Chapter 2.28
A Framework for Information Systems Integration in Mobile Working Environments

Javier García-Guzmán
Universidad Carlos III de Madrid, Spain

María-Isabel Sánchez-Segura
Universidad Carlos III de Madrid, Spain

Antonio de Amescua-Seco
Universidad Carlos III de Madrid, Spain

Mariano Navarro
TRAGSA Group Information, Spain

ABSTRACT

This chapter introduces a framework for designing, distributing, and managing mobile applications that uses and updates information coming from different data sources (databases and systems from different organizations) for helping mobile workers to perform their job. A summary of the state of the art in relation to mobile applications integration is presented. Then, the authors describe the appropriate organizational context for applying the integration framework proposed. Next, the framework components and how the framework is use are explained. Finally, the trials performed for testing the mobile applications architecture are discussed, presenting the main conclusions and future work. Furthermore, the authors hope that understanding the concepts related to the integration of mobile applications through the presentation of an integration framework will not only inform researchers of a better design for mobile application architectures, but also assist in the understanding of intricate relationships between the types of functionality required by this kind of systems.

INTRODUCTION

Many workers in current organizations perform their activity in mobile environments. Sellers, architects, doctors, veterinarians, and so forth perform the most part of their work outside an office, many of them in cities or at rural and remote areas. Moreover, in many cases, the information required for mobile workers comes from different information systems and databases owned by different organizations or providers, so it is necessary to provide mobile workers with devices (handhelds, pocket PCs [personal computers], tablet PCs, etc.) with software systems that employ user interfaces appropriate for this kind of devices, and with the capabilities for accessing and updating several information systems.

In order to solve this problem, an integration framework, called DAVINCI, has been defined. DAVINCI is a framework for providing mobile workers with mobile software applications to query and update information coming from different and heterogeneous databases.

The DAVINCI project was first tested with the main aim of developing a solution to help veterinarians performing in-field sanitary inspections in cattle holdings across European Union countries; DAVINCI was tested by veterinarian services from Spain, Bulgaria, Latvia, and Czech Republic.

During these trials, we identified that one of the main advantages of the DAVINCI architecture is its capability to be integrated together with different European databases for animal health controlling (for instance, EUROVET in Bulgaria or SIMOGAN in Spain registering cattle census and movements). DAVINCI also permits the development of new data warehouse systems compliant with the previously cited regulation, providing large economic costs savings. On the other hand, DAVINCI is easily adaptable to procedures in different countries, each with a singular culture and organizational structure regarding the responsibilities for livestock sanitary control.

STATE OF THE ART

Mobile computing devices (smart phones, PDAs (personal digital assistants), tablet PCs, or notebooks) increasingly include integrated wireless capabilities. Wi-Fi (wireless fidelity, 802.11) access points for wireless connectivity have appeared everywhere. Moreover, a growing number of complementary wireless networking standards, such as wireless personal area networks (802.15) and wireless metropolitan area networks (802.16), has evolved. In this sense, the users, who take their devices everywhere, expect their software applications to run as they do in the traditional network environment available at their offices.

To achieve such functionality transparently, however, these applications must meet a new set of requirements and support a specific set of capabilities related to the following.

- Provision of intelligent roaming capabilities to enable users to work without interruption, even when network connections are disrupted
- Exploitation of multiple network interfaces in a single device or the ability to select the most appropriate connection, for example, when two or more connections are simultaneously available
- Synchronization of databases by caching contents to local devices through asynchronous connections
- Access to data and applications on diverse devices through similar user interfaces
- Conservation of power at the operating-system level and maximization of performance

To implement mobile required functionality, application architects and developers have attempted to work around such problems without the benefit of development environments, application programming interfaces (APIs), or third-party

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