

Chapter VIII

An SLA-Based Auction Pricing Method Supporting Web Services Provisioning

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Abstract

Applying auctions to Web services selection and invocation calls for examination due to the unique features of Web services, such as interoperable machine-to-machine interactions and re-enterable bargaining services. In this chapter we propose a formal model for Web services-based auctions. Examining the one-sided sealed auction type, we prove mathematically that service requestors' risk preferences could lead to different pricing strategies for service providers towards higher profit. We argue that Service Level Agreement (SLA) documents can be used to analyze service requestors' preferences. On top of WS-Agreement, we propose a basic service requestor risk preference elicitation algorithm, as well as a historical data-based service requestor risk preference prediction model. Guidelines are provided to iteratively approach the learning rate of the proposed risk preference prediction model. The methods and techniques presented in this chapter can be reused to investigate and examine more facades of services-oriented auctions, towards establishing a new research realm on comprehensive services-oriented auctions.

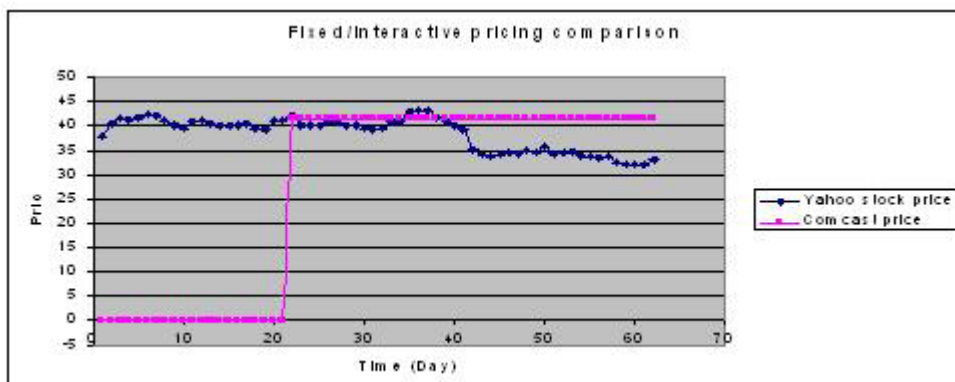
Introduction

The paradigm of Web services has opened a new era for business service providers. This new model not only allows easier management and maintenance for provider-hosting services, but also creates a lot more potential business opportunities for service providers. Gartner Group, a leading industry analyst firm, predicted that by 2008 more than 60% of businesses would adopt Web services and transform into new types of enterprises (Gartner, 2003).

As for traditional server providers, how to establish appropriate pricing models to pursue the highest profits is an essential concern for Web service providers. To date there are two major pricing models in the field of Web services that are derived from traditional business: periodic pricing and fluctuant pricing. Periodic pricing means that a service provider predefines a fixed price for a period of time, when every service requestor subjects to the same price value. In recent years, in order to attract more customers, many service providers offer a variant of the periodic pricing model, called staging price model. As shown in Figure 1, Comcast, a cable company, offers a \$0 first-month trial benefit for new customers and a fixed \$40/month service fee afterwards. Fluctuant pricing means that the price of a service is ever changing based on marketing situations. Stock pricing is a typical example of the fluctuant pricing model. The price of a stock symbol constantly changes depending on the number of transactions at the moment. Figure 1 shows the stock price curve of Yahoo (NASDAQ: YHOO) from November 15, 2005, to February 15, 2006, according to published data from E*TRADE (2006) financial.

As shown in Figure 1, the fluctuant pricing model automatically adjusts the service price subject to market demand, activity capacity, and changing environment. It obvi-

Figure 1. Illustration of fixed/interactive pricing model



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