

Chapter XXVII

The Linkcell Construct and Location-Aware Query Processing for Location- Referent Transactions in Mobile Business

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INTRODUCTION

The technologies that enable the transactions and interactions of mobile business are now as ubiquitous as any business-applicable technology that has emerged in recent decades. There is also an exploding base of literature with mobile business as its subject. The variety and volume of literature present a challenge to defining mobile business (*m*-business) in a way that differentiates it from other forms of technology-enabled business activity. For purposes here, *m-business* is held to be an extension of electronic business wherein transactions occur through communication channels that permit a high degree of mobility by at least one of the transactional parties. Within *m-business*, the distinct sub-area of *location-*

based mobile business (*l*-business) has recently emerged and is rapidly expanding (Frost & Sullivan, 2006). In *l*-business, the technologies that support *m*-business transactions are extended to incorporate location-aware capabilities. A system is 'location aware' when it senses a transactional party's geographical position and then uses that positional information to perform one or more of the CRUD (create, retrieve, update, delete) functions of data management in support of a mobile user's transactional activities (Butz, Baus, and Kruger, 2000). In their discussion of "location awareness", Yuan and Zhang (2003) suggest that it "is a new dimension for value creation" applicable to an extensive variety of areas in which mobility is a salient characteristic: travel and tourism, commercial transportation, insurance

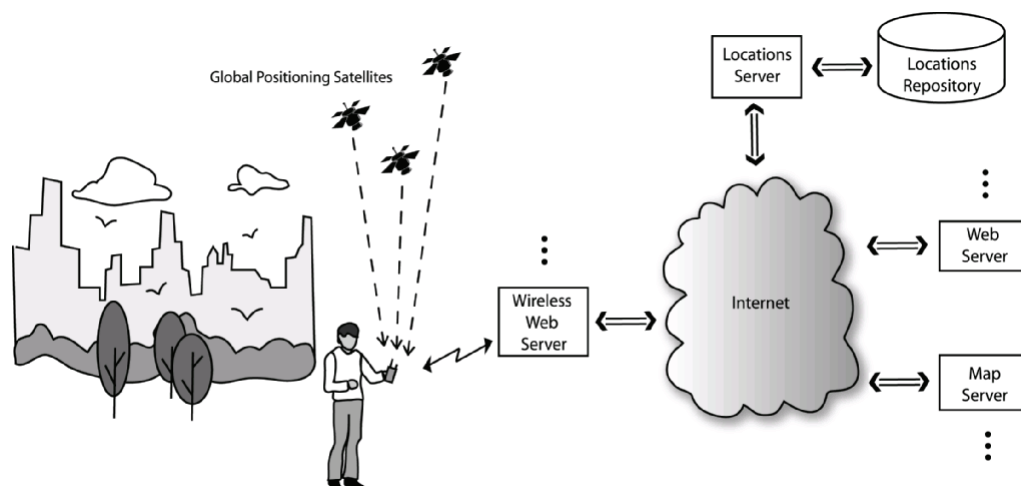
risk/recovery management, emergency response, and many others.

Figure 1 depicts a mobile user in an *l*-business context in which a GPS-enabled, Internet-connected, mobile, client platform employs a wireless communication channel to interact with web-based resources to support the user's transactional activities. Here, the provision of *l*-business services relies on an accessible collection of location-qualified business information. This information (contained in the Locations Repository of Figure 1) and its management (performed by the Locations Server of Figure 1) are the focal concerns of this article. In what follows, Wyse's (2003, 2004, 2006, 2008) location-aware linkcell (LAL) repository management method is described and discussed. Selected research results are reviewed that assess the performance and applicability of the method. The article concludes with an identification of trends in *l*-business addressed by the location-aware method. We begin with a discussion of the *problem* of managing data for which the location-aware method is intended as a potential *solution*.

BACKGROUND: THE LOCATION REPOSITORY MANAGEMENT PROBLEM

l-business applications must process transactions in which the proximity of the transactional parties is a material consideration. (Transactions of this type are referred to here as location-referent transactions.) *l*-business applications must also accommodate the location-variant behaviour of the transactional parties. Proximity-related questions such as *Where is the nearest emergency medical facility?* or *Is there a cash machine close by?* or, more generally, *What is my proximity to a goods-providing/service-offering location in a targeted business category?* typify those posed by mobile users when contemplating or concluding transactions in respect of user-sought goods and services. Queries (reflecting such questions) that are formulated by, and issued from, *l*-business applications based on mobile computing platforms require a resolution approach that accommodates not only the static locational attributes associated with the *targeted business category* but also the

Figure 1. Location-based m-business with a Web-based locations repository and location-aware repository management (Adapted from Wyse, 2007. Reproduced with the permission of IEEE).



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