Chapter 2.25
Building an Online Security System with Web Services

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ABSTRACT

This chapter presents a case study where Web services are used to build a user-centric online security system. It explores complex technical challenges encountered with the use of the Web services and online security technologies. Furthermore, the authors hope that their practical experiences and findings will shed some lights on how the online security system should and can be built in the approach of being user-centric instead of vendor-centric and on the implications of embracing Web services to conventional software engineering processes.

INTRODUCTION

Virtually everyone in the IT industry, from vendors to service providers to buyers, has taken up positions to support Web services in their software product and services offerings, but there tends to be some variance in what everyone's definition is. This chapter has chosen the definition from the Web Services Architecture Working Group (2004).

A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP-messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards.

In a typical use scenario, one business application sends a request to a Web service using the SOAP protocol over HTTP. Another business service receives the request, processes it, and returns a response using the same SOAP protocol.

For years, the software industry has developed several technologies, such as DCOM and CORBA, to battle against the interoperability problem, but the Internet-scale distributed computing need has pushed those technologies to an absolute limit. Web services promise to meet this challenge. As shown in the above simple scenario, it is simple using simple HTTP-based request/response call patterns using SOAP. It is also loose coupling separating service interfaces from service implementations. It is heterogeneous as the applications and services may be implemented in different languages and operate in different platforms. Finally, it is open because its messaging communication model and service interfaces are based on open standards, SOAP/WSDL.

Though the confidence in Web services has been increasingly gained in the enterprise-computing world, more issues remain. One such issue is whether there is any impact Web services technology has brought about to conventional software system engineering and what it is if the answer is yes. Software system engineering is about tools, methods, processes, and a quality focus (Pressman, 2001); it touches all the issues involved in software system analysis, design, construction, verification, and management of technical (or social) entities.

The case study presented in this chapter is a graduate level development project. Its purpose is to research, design, and prototype an online user-centric security system, called Persona System (Toth & Subramanium, 2003). Conceptually, Persona System is composed of two parts: a Persona Client on the user's device that is integrated with, for example, a web browser, and a Persona Server deployed on a trusted host system. The Persona Server stores and manages the user's personal and identity data. In reality, both parts

also need to interact with other online systems, Web services providers and certificates issuing authority systems, for example, http://www.amazon.com.

The implied distributed nature of Persona System introduces a tremendous interoperability challenge simply because both client and server parts are made up of software components that are to be implemented likely in different languages and operational on different platforms using different protocols. This challenge renders itself a perfect case for employing Web services and exploring online security problems and related system design and implementation issues.

The scale of Web services used in Persona System provides an opportunity for understanding the impact Web services bring about in conventional software engineering realms. Due to our time and resource constraints, we limit our efforts on these realms: architectural design and evaluation, development tools, programming languages, testing, and deployment processes.

The objective of this chapter is twofold: to present practical experience and findings in building Persona System and shed some lights on the implications of employing Web services to conventional software engineering.

BACKGROUND

Web services do not fundamentally change the conventional software engineering principles as creation of Web services still involves design of services, fabrication of service implementation parts associated with service interfaces, assembly of those parts into a service-based solution, and so forth. However, they do introduce new issues to the conventional software engineering practices and processes. To unearth them, related software development life cycle and methodology need to be well studied with regard to Web services. Due to our limited resources and time, we present our findings only on software architectural

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