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FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

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5
FIPA Subscribe 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]. A complete overview of the FIPA specifications and their current status may be found on the FIPA Web site.

FIPA is a non-profit association registered in Geneva, Switzerland. As of June 2002, the 56 members of FIPA represented many 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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1   FIPA Subscribe Interaction Protocol

The FIPA Subscribe Interaction Protocol (IP) allows an agent to request a receiving agent to perform an action on subscription and subsequently when the referenced object changes.

The representation of this IP is given in *Figure 1* which is based on an extension of UML 1.x. [Odell2001]. This protocol is identified by the token `fipa-subscribe` as the value of the `protocol` parameter of the ACL message.
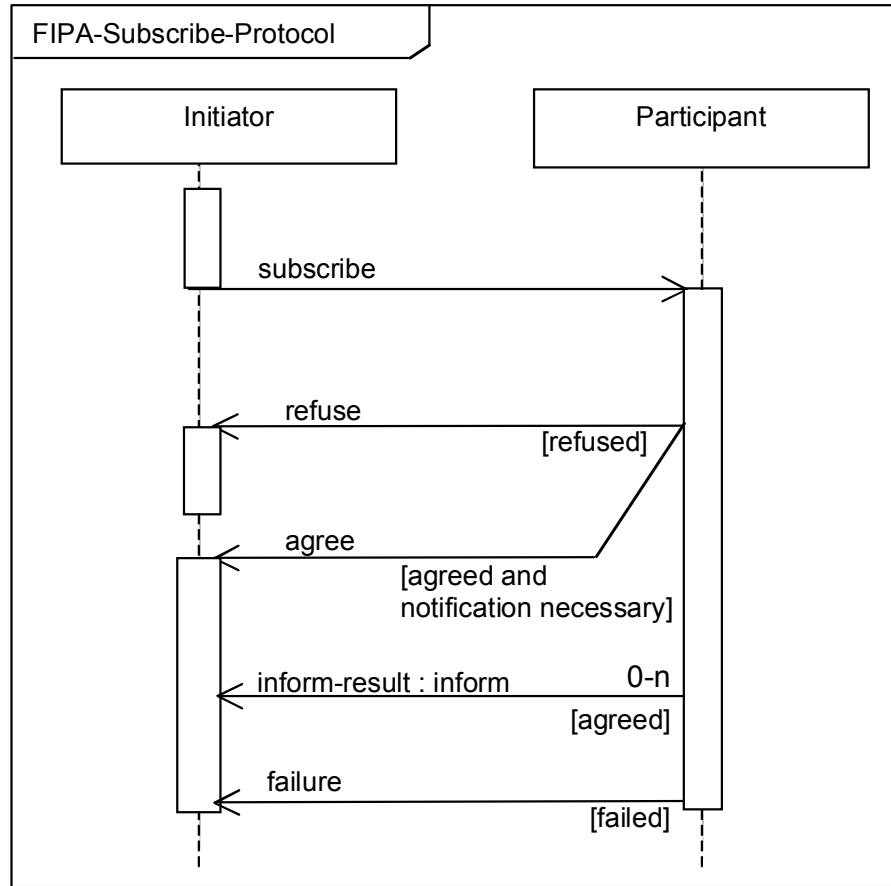
Figure 1: FIPA Subscribe Interaction Protocol

1.1   Explanation of the Protocol Flow

The Initiator begins the interaction with a subscribe message containing the reference of the objects in which they are interested. The Participant processes the `subscribe` message 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 (that is, "notification necessary" is true), then the Participant communicates an `agree`. The `agree` may be optional depending on circumstances, for example, if the requested action is very quick and can happen before a time specified in the `reply-by` parameter.

In a successful response, the Participant replies with an `inform-result` communication with the content being a referring expression to the subscribed objects. The Participant continues to send `inform-result` messages as the objects denoted by the referring expression change. If at some point after the Participant agrees, it experiences a

70 failure, then it communicates this with a `failure` message, which also terminates the interaction. Otherwise, the
71 interaction may be terminated by the Initiator using the cancel meta-protocol as described in Section 1.2.
72
73 Any interaction using this interaction protocol is identified by a globally unique, non-null `conversation-id` parameter,
74 assigned by the Initiator. The agents involved in the interaction must tag all of its ACL messages with this conversation
75 identifier. This enables each agent to manage its communication strategies and activities, for example, it allows an
76 agent to identify individual conversations and to reason across historical records of conversations. Additionally,
77 because it may be important to preserve the sequence of the `inform-result` messages, it is important that the
78 message transport used for this IP preserve the ordering of messages.
79

1.2 Exceptions to Interaction Protocol Flow

81 At *any* point in the IP, the receiver of a communication can inform the sender that it did not understand what was
82 communicated. This is accomplished by returning a `not-understood` message. As such, *Figure 1* does not depict a
83 `not-understood` communication as it can occur at any point in the IP. The communication of a `not-understood`
84 within an interaction protocol may terminate the entire IP and termination of the interaction may imply that any
85 commitments made during the interaction are null and void.
86
87 At any point in the IP, the initiator of the IP may cancel the interaction protocol by initiating the meta-protocol shown in
88 *Figure 2*. The `conversation-id` parameter of the cancel interaction is identical to the `conversation-id` parameter
89 of the interaction that the Initiator intends to cancel. The semantics of cancel should roughly be interpreted as meaning
90 that the initiator is no longer interested in continuing the interaction and that it should be terminated in a manner
91 acceptable to both the Initiator and the Participant. The Participant either informs the Initiator that the interaction is done
92 using an `inform-done` or indicates the failure of the cancellation using a `failure`.
93
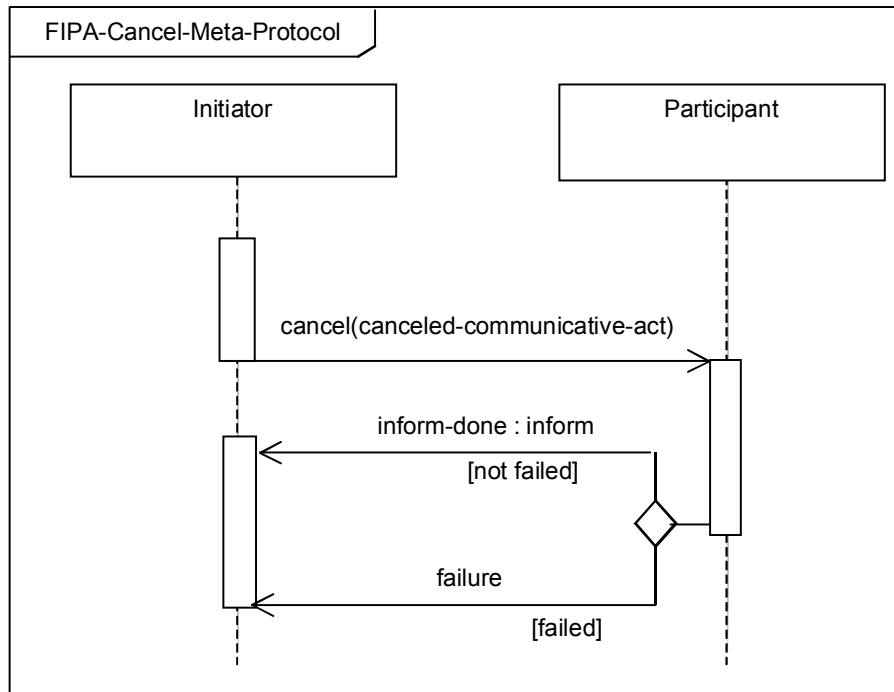
94
95 **Figure 2:** FIPA Cancel Meta-Protocol
96
97 This IP is a pattern for a simple interaction type. Elaboration on this pattern will almost certainly be necessary in order to
98 specify all cases that might occur in an actual agent interaction. Real world issues such as the effects of cancelling
99 actions, asynchrony, abnormal or unexpected IP termination, nested IPs, and the like, are explicitly not addressed here.
100

2 References

[FIPA00037] FIPA Communicative Act Library Specification. Foundation for Intelligent Physical Agents, 2000.
`http://www.fipa.org/specs/fipa00037/`
[Odell2001] Odell, James, Van Dyke Parunak, H. and Bauer, B., *Representing Agent Interaction Protocols in UML*. In: Agent-Oriented Software Engineering, Ciancarini, P. and Wooldridge, M., Eds., Springer, pp. 121-140, Berlin, 2001.
`http://www.fipa.org/docs/input/f-in-00077/`

3 Informative Annex A — ChangeLog

3.1 2002/11/01 version G by TC X2S

Page 1, Figure 1:	The `not-understood` communication was removed	
Page 1, Figure 1:	Reworked the protocol to insert an optional `agree`	
Page 1, Figure 1:	Deleted the explicit cancel from the protocol diagram because it has been moved to the meta-protocol section	
Page 1, Figure 1:	Added guards to the diagram to indicate that the protocol may be terminated by reaching the end of the conversation-length	
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 42:	Reworked and expanded the section description of the IP	
Page 1, line 54:	Added a new section on Explanation of Protocol Flow	
Page 1, line 54:	Reworked and expanded the section on Exceptions of Protocol Flow to incorporate a meta-protocol for cancel	
Page 1, line 54:	Added a paragraph explaining the `not-understood` communication and its relationship with the IP	