Foreword

The Foundation for Intelligent Physical Agents (FIPA) is an international organization that is dedicated to promoting the industry of intelligent agents by openly developing specifications supporting interoperability among agents and agent-based applications. This occurs through open collaboration among its member organizations, which are companies and universities that are active in the field of agents. FIPA makes the results of its activities available to all interested parties and intends to contribute its results to the appropriate formal standards bodies.

The members of FIPA are individually and collectively committed to open competition in the development of agent-based applications, services and equipment. Membership in FIPA is open to any corporation and individual firm, partnership, governmental body or international organization without restriction. In particular, members are not bound to implement or use specific agent-based standards, recommendations and FIPA specifications by virtue of their participation in FIPA.

The FIPA specifications are developed through direct involvement of the FIPA membership. The status of a specification can be either Preliminary, Experimental, Standard, Deprecated or Obsolete. More detail about the process of specification may be found in the FIPA Procedures for Technical Work. A complete overview of the FIPA specifications and their current status may be found in the FIPA List of Specifications. A list of terms and abbreviations used in the FIPA specifications may be found in the FIPA Glossary.

FIPA is a non-profit association registered in Geneva, Switzerland. As of January 2000, the 56 members of FIPA represented 17 countries worldwide. Further information about FIPA as an organization, membership information, FIPA specifications and upcoming meetings may be found at http://www.fipa.org/.
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1 Scope
This document specifies the Query Ref communicative act which is compliant to [FIPA00037] requirements.
### 2 Query Ref

<table>
<thead>
<tr>
<th>Summary</th>
<th>The action of asking another agent for the object referred to by an referential expression.</th>
</tr>
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<tbody>
<tr>
<td>Content</td>
<td>A descriptor (a referential expression).</td>
</tr>
<tr>
<td>Description</td>
<td><em>Query-ref</em> is the act of asking another agent to inform the requestor of the object identified by a descriptor. The sending agent is requesting the receiver to perform an <em>inform</em> act (see [FIPA00046]), containing the object that corresponds to the descriptor.</td>
</tr>
</tbody>
</table>

The agent performing the *query-ref* act:

- does not know which object or set of objects corresponds to the descriptor; and,
- believes that the other agent does know which object or set of objects corresponds to the descriptor.

### Formal Model

\[
i, \text{query-ref}(j, \text{Ref} x \delta(x)) = \\
i, \text{request}(j, <j, \text{inform-ref}(i, \text{Ref} x \delta(x))>) \\
\text{FP: } \neg \text{Bref}_i(\text{Ref} x \delta(x)) \land \neg \text{Uref}_i(\text{Ref} x \delta(x)) \land \\
\neg \text{B}_i \text{I}_j \text{Done}(<j, \text{inform-ref}(i, \text{Ref} x \delta(x)))> \\
\text{RE: } \text{Done}(<i, \text{Inform}(j, \text{Ref} x \delta(x) = r_j)>|...| \\
<i, \text{Inform}(j, \text{Ref} x \delta(x) = r_k)>)
\]

Note: \(\text{Ref} x \delta(x)\) is one of the referential expressions: \(\iota x \delta(x)\), any \(x \delta(x)\) or all \(x \delta(x)\).

### Example

Agent i asks agent j for its available services:

\[
\text{(query-ref} \\
\text{:sender i} \\
\text{:receiver j} \\
\text{:content} \\
(\text{all} ?x \\
(\text{available-services j} ?x)) \\
\text{...})
\]

j replies that it can reserve trains, planes and automobiles:

\[
\text{(inform} \\
\text{:sender j} \\
\text{:receiver i} \\
\text{:content} \\
(= \\
(\text{all} ?x \\
(\text{available-services j} ?x)) \\
(\text{set} \text{ reserve-ticket train}) \\
(\text{reserve-ticket plane}) \\
(\text{reserve automobile})) \\
\text{...})
\]
3 References
