FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

FIPA Request When Interaction Protocol Specification

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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 where appropriate.

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 Document Policy [f-out-00000] and the FIPA Specifications Policy [f-out-00003]~~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~~on the FIPA Web site.

FIPA is a non-profit association registered in Geneva, Switzerland. As of June~~anuary~~ 2002~~0~~, the 56 members of FIPA represented many~~17~~ countries worldwide. Further information about FIPA as an organization, membership information, FIPA specifications and upcoming meetings may be found on the FIPA Web site at http://www.fipa.org/.

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The FIPA Request When Interaction Protocol (IP) provides a framework for the `request-when` communicative act (see [FIPA00037]). The initiator uses the `request-when` ~~*request-when*~~ action to request that the participant do some action at the time ~~once~~ a given precondition becomes true~~.~~. ~~If the requested agent understands the request and does not initially refuse, it will *agree* (see [FIPA00037]) and wait until the precondition occurs. Then, it will attempt to perform the action and notify the requester accordingly. If after the initial agreement the participant is no longer able to perform the action, it will send a *refuse* action (see [FIPA00037]) to the initiator.~~

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-request-when as the value of the protocol parameter of the ACL message.

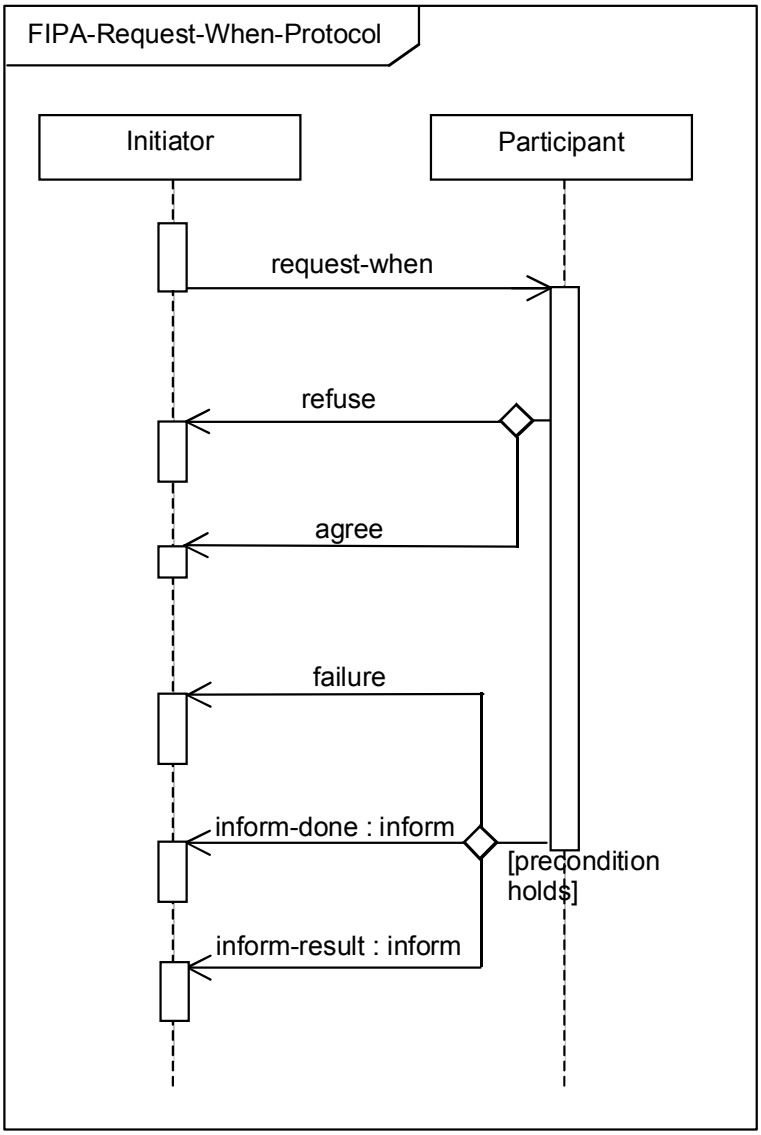

Figure 1: FIPA Request When Interaction Protocol

1.1 Explanation of the Protocol Flow

The initiator uses the `request-when` action to request that the participant do some action once a given precondition becomes true. If the requested agent understands the request and does not initially refuse, it will `agree` (see [FIPA00037]) and wait until the precondition occurs. Then, it will attempt to perform the action and notify the requester

accordingly. If after the initial agreement the participant is no longer able to perform the action, it will send a `failure` action (see [FIPA00037]) to the initiator. Once the action has completed and the `failure`, `inform-done`, or `inform-result` has been sent, the conversation ends.

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`.

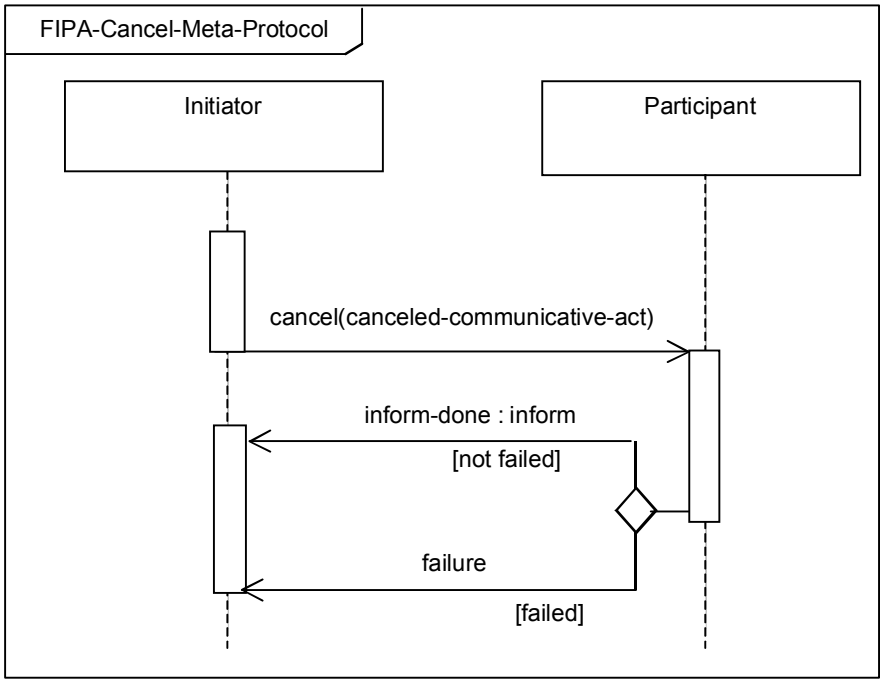

Figure 2: FIPA cancel meta-protocol

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.

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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 communication labeled «inform-ref» was changed to «inform-result» for clarity. The purpose of this communication is to inform the initiator of a results. Inform-result implies inform-done.
Page 1, figure 1 :	The `not-understood` communication was removed.
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 43 :	Moved a portion of the section introduction to the new section 1.1.
Page 1, line 56 :	Added a new section 1.1, entitled « Explanation of the Protocol Flow ».
Page 1, line 56 :	Renumbered old section 1.1 to section 1.2. Added a paragraph explaining the not-understood communication and its relationship with the IP.
~~Page x, line y:~~	~~<blah>~~