FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

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Problem Statement:

The *service* concept is germane to many current technologies, including Jini, software agents, the Grid and the Semantic Web with DAML-S, as well as the area of contemporary Web Services with its representative technologies of SOAP, UDDI, WSDL, BPEL, etc. While each of these technologies has a distinct focal point, there is also overlap in the application areas that they aim to serve. Furthermore, the continued evolution and maturation of these technologies will inevitably lead to convergence.

For example, he DAML-S effort to develop an ontology of services will support the use of services on the Semantic Web and the current technologies that comprise the area of Web Services also seek to enable the use of services on the Internet. These two efforts support the discovery, composition and utilization of services on the Internet. Interestingly, software agents are among the clients that DAML-S seeks to serve, but, neither DAML-S nor WSDL take into account the needs of agents and interoperability at the service level.

The concepts of service and ontology permeate the FIPA Agent Management Specification [FIPA00023]. In particular, the FIPA specifications provide for a Service Description object that represents a description of each service that is registered with the Directory Facilitator. However, the current definition is too unstructured since there is no notion of service composition, which is crucial for expressing service relationships and defining service flows. The FIPA specifications also do not capture the meta-level information of a service.

An effort to define the *service* concept more fully and completely within the context of the FIPA specifications would have benefits beyond the agent world. Ideally, services that are hosted in a FIPA-compliant multiagent framework would be accessible to a range of clients through the service paradigm. With the service concept more fully developed within the FIPA specifications, integration with other relevant technologies could proceed. An ultimate test of integration would involve composition models that can be shared between different environments and component services that are hosted across different types of frameworks, such as the Web Services environment and the FIPA-compliant multi-agent system. With this level of integration, agents will be able to naturally invoke and respond to, for example, Web Services and Web Services will be able to naturally invoke and respond to agents.

Objectives: There are three main objectives of this work plan:
- Develop a meta description of service. This should be at the level of the FIPA Abstract Architecture to capture the concepts of service elements and service composition.
- Offer multi-service groundings. Focus on groundings for Internet relevant service technologies of DAML-S and WSDL.
- Determine how to integrate the new service model into FIPA.

Technology: Input for this work plan will come from extant service technology specifications:
- FIPA Service Description from [FIPA00023]

- Service Description Service from [FIPA00094]
- DAML-S
- Web Services Description Language (WSDL)
- Business Process Execution Language (BPEL)

Specifications generated:
- Abstract Service Specification
- FIPA Service Description specification
- Grounding for WSDL
- Grounding for DAML-S

Plan for Work and Milestones: The plan is for an 18 month activity including the following steps:
- 2003/03   Initial work on White Paper detailing the requirements and issues for meta-service descriptions and modelling
- 2003/07   Completion and distribution of White Paper. Begin work on defining abstract service model
- 2003/11   Preliminary version of Abstract Service Specification. Begin work on developing a concrete service model for FIPA
- 2004/03   Experimental version of Abstract Service Specification. Preliminary version of FIPA Service Description
- 2004/07   Begin work on groundings for WSDL and DAML-S. Experimental version of FIPA Service Description
- 2004/11   Experimental versions of Grounding for WSDL and Grounding for DAML-S

The project plan will be reviewed and revised, if and when necessary.

Dependencies:
- [FIPA00001] FIPA Abstract Architecture Specification
- [FIPA00023] FIPA Agent Management Specification

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FAB Comments: