FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

FIPA Query Interaction Protocol Specification

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Geneva, Switzerland

consequential, which may result from the use of this specification.

Foreword

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1 FIPA Query Interaction Protocol

In the FIPA Query Interaction Protocol (IP), the receiving agent is requested to perform some kind of *inform* action (see [FIPA00037]). Requesting to *inform* is a query, and there are two query-acts: *query-if* (see [FIPA00037]) and *query-ref* (see [FIPA00037]) and either act may be used to initiate this protocol. In either case, an *inform* is used in response, although the content of the *inform* given in response to a *query-ref* would be a referring expression.

The representation of this IP is given in *Figure 1* which is based on extensions to UML1.x [Odell2001]. This protocol is identified by the token fipa-query as the value of the protocol parameter of the ACL message.

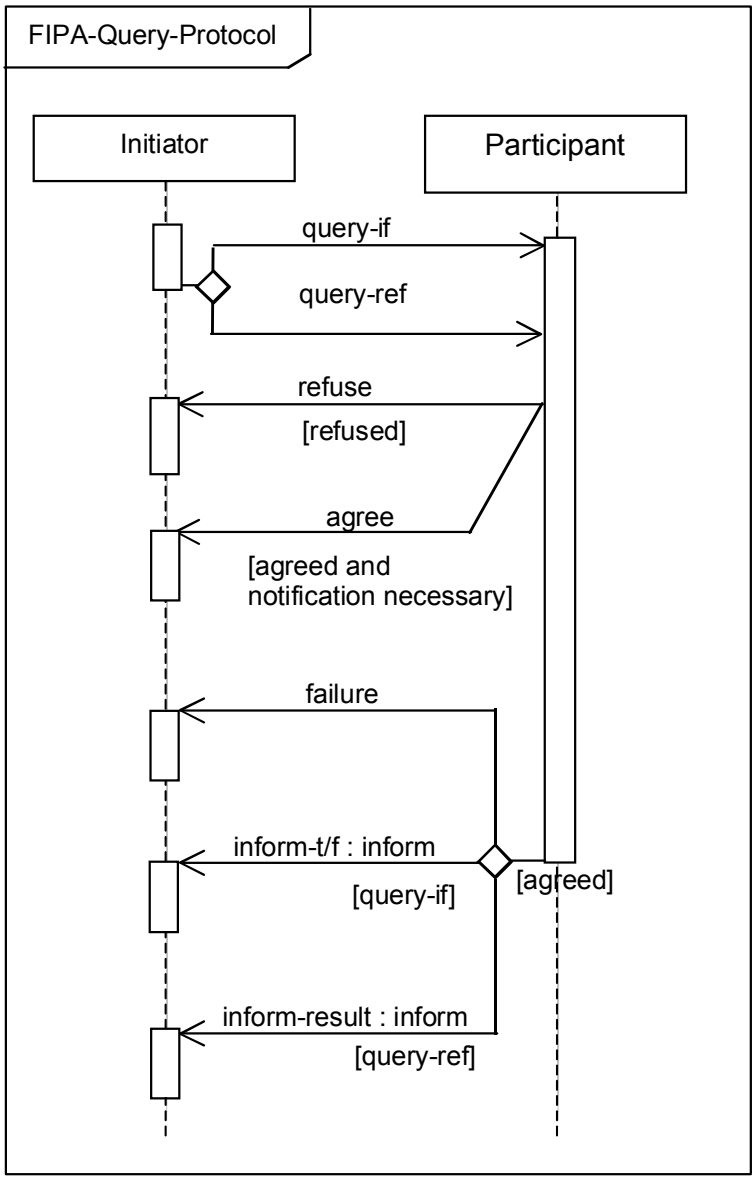

Figure 1: FIPA Query Interaction Protocol

1.1 Explanation of the Protocol Flow

The Initiator requests the Participant to perform some kind of `inform` action (see [FIPA00037]) using one of two query communicative acts, `query-if` or `query-ref`. The `query-if` (see [FIPA00037]) communication is used when the Initiator wants to query whether a particular proposition is true or false. The `query-ref` (see [FIPA00037]) communication is used when the Initiator wants to query for some identified objects. The Participant processes the

query-if or query-ref and makes a decision whether to accept or refuse the query request. If the Participant makes a refuse decision, then "refused" becomes true and the Participant communicates a refuse. Otherwise, "agreed" becomes true. If conditions indicate that an explicit agreement is required (i.e., "notification necessary" is true), then the Participant communicates an agree. The agree may be optional depending on circumstances, e.g., if the query is very quick to answer, and can happen before a ~~÷~~reply-by time from the request is reached. If the Participant fails, then it communicates a failure. In a successful response, the Participant replies with one of two flavours of inform. The Participant uses an inform-t/f communication in response to a query-if. The content of the inform-t/f asserts the truth or falsehood of the proposition. The Participant returns an inform-result communication in response to a query-ref, and the content of the inform-result contains a referring expression to the objects ~~that were queried for~~for which the query was specified.

Any interaction using this interaction protocol is identified by a globally unique, non-null conversation-id, assigned by the Initiator. The agents involved in the interaction must tag all of its ACL messages with this conversation identifier. This enables each agent to manage its communication strategies and activities, e.g. it allows an agent to identify individual conversations and to reason across historical records of conversations.

~~1.~~11.2 Exceptions to Interaction Protocol Flow

At *any* point in the IP, the receiver of a communication can inform the sender that it did not understand what was communicated. This is accomplished by returning a not-understood communication. As such, the figure above does not depict a not-understood communication as it can occur after any communication. The communication of a not-understood within an interaction protocol may terminate the entire IP. Termination of the interaction may imply that any commitments made during the interaction are null and void.

At any point in the IP, the initiator of the IP may cancel the interaction protocol by initiating the meta-protocol shown in *Figure 2*. The conversation-id of the cancel interaction is identical to the conversation-id of the interaction that the Initiator intends to cancel. The semantics of the cancel should roughly be interpreted as meaning that the initiator is no longer interested in continuing the interaction, and that it should be terminated in a manner acceptable to both the Initiator and the Participant. The Participant either informs the Initiator that the interaction is done using an inform-done, or indicates the failure of the cancellation using a failure.

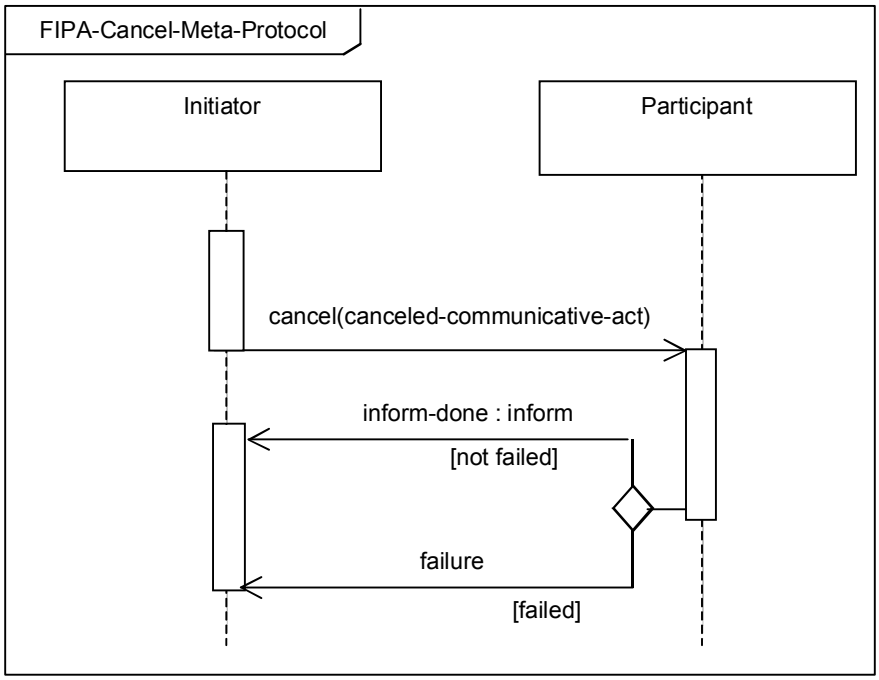

Figure 2: FIPA cancel meta-protocol

This IP is a pattern for a simple interaction type. Elaboration on this pattern will almost certainly be necessary in order to specify all cases that might occur in an actual agent interaction. Real world issues such as the effects of cancelling actions, asynchrony, abnormal or unexpected IP termination, nested IPs, and the like, are explicitly not addressed here.

~~At *any* point in the IP, the receiver of a communication can inform the sender that it did not understand what was communicated. This is accomplished by returning a "not-understood" communication. As such, the figure above does not depict a `not-understood` communication as it can occur after any communication. The communication of a `not-understood` within an interaction protocol terminates the IP. Termination of the interaction may imply that any commitments made during the interaction are null and void.~~

~~This IP is a pattern for a simple interaction type. Elaboration on this pattern will almost certainly be necessary in order to specify all cases that might occur in an actual agent interaction. Real world issues of cancelling actions, asynchrony, abnormal or unexpected IP termination, nested IPs, and the like, are explicitly not addressed here.~~

2 References

[FIPA00037] FIPA Communicative Act Library Specification. Foundation for Intelligent Physical Agents, 2000. http://www.fipa.org/specs/fipa00037/

[Odell2001] Odell, James, H. Van Dyke Parunak, and Bernhard Bauer, "Representing Agent Interaction Protocols in UML," *Agent-Oriented Software Engineering*, Paolo Ciancarini and Michael Wooldridge ed., Springer, Berlin, 2001, pp. 121-140. http://www.fipa.org/docs/input/f-in-00077.

3 Informative Annex A — ChangeLog

3.1 2002/05/10 - version G by FIPA Architecture Board

Page 1, Figure 1 :	The «not-understood» communication was removed
Page 1, Figure 1 :	Reworked the protocol flow to insert an optional « agree ». Also, made explicit the different inform response content expected for a query-if as opposed to a query-ref.
Page 1, Figure 1 :	To conform to UML 2, the protocol name was placed in a boundary, « x » is removed from the diamonds (xor is now the default), and the template box was removed.
Page 1, line 54 :	Added a new section 1.1 entitled « Explanation of the Protocol Flow »
Page 4, line 54 :	Renumbered old section 1.1 to section 1.2. Added a paragraph explaining the not-understood communication and its relationship with the IP.
~~Page iii~~	~~Regenerated Table of Contents~~
~~Page x, line y:~~	~~<blah>~~ **FIX**