

FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

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This work-plan will seek to address some of the specific ontological requirements for interoperating agent applications, with a specific focus on referencing multiple ontologies within single content expressions.

Problem Statement:

Many standards exist (or are in progress) for ontology infrastructures, as well as guidelines for engineering ontologies and representing them. However, these are in effect peripheral to the core issue, because many of these approaches take a static, closed perspective on knowledge expression and prior knowledge. Specifically, the referencing of multiple ontologies within single message content expressions is rarely supported, and is not currently addressed by FIPA. Hence interpretation of ontological mappings and relationships may vary within a communication; implying that interoperability at the semantic level can not always be guaranteed.

Standardizing methods for knowledge sharing and filtering through ontological representation will allow interoperating systems to automate message processing with respect to cross-referenced semantic classification. This will be one of the first steps in enabling true content based service discovery and scalability in developing services both from the provider and user perspective.

The particular focus will be to enable a structured, standardized approach towards the support of multiple ontologies within a content representation and concepts of relationships held within propositional content.

Objective:

There are five main objectives of this work-plan:

1. Review the former work on ontologies by FIPA [FIPA00086]. This material should be updated to include a FIPA position statement and full FIPA2000 compliance.
2. Develop an understanding of, and working relationships with, other projects and standards in this area (such as OKBC, DAML and OIL), in order to design an ontology stack enabling semantic interoperability.
3. To issue a Call For Information to the community.
4. To identify ontology specific architectural abstractions, illustrating any impact on other FIPA standards. Areas to be addressed will be:
 - Multi-ontology referencing within unitary content expressions.
 - Manipulation of ontological structures from a communication perspective, that is how to decompose the content into semantic trees.
 - Sharing of ontologies.
 - Guidelines on how to test ontological interoperability.
 - To work closely with semantic web efforts, such as DAML+OIL.
5. Design of a test suite for a multi-ontology tool 'bake-off' between agent platforms and other knowledge sharing services.

Technology:

There are a number of developments in ontology standards and tools that have relevance. A call for information will be issued to assess and possibly incorporate technology contributions from responders to this call.

Specifications generated:

Re-open the FIPA 98 Ontology Service Specification [FIPA00086].

Plan for Work and Milestones:

The plan is for a 12 month program of work and includes the following steps:

- 2001/05 Issue Call For Information: This will focus on the work in DAML+OIL, but will not be limited to this.
- 2001/07 First draft of informative output document on Ontologies. The document will address how to represent and manage message content with multiple ontological references within agent communication and dialogues.
- 2001/09 Final version of informative output document.
- 2001/09 Design of a test suite to highlight the semantic interoperability stack relating to ontological representation. This should include the work of DAML and OIL.
- 2002/01 Pragmatic testing of "Multi-ontology Tool Bake-off" with FIPA platforms but also with the Semantic Web and other relevant architectures.
- 2002/04 Completion of testing and report of results.
- 2002/05 Feedback to the FIPA community and ultimately the Ontology Service Specification.

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

Future Work:**Dependencies:**

- [FIPA00001] FIPA Abstract Architecture Specification
- [FIPA00061] FIPA Agent Communication Language Parameters Specification
- [FIPA00037] FIPA Communicative Act Library Specification
- [FIPA00025] FIPA Interaction Protocol Library Specification
- [FIPA00007] FIPA Content Languages Specification

Additional References:

DAML: "DARPA Agent Markup Language", <http://www.daml.org/>.

OIL: "Ontology Inference Language", <http://www.ontoknowledge.org/oil/>

Support:

- Patricia Charlton, Motorola
- Dominic Greenwood, Fujitsu
- Tim Finin, University Maryland.
- Jim Odell, James Odell Associates

FIPA Architecture Board response: