Chapter IV

Techniques to Facilitate Information Exchange in Mobile Commerce

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ABSTRACT
Data management issues related to organizing and retrieving information from wireless channels have posed challenges for the database community. In this chapter, we discuss data dissemination to mobile clients and present solutions that address the bandwidth and energy limitations resulting from short battery life of the mobile units. We also add a subscription-based data access layer on top of this. Our solutions overall propose a secure and scalable wireless data dissemination architecture. Our broadcast organization and subscription-based access protocols are geared to work hand-in-hand to facilitate a complete content distribution solution via broadcasts.

INFORMATION AS A COMMODITY
As more and more e-commerce applications are brought to the mobile platform, the users have increasingly become reliant on mobile data. Mobile commerce applications cover a wide range from short and multimedia messaging and wireless
mail, to downloadable multimedia. Financial services, business-to-business m-commerce, as well as consumer m-commerce are areas that will potentially use mobile data. With the extensive use of location-based services, more data will be available to information providers for relaying to the clients.

All these applications, when deployed, can quickly fill the airwaves and cause service disruption or service quality problems. Therefore, it is important to distinguish the types and priorities of data and design the information exchange protocols accordingly. In the rest of this chapter, we will concentrate on “rapidly changing data” that potentially has many users (e.g., stock market data) and present techniques to disseminate the data in an efficient manner.

The challenges of designing and implementing wireless networks are important ones for the telecommunications research community. At the same time, data management issues related to organizing and retrieving information from wireless channels have posed challenges for the database community as well. Some of the software problems, such as data management, transaction management, database recovery, etc., have their origins in distributed database systems. In mobile computing, however, these problems become more difficult to solve, mainly because of the narrow bandwidth of the wireless communication channels, the relatively short active life of the power supplies (battery) of mobile units, and the changing locations of required information due to client mobility. Solutions to such problems should also adequately deal with the requirement of securely accessing data from the wireless channels.

In this chapter, we will discuss data dissemination to mobile clients and will first present solutions that address the bandwidth and energy limitations resulting from short battery life of the mobile units. We will then turn our attention to add a subscription-based data access layer on top this. Our solutions overall propose a secure and scalable wireless data dissemination architecture.

This chapter is organized as follows. After a brief introduction to the mobile data concept, we first present a general architecture, requirements and trade-offs in designing a data dissemination application. We then present our solutions that provide 1) energy efficient and timely data delivery and access, and 2) subscription-based secure access to wireless data. We provide a brief literature review and outline the significance of our work and future research directions.

AN ARCHITECTURE FOR MOBILE INFORMATION EXCHANGE

In this section, we present the “broadcasting” paradigm in data dissemination. We first present a mobile architecture and describe the parameters. We then present the two problems that we are addressing in this chapter: the broadcasting problem and the subscription-based data access problem.
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