FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

FIPA Dutch Auction 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.

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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In the FIPA Dutch Auction Interaction Protocol (IP), the auctioneer attempts to find the market price for a good by starting bidding at a price much higher than the expected market value, then progressively reducing the price until one of the buyers accepts the price. The rate of reduction of the price is up to the auctioneer and they usually have a reserve price below which not to go. If the auction reduces the price to the reserve price with no buyers, then the auction terminates.

The term "Dutch Auction" derives from the flower markets in Holland, where this is the dominant means of determining the market value of quantities of (typically) cut flowers. In modelling the actual Dutch flower auction (and indeed in other markets), some additional complexities occur. First, the good may be split: for example the auctioneer may be selling five boxes of tulips at price X, and a buyer may purchase only three of the boxes. The auction then continues, with a price at the next increment below X, until the rest of the good is sold or the reserve price met. Such partial sales of goods are only present in some markets; in others the purchaser must bid to buy the entire good. Secondly, the flower market mechanism is set up to ensure that there is no contention amongst buyers by preventing any other bids once a single bid has been made for a good. Offers and bids are binding, so there is no protocol for accepting or rejecting a bid. In the agent case, it is not possible to assume, and too restrictive to require, that such conditions apply. Thus it is quite possible that two or more bids are received by the auctioneer for the same good. The protocol below thus allows for a bid to be rejected. This is intended only to be used in the case of multiple, competing and simultaneous bids. It is outside the scope of this specification to pre-specify any particular mechanism for resolving this conflict. In the general case, the agents should make no assumptions beyond "first come, first served". In any given domain, other rules may apply.

The representation of this IP is given in *Figure 1*.

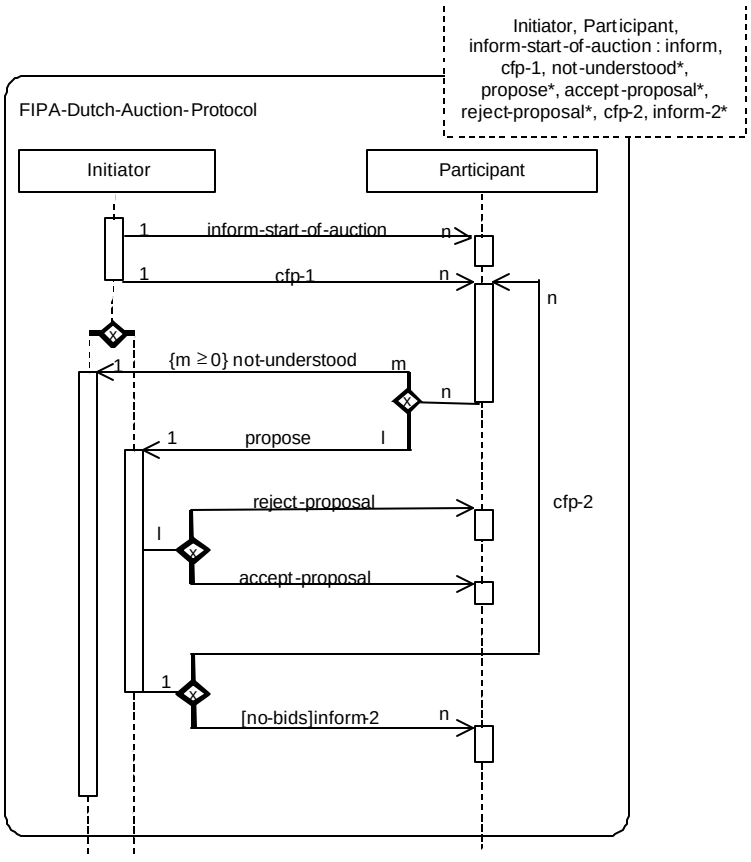

Figure 1: FIPA Dutch Auction Interaction Protocol

1.1 Exceptions to Interaction Protocol Flow

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.