundation of Intelligent Physical Agents

- International independent organization
- 47 members, including 28 corporations, 13 academic organizations and 10 Telcos.
- Chaired by Dr. L. Chiaglone of CSELT.

What is an agent?

- An agent is
  - the fundamental actor in a domain. It combines one or more service capabilities into a unified and integrated execution model which can include access to external software, human users and communications facilities.
- An agent is
  - Autonomous
  - Communicative
  - owned

An agent is not an object

- Agent's autonomy is deep:
  - Messages are not methods, but tokens in a negotiation
  - Receiving messages is a positive action
  - The outcome of a conversation between two agents may depend on other conversations the agents are having with other agents
  - An agent is free to say NO

Speech acts and messages

- A speech act is an act of communication
  - Locutionary act -- making an utterance
  - Illocutionary effect -- catagorizing an utterance
  - Perlocutionary effect -- intended effect of an utterance
- Combinations of speech acts (in FIPA ACL) form protocols, which are logically related networks of messages.

Speech act messages

- The general form of a speech act encoded as a message is:

(***performative***

:content *contents*

)

- The performative is typically one of:
  - inform, agree, not-understood, propose
- The content is a proposition -- a sentence with a truth value.

A FIPA ACL message

```
(inform
    :sender agent1
    :receiver hpl-auction-server
    :content
        (price (bid good02) 150)
    :in-replyto round-4
    :reply-with bid04
    :language sl
    :ontology hpl-auction-ontoloy
    :protocol hpl-auction
)
```

Features of ACL messages

- ACL messages are recursively embeddable
- Separate meta-/object-language allows agents to model other agents' intentions
- Protocols enable conversations between agents
- Ontologies allow agents to agree on the meanings of words on a per-conversation basis

Multi-agents systems as computer architecture

- Multi-agent systems is an approach to building computer systems
- Can be viewed as a generalization of Client-Server architectures
  - An agent is variously a client and a server, sometimes simultaneously.

Benefits of agents

- This style allows us to encapsulate *intentions* as a separable computable entity.
  - We can capture our goals as software processes
- The `soft' nature of negotiations makes it easier to build large scale dynamic distributed applications
  - The requirement that a negotiation is permitted to fail also permits dynamic `networking' between agents

FIPA's contributions

- Agent communication language
  - Similar to KQML
  - Well-founded semantics
  - Support for multiple ontologies
- Demonstration example scenarios
  - Proof of concept situations
  - Include personal assistant, travel assistant, network managent, manufacturing
- Agent management standards
  - Standards for getting information about agents
  - Including mobile agents

Current status of FIPA

- Membership is increasing
- Stable standards for communications language, simple agent management
- Draft standards for mobile agents, security, ontology mgt, and human/agent interaction
- Forthcoming topics may include agent configuration, agent-oriented communication protocols, additional application domains

Summary

- Agents are not the same as mobile objects
- Agents encapsulate ***intentions***
  - This requires a lot of technology that is in addition to conventional OO-style technology
- FIPA is a major force in standardizing agent interoperability
- See the website at
  - **drogo.cselt.stet.it/fipa**