

Chapter 1.7

Demand Driven Web Services

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ABSTRACT

Web services are playing a pivotal role in e-business, service intelligence, and service science. Demand-driven web services are becoming important for web services and service computing. However, many fundamental issues are still ignored to some extent. For example, what is the demand theory for web services, what is a demand-driven architecture for web services and what is a demand-driven web service lifecycle remain open. This chapter addresses these issues by examining fundamentals for demand analysis in web services, and proposing a demand-driven architecture for web services. It also proposes a demand-driven web service lifecycle for the main

players in web services: Service providers, service requestors and service brokers, respectively. It then provides a unified perspective on demand-driven web service lifecycles. The proposed approaches will facilitate research and development of web services, e-services, service intelligence, service science and service computing.

INTRODUCTION

Web services are Internet-based application components published using standard interface description languages and universally available via uniform communication protocols (ICWS, 2009). With the dramatic development of the Internet and the web in the past decade, web services have been flourishing in e-commerce,

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e-business, artificial intelligence (AI), and service computing. They have also offered a number of strategic advantages such as mobility, flexibility, interactivity and interchangeability in comparison with traditional services (Hoffman, 2003).

The fundamental philosophy of web services is to meet the needs of users precisely and thereby increase market share and revenue (Rust & Kannan, 2003). Web services have helped users reduce the cost of information technology (IT) operations and allow them to closely focus on their own core competencies (Hoffman, 2003). At the same time, for business marketers, web services are very useful for improving interorganizational relationships and generating new revenue streams (Sun & Lau, 2007). Furthermore, web services can be considered a further development of e-business (Gottschalk, 2001), because they are service-focused business paradigms that use two-way dialogues to build customized service offerings, based on knowledge and experience about users to build strong customer relationships (Rust & Kannan, 2003). However, one of the intriguing aspects of web services is that any web service cannot avoid similar challenges encountered in traditional services such as how to meet the customer's demands in order to attract more customers.

Service-oriented architecture (SOA) is an important topic for service computing, service science and service intelligence (Singh & Huns, 2005). The special form of SOA in web services is Web service architectures. Web service architectures are the basis for engineering many activities in web services. Therefore, there are many web service architectures proposed in the web service community (Erl, 2006; Alonso, et al, 2004). Papazoglou (2003) proposes a hierarchical service-oriented architecture (SOA) for web services. Burstein, et al. (2005) propose a semantic web services architecture. However, the existing web service architectures are mainly from the perspective of implementation (Benatallah, et al, 2006) rather than from a demand perspective. It seems that demand-driven web service architecture and

corresponding web services have not yet received any attention, to our knowledge, although demand is a critical force for developing web services, just as demand is a driving factor for microeconomics.

Demand is a fundamental concept of economics. Demand refers to "the quantities that people are or will be willing to buy at different prices during a given time period provided that other factors affecting these quantities remain the same" (Wilkinson, 2005, p. 75). The demand for a firm's products determines its revenues and also enables the firm to plan its production (Wilkinson, 2005, p. 71). Then demand is a decisive factor for market. Demand theory is an important part in microeconomics and managerial economics (Wilkinson, 2005, pp. 73-120). Demand theory in managerial economics examines demand curves, demand equations, demand analysis, demand chain, impact factors on demand, demand estimation and so on. Demand analysis is a factor driving e-marketing and e-business strategy objectives (Chaffey, 2007, p. 344). Demand analysis assesses current and projected demand for e-commerce services amongst existing and potential customer segments (Chaffey, 2007, p. 344). Demand chain has drawn attention in the field of supply chain management and customer relationship management since the end of last century (Walters, 2006). The demand chain can be defined as "The complex web of business processes and activities that help firms understand, manage, and ultimately create consumer demand" (Rainbird, 2006). The following problems arise in web services: what is the demand of main service players in web services? what is the demand theory for web services? what is demand analysis? What is a demand chain in web services? what is the mathematical analysis of demand in web services? These problems remain open in web services. This chapter addresses these issues by providing a mathematical analysis for web services taking into account the demand of service players in web services.

The web service lifecycle (WSLC) is a fundamental topic for web services and service

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