

Realtime Commercial Bidding System

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Introduction

Since Enron's demise, there seems to be a role for brokering various kinds of commercial goods and commodities, or so our customer believes. Your group has been contacted to architect a distributed online brokering system for commercial products. Unlike EBay, this is not strictly a consumer oriented system, we allow *reverse-auctions*, and we expect the transactions to occur in approximate realtime. The set of auctions and reverse-auctions, an auction or reverse-auction itself, and the bidders, must be assumed to be running concurrently on separate platforms connected by some sort of network. Our customer has little expertise in E-systems and may not have asked for all that is needed. Similarly, she may be asking for features that are not a good idea. Your job includes analysis of this problem to give the customer a viable system.

Background

An *Auction Site* consists of a group of *auctions* and *reverse-auctions*. An auction is conducted by an auctioneer, which is to be automated. A user should be able to get a list of auctions and connect to a specific auction (or auctioneer). An auction follows the traditional definition: an auction is a client (seller) selling one item to a dynamic group of bidders mediated by an auctioneer. A *reverse-auction* is a client (buyer) buying something, usually a contract for delivery of goods, from a dynamic group of bidders mediated by an auctioneer. In an auction, the client sets the suggested initial price and the starting date and time, which is available from the auction site. In a reverse-auction, the client sets the *highest* price she will pay, and a date and time for for the reverse-auction.

Each bidder must be known to the auction site globally, and must be active with the auctioneer. The initial authorization process is described below. Even though this will be a distributed process, we have been asked to include in our design the bidding client. Each bidder will maintain a list of bids for the current auction with which the bidder is associated. Bids are received by the auctioneer from bidders in realtime. When the current high (auction) or low (reverse-auction) bid price is bested, the auctioneer must notify all currently active bidders that this has occurred and

what the current new best bid is. The identity of the maximum/minimum bidder is not broadcast. Auctions and reverse-auctions start at a specific time set by the client, and end when the bid has not been bettered for some parameterized length of time (we'll start with 10 minutes, but this is subject to change), or when a specific preset time occurs.

Authorization

Bidders must be known to the auction site, and for each auction/reverse-auction a one-time authorization process is required. We may require encrypted transmissions, so provision should be made for sending a key and decoding inbound bids. The authorization method should be left open, but currently includes userid-passwords, and smart cards. Other authorization methods may be plugged in later.

Specific Requirements

Some of the specific requirements the system must fulfill are as follows:

1. A user must be able to initially sign up with the auction site.
2. A user must join an auction. This can occur before or after the auction has started.
3. A user can withdraw from an auction, but not when their bid is the highest (auction) or lowest(reverse-auction). When this occurs, the auctioneer no longer accepts bids from or sends bids to, that user.
4. Notification of the end of the auction must be sent to active bidders, and the auction site must be notified of the auction end and winning price.
5. Bid placement occurs when the bid arrives at the auctioneer.
6. The auction can be either "reserved" or "no reserved". In a *reserved auction*, a minimum price must be met to complete a sale. In a *no reserve* auction, the high bidder wins regardless of price.
7. Bidders must be able to see (locally) the history of their bids.
8. Auctions start automatically on the date and time set by the seller.
9. The auctioneer must inform the client of what is going on during the auction.