

Chapter 3.9

Databases for Mobile Applications

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INTRODUCTION

Owing to the rapid development of mobile technology over the past few decades, there have been many different kinds of mobile devices emerging in the market, and most of them work with databases seamlessly. Mobile phone gaming, downloading of ringtones, and e-calendaring are some of the prominent examples of mobile applications that require the close integration of mobile devices with databases. Mobile devices take various forms and configurations. The packaging, form factors, hardware platforms, operating system support, and functional capabilities vary

across these devices. There are, however, many common attributes shared by the devices, such as notebook computers, pen-based computers, handheld computers, and the like, all of which are used in mobile computing. These devices can be categorized into the following categories according to their functionalities and features, as detailed in Dhawan (1997). They are:

- notebook computers
- personal digital assistants
- tablet computers
- hybrid mobile devices
- mobile phones

In this article, we focus on personal digital assistants (PDA) and mobile phones as they are the most popular and commonly used mobile devices in the industry.

Mobile Computing Applications

Mobile applications include basic applications like datebook, address book, to-do list, and memos and also horizontal and vertical industry applications that mainly fall into the following three categories (Dhawan, 1997):

- Shrink-wrapped horizontal industry mobile computing applications that can be used in broad segments of various industries, e.g., electronic mail, electronic messaging via paging, and sales force automation.
- Generic horizontal industry applications requiring extensive customization, and these include database access from an information server, computer-aided dispatch (CAD), and intrasite and intersite mobility applications among others.
- Vertical industry applications include the applications that are specific to industries like insurance, banking, airlines, government, utilities, and transportation, e.g., finance industry insurance and financial planning, and stock trading.

The diverse variety of the types of mobile applications demonstrates the reach of mobile computing into almost every facet of personal and business life. One of the applications that is gaining popularity is mobile e-commerce. Mobile e-commerce refers to commercial activities performed electronically. An example of this is an online shopping mall (via the mobile devices to the Internet). Mobile commerce is one of the most popular applications these days in addition to obtaining stock quotes, directions, weather forecasts, and airline flight schedules from mobile devices (Munusamy & Hiew, 2004).

Comparison Between Mobile Devices and Desktop Computers

Compared to desktop computers, mobile devices have small memory, low computing capabilities, limited interaction facilities, and limited display and network processing capabilities. With recent technological advancements, hybrid devices combining the functionality of mobile phones together with PDAs have been developed. The differences are mainly attributed to their hardware design and system configurations. Table 1 compares desktop computers, PDAs, and mobile phones with respect to their processing power, memory, storage capacity, connection speed, and display. The data presented is current as of June 22, 2004. Data related to specifications for the desktop, PDA, and mobile phone have been downloaded from the Web sites of Dell Inc. and Nokia Inc. and relate to the Dell Dimension 8400 Desktop, the Dell Axim X3 Pocket PC 400 MHz WiFi, and the Nokia 7610, respectively.

From Table 1, it can be observed that mobile devices have smaller memory size and storage capacity as well as display size than desktop computers. So, the amount of data that can be transferred and displayed at a time is less than that of desktop computers. Furthermore, the processing power of mobile devices is usually limited when compared with desktop computers. The amount of data that can be processed at a given time is also small. Also, mobile devices have lower connection speeds and less stable network connections. They must have ways to overcome these deficiencies in order to ensure good performance in retrieving data from remote databases.

Challenges for Mobile Devices

Some of the challenges faced by mobile devices when connecting to remote databases include challenges in network connectivity, data transmission, security, and data consistency.

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