Chapter 17

A Software Model, Architecture and Environment to Support Web-Based Applications

David Kearney and Weiquan Zhao
University of South Australia, Australia

ABSTRACT

Designed originally for document delivery, the Web is now being widely used as a platform for electronic commerce application software. The ad hoc enhancements that have made Web application software possible (for example, CGI and Java Script) have created an application support infrastructure where application software upgrades and maintenance are very complex. Yet the Web is the preferred platform for applications that have continuous ongoing development needs. In this chapter, we describe a model, an architecture, and an associated Web Application Support Environment (WASE) that both hides the low-level complexity of the existing Web infrastructure and, at the same time, empowers enterprise Web application programmers in their objective of writing modular and easily maintainable software applications for electronic commerce. WASE is not a compiler and does not completely abstract away the unique features of Web infrastructure. It is being constructed using XML documents in its API, to allow the function and configurability of applications to be defined in a Web-like fashion.

INTRODUCTION

There is a great demand to deploy electronic commerce applications on the Web. This demand is somehow stimulated and made possible by the services the Web itself provides and, at the same time, it is driving the Web's development. However, not all innovations to assist application development on the Web have been good software engineering, partly because the Web was not originally designed for this purpose, as has been widely recognized (Gellersen & Gaedke, 1999). Despite many enhancements that have been made to the Web,

difficulties and inefficiencies in development and maintenance are still prominent, especially with the deployment of large-scale and sophisticated applications. A mechanism is needed to fill the gap between the Web used as an application infrastructure for hypermedia and the needs of complex business applications. Many approaches, for example, (Barta &Schranz, 1998; Fraternali & Paolini, 1998; Schwabe & Rossi, 1998; Diaz, Isakowitz, Maiorana & Gilabert, 1995) have been proposed. These studies either do not address large-scale Web-based applications at all or have not made a detailed study of the Web infrastructure and its relationship to large-scale application requirements. In this chapter we begin with an in-depth investigation of the Web infrastructure and proposed applications and then devise a model and architecture of Web applications together with a support environment. The architecture aims to make Web applications not only easy to implement but also easy to maintain. The chapter is organized as follows. We begin by discussing the unique aspects of the Web that impact on application development are described. Then, a completely fresh model and architecture of Web-based applications is described. This is followed by a support environment is designed to fulfil the requirements of this model, and finally, we report initial progress on implementing the architecture and our experience writing applications for it.

WEB-BASED APPLICATIONS

The Web has been used for deploying applications beyond delivering information and hypermedia only, which was its original purpose when devised about a decade ago. We define *Web-based applications* as applications that rely on the Web as the application infrastructure to perform their functionality (Kristensen, 1998) and have significant complexity in logic processing, as opposed to just hypermedia or data intensive content. We distinguish *Web-based applications* from the more common *Web applications*, which use hypermedia extensively and may have no business logic at all. Web-based applications rely on Web browsers to interact with users and employ Web protocols, mainly HTTP, to enable user interaction in the form of Web pages, delivered and connected to the rest of the application. They may range in scale and complexity from a message board utility in a personal Web site to a worldwide enterprise-level business system. The fact that the Web has been chosen to perform functions for which it was not originally designed means that this "new platform" was not devised from a fundamental requirements analysis, as was the case with CORBA (Object Management Group, 2002), for example. This explains well why the Web has been patched up with a family of technologies such as CGI and JavaScript, and a series of revisions of HTTP has been developed and innovation conducted to enhance the Web for its new role. This has made the Web different from traditional application platforms, posing a new set of challenges for development and maintenance. In this section, we compare the deployment of the same application on a traditional platform and the Web in an effort to distill the unique features of Web-based applications and define the issues raised by the existing Web infrastructure.

Web Infrastructure and Web-based Applications

If we regard the Web as a new kind of application platform then Web applications could theoretically be designed almost independently of the underlying Web. They could be deployed on an abstract application platform which hides unique features of the Web from the developer, no matter at what cost. The functionality of Web-based applications might then be implemented as if the Web never existed. But the Web has significant and unique features, that are so fundamentally different from other platforms that they cannot be entirely

14 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/software-model-architecture-environment-support/5204

Related Content

Optimizing Recruitment Online: The Critical Importance of Using the Right Channels
Loubna Alsaghir, Nathalie Abdallahand Stéphane B. Bazan (2020). *International Journal of E-Business Research (pp. 18-33).*
www.irma-international.org/article/optimizing-recruitment-online/264464

The Rise of Digital Marketplace in Brunei Darussalam
Alif Azizi Abdullah, Mohammad Nabil Almunawarand Muhammad Anshari (2021). *Handbook of Research on Innovation and Development of E-Commerce and E-Business in ASEAN (pp. 289-307).*
www.irma-international.org/chapter/the-rise-of-digital-marketplace-in-brunei-darussalam/260697

A Social Shaping Perspective of the Digital Divide: Implications for E-Business
A. Genus (2007). *Social Implications and Challenges of E-Business (pp. 198-207).*
www.irma-international.org/chapter/social-shaping-perspective-digital-divide/29140

Reasons for Non-Engagement in Online Shopping: Evidence from the Philippines
Rex P. Bringula (2016). *International Journal of E-Business Research (pp. 17-30).*
www.irma-international.org/article/reasons-for-non-engagement-in-online-shopping/152316

EBBSC: A Balanced Scorecard-Based Framework for Strategic E-Business Management
Fen Wangand Guisseppi Forgionne (2007). *International Journal of E-Business Research (pp. 18-40).*
www.irma-international.org/article/ebbsc-balanced-scorecard-based-framework/1873