

Chapter 7.34

Location-Aware Query Resolution for Location-Based Mobile Commerce: Performance Evaluation and Optimization

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ABSTRACT

Location-based mobile commerce incorporates location-aware technologies, wire-free connectivity, and locationalized Web-based services to support the processing of location-referent transactions. In order to provide usable transaction processing services to mobile consumers, location-referent transactions require timely resolution of queries bearing transaction-related locational criteria. This research evaluates Wyse's location-aware method of resolving these queries. Results obtained in simulated mobile commerce circumstances (1) reveal the query resolution behavior of the location-aware method, (2) confirm the method's potential to improve the timeliness of transactional support provided to mobile consumers, and (3) identify the method-related

adjustments required to maintain optimal levels of query resolution performance. The article also proposes and provides a preliminary evaluation of a heuristic that may be used in efficiently determining the method-related adjustments needed in order to maximize query resolution performance.

INTRODUCTION

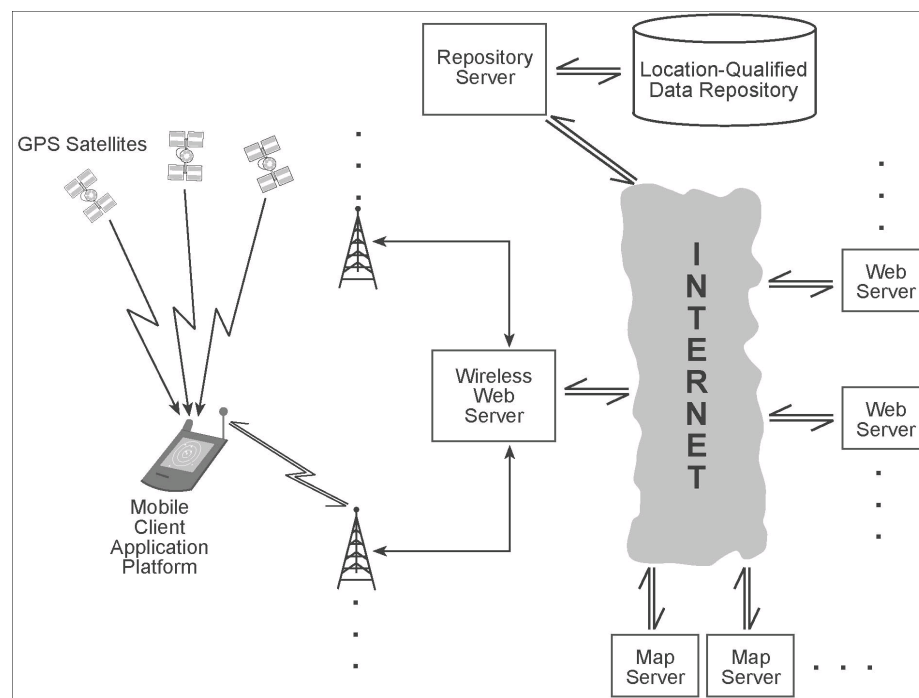
Recent years have witnessed the emergence of transaction-supporting devices directed toward the mobile consumer. Devices range from simple handsets in mobile/cellular phone systems to those involving the convergence of palm-top computing, location-determining technology, and wireless Internet connectivity. Minimally,

devices utilized by mobile consumers must incorporate wireless communication capabilities that permit a significant degree of mobility (Leung & Atypas, 2001; Santami, Leow, Lim, & Goh, 2003). Yuan and Zhang (2003) assert that mobile devices with capabilities extending beyond wireless communication to include those that support location awareness add a “much emphasised ... new dimension for value creation” (p. 41) to mobile commerce. Location awareness refers to the capability of a device to obtain data about geographical position and then to use the data to retrieve, select, and report information with respect to that position (Butz, Bauss, & Kruger, 2000). Figure 1 illustrates a location-aware mobile commerce (mcommerce) context in which location-aware applications operating on mobile, GPS-enabled, handheld computing devices avail of wireless connectivity to access a variety of

Internet-based servers providing information and functionality to support the transactional activities of mobile consumers.

An essential component in large-scale, location-aware, mobility-supporting applications is a specialized database of transaction-supporting information (Location-Qualified Data Repository, Figure 1). Locational content from the repository is required for the resolution of queries arising from location-referent transactions, transactions in which the relative geographical locations of the prospective transactional parties is a material transactional concern. Siau, Lim, and Shen (2001) and, later, Siau and Shen (2003) call for research on improving the processing of transactional queries in circumstances “where users are constantly on the move and few [end user device] computing resources are available” (p. 13). The research reported here responds to this call; it is

Figure 1. Illustrative configuration of m-commerce components



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