



Chapter XVII

Deploying Java Mobile Agents in a Project Management Environment

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ABSTRACT

This chapter introduces mobile agent technology and explains how it can help businesses to implement client-server enterprise computing solutions. A Java mobile agent-based project management system prototype is presented to demonstrate the main features of mobile agents (mobility, functionality, intelligence and autonomy), and how they help to enhance communication processes and facilitate security within the project environment. It suggests a practical way to isolate all host resources from all visiting agents using host agents and exported host functions. It also proposes a communication infrastructure to support intelligent dialogue among agents.

INTRODUCTION

In the computing world, there are three categories of mobility: mobile hardware, mobile users and mobile software. Mobile devices (e.g., PDA and 3G mobile networks), user mobility concepts (e.g., telecommuting) and mobile software (e.g.,

mobile agents) recently have attracted a great deal of attention from both industry and academia. In this chapter, mobile agent technology and how it can help businesses implement client-server enterprise solutions is examined. Harrison et. al. (1995) concluded that alternative solutions, such as Remote Procedure Calls and Sockets, can perform as well as mobile agents, except in relation to real time interaction with the server. Mobile agents, however, provide better support to mobile clients, including users and hardware devices. Mobile agent technology tolerates unreliable network services, supports transient connected devices and can conserve network bandwidth.

Mobile agent technology, however, is not without its critics. Security, negotiation, intelligence and virus-like behaviors are some of the major causes of concern. This chapter presents a mobile-software based prototype designed to operate within a project management environment. The prototype, though incomplete, highlights the issues associated with mobile agent technology and presents a practical approach to addressing the problem.

INTERNET AND MOBILE AGENT TECHNOLOGY

Business transactions require human activity, such as information collection and analysis, and human interaction, such as negotiation. With the rapid growth of Internet technology throughout the past few years, e-business has started to transform the ways in which we conduct our business. Concepts such as e-shopping carts and e-shops are helping us to implement Business to Consumer (B2C) business. Such working models often require a buyer to visit vendors' Web sites. The data collected is analyzed, and a transaction completed, often without much interactive negotiation. Mobile agent technology now exists to provide an alternative way to implement e-business. The new technology enables automation and negotiation and is receiving a lot of attention from both researchers and industrialists. The new approach can provide enterprise-computing solutions rather than relying on traditional message-based architecture.

WHAT IS MOBILE AGENT TECHNOLOGY?

A mobile agent can migrate from machine to machine in a heterogeneous network under its own control. It is capable of roaming wide area networks (WANS) and the World Wide Web (WWW); interacting with foreign hosts; collaborating with other agents; gathering information on behalf of its owner; and coming 'back home,' having performed the duties pre-defined by its user.

Most mobile agents possess following basic properties:

- **Autonomy;**

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