Chapter 7

Testing Web Services in the Cloud

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ABSTRACT

Cloud Computing makes it possible for users to access a wide range of web services in the public domain and to embed these global services in their local applications. This promises to save a significant amount of individual development cost. The biggest obstacle to using this technology is the problem of trust. To gain trust in the services offered they have to be extensively tested, either by the user himself or by a trusted agent. This chapter deals with the testing of web services in the cloud. There are many similarities to testing web services in a local service-oriented architecture, but there are also significant differences. In a company specific SOA, testers can gain access to the source. This is not true of the cloud. There is no possibility of accessing the source. Therefore, testers must rely solely on the specification contained in the service level agreement – SLA – and the web service interface definition – WSDL or REST – to base their test upon. Testing in the cloud is strictly a black-box test. The goal of a cloud service test is also not to find errors but to assess the suitability of the service to the purpose of the user. It may be necessary to test several services in order to find that one best suited to the requirements of the user. To judge suitability it is necessary to define an ideal usage profile, including performance, security and other non-functional criteria, and to compare that with the actual profile of each potential service. For this both static and dynamic analysis methods must be applied. The chapter presents an automated approach to assessing cloud services and selecting that one most suitable to the user’s application.

1. THE RATIONALE FOR USING WEB SERVICES IN THE CLOUD

Cloud computing, as defined by the U.S. National Institute of Standards and Technology allows users to lease data and processing capacity from a pool of interconnected computing systems, maintained by a provider and shared by others to the level required (Mell & Grance, 2011). Web services play an important role in the manifestation of cloud computing, particularly when it comes to a public cloud. They are made available on demand and can be used in any context the user may have. They are the elementary building blocks upon
which the users build their business processes. In view of the total cost of ownership, users are encouraged to use ready-made components to implement their applications rather than developing the components themselves, which is much too costly in the long run. The maintenance and evolution of the components, i.e. services, is left to the provider. The cloud service provider Ariba offers a wide range of uniform trading, ordering and supplying services to over 730,000 customers. Each service is maintained by a small team of approximately seven developers. If each customer were to maintain the service themselves with even only one person, that would amount to a cost of one person year per service to the user and 730,000 person years to the economy as a whole. Ariba can offer to maintain a service at a cost of one person day per annum and still make a significant profit. It may be added that the Ariba users are turning over no less than 319 billion dollars per year with their trading services (Hackel, 2012).

There is no way to beat this business model. Before beginning any new application or migrating an old one, a user organization should carefully consider using available cloud services from a qualified service provider. Any new or modernized IT-application should consist to a great extend out of ready-made services offered via the cloud, independently of whether it be a public or a private cloud. The way the services are composed can still be designed and implemented by the user himself with a business process modeling language. However the basic building blocks, i.e. the components and classes, should be taken from the cloud. The madness of every commercial user developing and maintaining his own basic software building blocks must be stopped. The fact that a user can select from among a wide range of services offered only strengthens this argument. If he is not satisfied with the price or the performance of a particular service, the user can replace it with the same service from another provider. He needs only to adapt the interface (Rinngu-Kalliosaari, Taiple, & Smolander, 2012).

2. OBSTACLES TO USING WEB SERVICES IN THE CLOUD

2.1 The Problem of Trust in Using Cloud Services

The biggest obstacle to using cloud services is that of trust. The economic rationale for using web services offered in the cloud is overwhelming, but how can users know if they can trust them. Most cloud researchers agree that there is definitely a trust problem. According to the CBDI Forum, the big issue is “will the service work every time when I need it?” That forum is concerned about the fact that too few potential users are thinking about the issues of testing and certification. It suggests that the testing and certification of web services in the cloud in not business as usual and that new approaches are needed to assure that those services can really be trusted (CBDI, 2010). In recent years a number of researchers have turned their attention to this problem and some are calling for a formal certification of public cloud services. Others, such as the author of this chapter, are calling for testing organizations to offer the testing of cloud services as a service. The goal of such a service is to offer quantitative evidence of whether a service can be trusted or not (Vossen, 2011).

2.2 The Problem of Finding the Most Suitable Cloud Service

The second biggest obstacle to the use of cloud services is the selection process itself. It requires a lot of technical knowledge and the appropriate tools to evaluate web services in the cloud. Not only do the services need to be tested, but they also need to be assessed against the service level agreement. Most of the run of the mill users have neither the know-how nor the tools to make such an evaluation. That is another reason for engaging an external agent to evaluate alternate services for a specific task and to make recommendations as to which service is best suited to the user needs. The