ABSTRACT

Many businesses obtain feedback by surveying customers and business partners. With the advent of the Internet, many of the surveys are now conducted on the Web. This paper describes a software architecture for a Web-based survey system. The architecture for the survey system is based on a three-tier system that is comprised of a Web server, Web application server, and database server. The Web application server hosts the application modules that display and process the surveys. The application software consists of packages for establishing connections to the database and for reading static and dynamic data from the database. The processed surveys are written to the database with the survey responses. This system allows for anonymous survey responses and maintains user confidentiality. At the University of Wisconsin-Parkside, we have implemented this Web-based survey system, and it was subsequently used to conduct three different surveys. This survey system is easily extensible to new surveys, and is used for instructional purposes to teach server-side programming to MIS students. In this paper, we discuss the key ideas behind the design and implementation of the extensible survey system and provide results on its application.

Keywords: application service providers; enterprise computing; software architectures; Web application servers; Web-based surveys

INTRODUCTION

Maintaining a high-level of customer satisfaction is critical for any business to succeed. Especially in today’s difficult economic environment where economic growth is limited by intense competition, businesses are seeking to improve customer satisfaction with their products. Traditionally, businesses have obtained feedback from their customers using surveys. These surveys used to be conducted via paper or telephone. However, with the advent of the Internet, an increasing number of businesses use the Internet for business-critical processes.
Businesses prefer electronic commerce (or e-commerce) because of the inherent advantages such as increased efficiency and reduced costs associated with selling products. Consumers are attracted by the ease of shopping using the Internet, the ability to search among different brands and products in less time, and the reduction in the overall costs. As businesses use the Internet to sell their products, they are also seeking to obtain feedback from customers via Internet-based surveys.

In this paper, we describe a Web-based survey system that we developed at the University of Wisconsin-Parkside. We discuss the software architecture for this survey system and the processes involved in constructing these systems. One guiding principal of this system is that it should be easily extensible to conduct new surveys. We have used this system at UW-Parkside (UWP) to conduct three different surveys. The system uses server-side Java programs such as servlets and Java Server Pages (JSPs). We have also used this survey system for pedagogical purposes. That is, it is used to teach students how to model/construct survey databases and develop server-side Java programs.

Many Web-based survey systems can be thought of as business-to-consumer (B2C) Internet applications, since customers (consumers) use the Web-based survey system to provide data to the business. This data is processed by the business to analyze the strengths and weaknesses of their products, services, and operations. The concept of B2C applications is simple on the surface, but building and deploying these systems presents serious technical challenges (Allamaraju et al., 2001; Pyke et al., 2001). Computing systems for use in the Internet age must be designed carefully to meet the performance demands of the users while protecting the information privy to the business and the users with stringent security measures.

To develop applications with Internet technologies, we need to integrate processes with the Web to achieve the best return on the IT investments. To do this, it is important to consider the following elements:

- Robust software architectures for accessing data via the Internet and
- Efficient database infrastructure for storing and retrieving data.

It is widely accepted that the thin-client model is the de facto standard when it comes to developing Web applications. Typically, a thin-client application is most readily associated with a browser-hosted user interface (UI), which is dynamically generated and sent to the client, in the form of HTML, by the server. It is considered thin because clients of Web applications are expected to have a browser pre-installed on their machine so the application need only focus on feeding the browser UI instructions it can understand and use to build a presentation to the end user. With this configuration, Web clients are essentially dummy terminals that send requests to the server, where all the business logic and data source integration occurs (Allamaraju et al., 2000).

A typical information system model for a B2C system, based on thin-client architecture, is shown in Figure 1. User requests for information from the business may first pass through the firewall. User requests are intercepted by the Web server, which services simple requests (for example, requests for static HTML pages or images). More complex requests that involve execution of business logic and/or retrieval of information from the database are forwarded by the Web server to the Web application server. Such requests that require execution of business logic are executed by the application code running under the Web application server. The application code first may authenticate the user against the security database and may interact with multiple databases to execute a single user request. In this model, a user interacts with the business via a browser such as Internet Explorer and the user requests as well as business responses are transmitted back and forth using the Hypertext Transfer Protocol (HTTP).

In the rest of this paper, we will use this information system model for developing and implementing a Web-based survey system.
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