Chapter 9
Software Testing as a Service: Perceptions from Practice

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ABSTRACT
This chapter describes a qualitative study whose aim was to explore and understand the conditions that influence software testing as a service. Interviews were conducted with software professionals from 16 organizations. The study used qualitative grounded theory as its research method. The level of domain knowledge required by testers was an initial indication of whether testing could be delivered as a service. The benefits of software testing as a service included flexibility and cost effectiveness. Among top requirements were security and pricing. Cloud computing was envisaged as the delivery model for software testing as a service. Some potential research areas suggested were pricing models and handling of test data. There was an indication that the demand for software testing as a service was on the rise, albeit with mixed feelings. Organizations would have to make careful considerations before embarking on testing their systems and applications over the internet.

INTRODUCTION
In recent years, innovations towards service-oriented architecture (SOA) and software-as-a-service (SaaS) models have greatly affected the nature of software systems and organizations (Goth, 2008; Collard, 2009). This means that software developers from different organizations are continuously surprised to find that their code is more inter-related than they would have initially anticipated (Young, et. al, 2009), so that their systems are able to work together easier than they would have done so in the past. At the same time, the goal of every software organization is to
produce high-quality software that is flexible and easy to use — as is the expectation of the modern world’s technologically-savvy end user.

Initially, we drew the concept of software testing as a service from Turner et al. (2003) and Dubey and Wagie (2007). Turner et al. (2003) envisaged the concept of software as a service (SaaS) into one that exists within a “demand-led software market in which businesses assemble and provide services when needed to address a particular requirement.” As a result, SaaS distinguishes between the provider and user whereby, the software’s functionality can be delivered as a set of combined services that are assembled during delivery time. Similarly, Dubey and Wagie (2007) described SaaS as a move from installing license-based software on local machines to using the software as an application service provided by a third party. This would grant the user freedom to choose and switch between vendors and reduce software maintenance efforts.

Our view of software testing as a service was aligned to the above mentioned early SaaS descriptions, such that software testing would be provided on-demand, by a third party and testing resources could be used without prior installation on local machines. For example, instead of acquiring hardware to set up a load testing environment, a user could make use of a third party’s already existing testing environment, and access the resources via a communication channel, which in this case would be the internet. During the course of the study, we became aware of cloud computing as a delivery model that enables an application to be hosted by a provider and accessed by many users at the same time. Hence, it became imperative to contextualize the concept of software testing as a service within cloud computing.

Cloud computing is one model that is changing the way software is produced and consumed — mainly from the traditional desktop form to online software services. Popular models for delivering computing services in the cloud are software as a service (SaaS) — applications hosted in the cloud, and accessed by means of a web browser; platform as a service (PaaS) — programming and execution environments in the cloud through which users can run and access applications; and Infrastructure as a service (IaaS) — storage, processing and network capabilities for cloud users e.g. Amazon’s EC2. Evidently, technologies are constantly evolving, and this implies that the methods, tools and concepts to test them must also change (Collard, 2009).

In this study, we wanted to gather views about software testing as a service from practitioners in the industry. Interviews were conducted with respondents from organizations that were either software testing providers or customers. The underlying research question was: “What conditions influence software testing as a service?” In addition, we also gathered important issues regarding software testing as a service so as to establish a direction for future research.

The chapter is organized as follows: The background section includes definitions, a literature review, a description of the research process and the grounded theory method used. The results section presents the analysis results including future research directions. Thereafter, we discuss the practical implications of the results followed by concluding remarks.

BACKGROUND

This section presents a literature review related to this chapter and the research process employed in the study.

Software testing as a service is defined as “a model of software testing used to test an application as a service provided to customers across the internet” (Aalst, 2009). It provides daily operation, maintenance and testing support through web-based browsers, testing frameworks and servers. This model supports a demand-led software testing market by enabling organizations to provide and acquire testing services whenever needed. It
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