Agentcities Travel Assistant : A multi-agents system that delivers itinerary timetables

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Abstract. France Telecom R&D whishes to stimulate the usage of the agent paradigm in the service development area by illustrating and demonstrating the potential of the FIPA technology. We propose to build a multi-agents system that delivers itinerary timetables between European cities. This new node in the Agentcities network will provide a new "intelligent" source of information to be used by, and interact with other agents

1. Introduction

France Telecom R&D is a leading actor on rationnal agents technologies, and has been involved in the FIPA consortium from the beginning. France Telecom R&D is at the origin of the rationnality theory on which are based FIPA ACL and FIPA SL languages. In order to demonstrate the potential of this theory and of the FIPA standard, France Telecom R&D proposes to add a new node in the Agentcities network that will be based on this theorical ground. This node will consist in a FIPA platform, hosting several FIPA agents that collaborate with each other to provide itinerary timetables between European cities. On one hand, this node will add a new source of information for the network, inline with the Agentcities application domain. On the other hand, the objective of this application is also to demonstrate the capacity of FIPA agents to be combined to build new value added services. In such a way, the Travel Assistant will be able to interact with other travel related agent services (taxis, hotels) to increase its value, or to be used by other higher level services like virtual travel agencies.

2. The Travel Assistant agents

FTR&D proposes to connect a FIPA agent platform to the Agentcities network that will host several FIPA compliant agents. These agents will provide information assistance for travel in Europe. The platform itself will be hosted in Lannion (France) and connected to the Agentcities network through standard Internet protocols. The

travel assistance service will be based on several FIPA collaborating agents. These agents will use the France Telecom R&D ARTIMIS technology and will be able to interact with other agents using standard FIPA protocols.

The Lannion agent platform will host 3 different kinds of agents :

- one agent that will deliver information about train timetables between main cities in Europe,
- one agent that will deliver information about flights timetables between main airports in Europe,
- and one agent that will be able to deliver end to end trip information potentially mixing both means of transport. This agent will act as a broker between other agents and the train and flights agents. It will be able to interact with FIPA agents through the agent platform and standard FIPA protocols, and eventually with human users through a dedicated interface in natural language.

The first two agents will deliver data extracted from public web sites and encapsulated into ontology objects. They will use standard FIPA protocols with other agents like the FIPA-Query protocol. The third agent will deliver data based on the two other agents. It will manage a negociation with them with the objective to return an adequate answer to the other requesting agents. This agent will use standard negociation protocols like FIPA-Query or FIPA-ContractNet, or specific protocols.

Note that Agentcities agents on network will be able to interact with any of these 3 agents. The level of services will depend upon which agent is contacted.

3. Détail of the work

Because the nature of the project and the aim of the Agentcities network is to create a number of agents that interoperate, we intend to make the application available on the network as soon as possible, even in a very low feature version.

The work to be done will be divided into the following tasks :

- FIPA platform deployment :

  This task will consist in installing and running a FIPA agent platform on the internet, implement the minimal necessary protocols (like the Ping agent) and platform description to make it interoperable with the other platforms on the Agentcities network, and finaly run interoperability tests. The agents residing on this platform will be registered in its Directory Facilitator with adequate service description. We envisage to use JADE or LEAP platform on a Windows 2000 computer.

- Travel Ontology definition :

  To interact between them and with other Agentcities agents, a travel ontology have to be defined. Although we do not intend to provide a full complete ontology for travel systems interoperability, we will have a look on the already existing specifications like OTA specs (Open Travel Alliance). As far as possible, we will use standard content languages and tools (like Protégé 2000) to generate this ontology.

- Train and Flights agents design and implementation :

  Although these two agents will be able to interact fully independently, they will be based on a common architecture. Timetables for each means of transport will be wrapped from public web sites and delivered through the use of standard FIPA protocols.

- Travel assistant design and implementation :

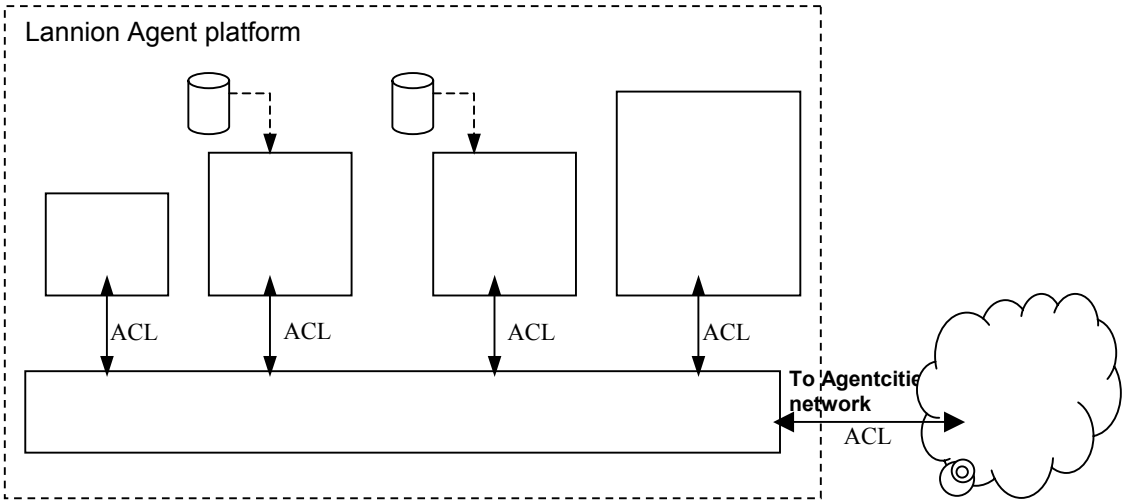
  This agent will be seen as a broker from the other agents point of view. It will offer a global service about travel timetables, taking in account means of transport combination. Other FIPA agents will have the possibility to interact directly with the Train or Flights agents for requests on a specific mean of transport, or with the Travel Assistant for more general requests with a value-added service (like taking in account steps during the journey, delays for transit, combination of trains and flights). This agent implementation will be based on the ARTIMIS technology developed at France Telecom R&D. Moreover, depending on the project schedule, this agent may be extended to offer a human interface with natural langage interaction.

- Web site :

  A web site will publish information on the Lannion node. This one will give an overview of the node (presentation, available services, evolutions, status of the node) and technical information (service and platform description, platform address, protocols and ontologies).

4. Architecture

The global architecture of the Lannion agent platform will be similar to the following picture :



5. Innovation, relevance to Agentcities and Exploitation

The innovative aspects of the Travel Assistant application resides on :

- A multiagent application, where each agent can be requested individually, or combined by a higher level service. The later will demonstrate the possibility to build added value services based on multi-agents systems and more specifically on FIPA compliant agents.
- The travel assistant agent will be based on the intelligent interaction kernel ARTIMIS, developed at France Telecom R&D. This one is an implementation of the interaction theory on which is based the FIPA ACL semantic. The same kernel is used for agent-agent interactions and human-agent natural language interactions. The usage of this technology inside a real opened agent testbed like Agentcities, will demonstrate the potential of agents in dynamic services environment, and their application to build compound value added services.
- The integration of non agent services (web sites) into the agent world.

The travel assistant service is new to the Agentcities network. It covers travel assistance between cities in Europe and add a new source of information available to other agents. The service can be used directly as such, or combined with any of the other agents connected to the network, to provide travel information for value added services. For example, it could be efficiently combined with Taxi or Hotel booking to provide full packaged journey offering, international meeting organization and so on. Contacts will be established with other related Agentcities projects in order to optimize service interoperability in terms of ontologies or languages.

The results of the project will be made public as soon as they do not interfere with the France Telecom intellectual and industrial property rules. These results will also be used internally in France Telecom R&D for agent technology dissemination and illustration. But the aim of the project is also to keep this platform running on the internet and available to other agents that will build higher level services. Moreover,

this testbed will also be used by France Telecom R&D to demonstrate results of other innovative internal projects around the agent technology.