Developing Forward and Reverse e-Auction with Alert Support in a Web Service Environment

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ABSTRACT

Auction is a common competitive business-to-business (B2B) procurement procedure for supplying products and services, which are solicited, received, and evaluated. Currently, most auction portals support only forward auctions with interactive Web portals, while large companies usually construct their own reverse auction Websites. To provide a unified and more comprehensive solution, the authors develop an E-Auction System (EAS) to provide both forward and reverse auction support in a Web services environment. Buyer and sellers can post their requests via automated Web services for better Enterprise Information System (EIS) integration. Alternatively, they can manually browse the portal with a browser to post requests or submit their bid prices. Their EAS also provides an auction-matching function that automatically matches forward and reverse auction records to help completing business processes effectively. Further, their EAS’s CRM system can capture and analyze user bidding behavior and posting to provide personalized Webpages. Besides, alert services provide notification of auction and bid statuses to customers for efficiency.

Keywords: Business Process Management, E-Marketplace, E-Procurement, Matchmaking, Reverse Auction

INTRODUCTION

Auctions are provided by numerous Websites. Corporate sellers can reach many more buyers than they could in the physical space, and corporate buyers have access to many more sellers than they do through trade journals. These auction sites create highly competitive environments in which buyers can obtain much lower prices for given products and quantities. Therefore, auction Websites have become alternative marketplaces to allow more businesses.

Currently, most auction portals support only forward customer-to-customer (C2C) or business-to-customer (B2C) auctions. Sellers post offers manually by submitting product information, base prices, and deadline via the Webpages of portals, such as eBay and Yahoo Auction. For reverse auctions, buyers usually...
construct their own reverse auction Web sites and post the purchasing requests to let suppliers submit their prices.

To provide a unified and more comprehensive solution, we propose an E-Auction System (EAS) that works as aggregated catalog to support both forward and reverse auction. For B2B, corporate buyers and sellers use Web Services (Chiu, Cheung, Hung, & Leung, 2005) to post their auction requests with item information, quantity, acceptable price range, auction period and so on. In addition, our EAS provides forward-reverse auction matching function. This function compares forward and reverse auction requests automatically, instead of requiring buyers or sellers to manually browse or search for targets. Then, auction matching alerts (Chiu et al., 2009) in Simple Object Access Protocol (SOAP) and eXtended Markup Language (XML) are sent to inform buyers and sellers about the matching auction items. Buyers and sellers may then reply the alerts with agreements or other counter-offers. This can reduce the efforts in repeated manual tasks of regular procurement procedure, increase the performance of B2B procurement procedure, and reduce human errors during the business processes (Chiu et al., 2002).

EAS supports not only B2B auction with Web Services for EIS integration, but also has a Hypertext Markup Language (HTML) based portal that can be accessed by individual auction users or corporate users without Web Services. With individual authentication, users can have personalized Web access, which includes auction aggregated catalog with searching, filtering, auction posting, bidding functions, favored article hyperlinks, sub-list of interested auctions, and associated advertisings that are prepared with our Customer Relationship Management (CRM) subsystem.

Web services effectively provide loosely-coupled standard interfaces among autonomous systems of different organizations constructed in different platforms. Therefore, organizations can easily re-engine their existing systems to fulfill the requirements of the system interoperability, by constructing Web service interfaces as middleware that connect their existing systems and foreign systems through SOAP and XML. Documents can thus be transmitted among different autonomous systems over the Internet automatically and systematically without additional human intervention to avoid human mistakes and delays.

The rest of this paper is organized as follow. We proceed to discuss the background of auction business model and methodology overview and then some related work. Next, we explain the outline of our EAS, addressing existing business requirements. Then, we present our system design and implementation in both Web services environment and human accessible environment, followed by some detailed Web Services design. We conclude by discussing some limitations of the EAS and our future work direction.

BACKGROUND AND RELATED WORK

Many manufacturing companies periodically need to dispose of unusable or excess inventory, or want to sell a large amount of products with reasonable prices. Online forward auction is now a logical choice for these inventory liquidation and product selling activities as a new and more efficient channel, the Internet. Larger enterprises often create their own auction sites for selling excess inventory or products (Zeithammer, 2006).

One of the earliest examples of company B2B auction Websites is Ingram Micro (Kaplan & Sawhney, 2000), a major distributor of computers and related equipment to value-added resellers. As computer technology changes rapidly, Ingram Micro often finds itself with outdated items that it formerly turned over to liquidation brokers. Ingram Micro therefore auctions those items to its established customers through its internally operated Auction Block site. Auction volume reached over US$6 million per year.

For smaller companies, third-party Web auction sites (Ray & Ray, 2006), sometimes
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