Chapter 12
Service Selection Based on Customer Preferences of Non–Functional Attributes

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ABSTRACT

With service-oriented systems driving the economies around the world there has been an exponential rise in the number and choices of available services. As a result of this, for most tasks there are a large number of services that can adequately cater to the requirements of the customers. Choosing the service that best conforms to the requirements from the set of functionally equivalent services is non-trivial. Research in the past has utilized the non-functional attributes of such services to select the best service. These efforts however make the assumption that the services with the best non-functional attributes are the ones that most closely conform to the requirements of the customer. This is not always true since the customer may sometimes prefer to settle for a slightly "inferior" service owing to price constraints. In this chapter, we apply the Mid-level Splitting technique to better assess the requirements of the customer and make a more judicious service selection. Furthermore, we also address the issue of assignment of weights to the various non-functional attributes of the services. These weights are reflective of the emphasis that the concerned customer wants to put on the various non-functional attributes of the service. These weights are normally assigned based on the intuition of certain expert personnel and are prone to human error and incorrect judgment. We utilize the Hypothetical Equivalents and Inequivalents technique to more systematically assign weights to the services based on customer preferences. The techniques are demonstrated with a real world example.

INTRODUCTION

The major part of the so-called 'developed' and 'developing' economies in the world today is driven by services (Battilani & Fauri, 2007; Gallouj, 2002). This does not mean that services are replacing manufacturing based economies *per se*, rather services compliment manufactured products in what has been described as "servitization" of products (Vandermerwe & Rada, 1988). Manufacturing houses nowadays deliver 'bundles' to the customer that include the actual product along with supporting services with the goal of enhancing the customer experience. Besides such supporting services there are also 'pure' services such as a hotel service where the customer mainly pays to utilize the service. The penetration of the Internet in the daily lives of people also plays a big role in the proliferation of services. Vendors package their capabilities as web-services and conveniently transport these over the Internet to the customers.

The issue in such a scenario is service selection. With more and more services available, it is not unusual for more than one service to cater to the requirements of the customer. The customer has a choice to either select one of the functionally equivalent services at random or select the service that most closely conforms to his/her requirements. The latter task is non-trivial given the functional similarity of the available services. This task is further complicated by the availability of a large number of services and also by the multiple characteristic attributes of the services.

Research in the past has addressed the issue of service selection from functionally equivalent services making use of the non-functional attributes of the services (Ran, 2003; Kokash, 2005; Gao, & Wu, 2005). These approaches compare the available services on the basis of their non-functional attributes and the service that most closely conforms to the requirements of the customer is selected.

There are several challenges in this approach. First, services usually have more than one non-functional attribute associated with them. Different non-functional attributes for the same service can be ranked differently when compared with the respective attributes of other competing services. For example, a service may have a higher value of reliability than another but a lower value in terms of security. How can one decide which of the two services is better? A lot of work has been done in addressing this problem and this is discussed in a subsequent section.

The second challenge in ranking services on the basis of their non-functional attributes is the main subject of this chapter and has to do with the perception of the customer of the various non-functional attributes. In the approaches thus far, it is assumed that the 'best' value for a non-functional attribute is what a customer always prefers. This however is not always true. A customer prefers a good value but not always the best as the best often entails a higher price. For example, while comparing two services on the basis of the non-functional attribute reliability, one service is found to have a reliability of 95% and another a reliability of 70%. All the previous approaches would rank the first service higher and it would be selected for the customer assuming that the customer always prefers the higher value. It is possible however that a certain customer might prefer a service of lower reliability in lieu of the lower price that he/she has to pay for the same. In this chapter, we utilize the 'Mid-level splitting' technique (Callaghan, & Lewis, 2000) to assess and better understand the customer perception of the various non-functional attributes of the service *vis-à-vis* the true value of the attribute. This enables service selection that conforms more closely to the requirements of the customer.

The third challenge in service selection using the non-functional attributes deals with the uneven emphasis that customers put on the various non-functional attributes of the service. For example, a customer may want to put greater emphasis on the reliability of a service than its security features. This would result in a different service selection

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