

Chapter IV

Location-Based Service (LBS) System Analysis and Design

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ABSTRACT

Advances in GPS, personal locator technology, Internet and network technology, and the rapidly growing number of mobile personal devices are helping to drive the fast growth of mobile e-commerce, we refer to as m-commerce. A special case of m-commerce is enabled with location based services (LBS) where often the actual position of the terminal is used in the service provision. In this chapter, we concentrate on the analysis and design issues and techniques for the LBS. We give a brief introduction of LBS and its applications and present the most important user, system, and infrastructure requirements. We also present the architecture and database design issues in LBS systems and study the performance an LBS system and evaluate its properties.

INTRODUCTION

Location based services are services that are sensitive to and take advantage of the location of the service user. Any service that makes use of the location of the user can be called a location based service. The location of a person can be determined

using a GPS receiver or other technologies, now available in many mobile phone platforms. This position-determination technology (PDT) is generally carried by the person, from which the location must be provided to the location-based service provider. Today, the location-based services are generally hosted in the network, which may pose performance and scalability issues..

The uptake of mobile phones with PDT capabilities continues to grow and most mobile phone users have a phone which can be traced with good accuracy and a lower cost. This new technology has given the LBS market a greater push. Location based services can be divided into four categories:

- Business to business
- Business to consumer
- Consumer to business
- Consumer to consumer

The business to business services include fleet tracking, courier tracking, and others. Business to consumer services include pushed ads based on the location, where a user will receive ads most relevant to the location. Consumer to business services include location based search, where a user is searching for the nearest restaurant, petrol pump, and so forth. A consumer to consumer service is the friend finder service where the user will be alerted if his friend is within a few meters (Jacob, 2007).

Location Based Services Examples

Typical location based services include:

- **Fleet tracking service:** Fleet tracking service can be used to locate and track moving vehicles. This can be very useful for fleet owners/individual vehicle owners. This enables them to pinpoint their vehicles on a map. Taxi fleets can use the location information to calculate the distance traveled, and use that for internal billing. Government can use this service for preventing misuse of government vehicles. Also, the tracker will help in finding the vehicle in case of a theft.
- **Courier tracking:** Courier or costly assets can be tagged with tracking devices so that the position of these can be monitored. In case of freight items, such tracking will allow the user to exactly know where his package is. This avoids manual intervention for data

entry and can speed up the handling process. Current freight tracking systems use passive components to track items.

- **Traffic alerts:** Traffic and weather alerts are among the most widely used location services. These alerts provide a traveling person with the latest traffic situation on the road ahead. It also delivers the latest weather updates for the subscriber's current region. Traffic radios are very popular in many countries, but location based traffic alerts can provide customer specific traffic alerts only when he needs an alert.
- **Location sensitive advertising:** LBS can be used to provide location sensitive advertising. Consider a scenario where a traveler gets a message about the nearest hotels as soon as he lands in an airport. In a shopping mall, the service can be used to push information about shops offering a discount. Everyone within a fixed distance from the mall will get the promotional message. This can increase sales and brand awareness.
- **Emergency assistance:** Emergency assistance is the most useful and life saving among all location based services. In case of an accident, a panic button can be pressed, which will send out the location information where the accident took place to nearest control center/ambulance/patrol car. This will help the police/paramedics to reach the accident scene earlier and save lives.
- **E911 services:** Location based services got a boost when the E-911 enhancements were suggested to the 911 system in the USA. E-911 specifies that all operators must provide the location of a 911 caller so that the emergency team can reach the spot faster. This brought about many technological and business changes. Mobile locating technology enables and improves E911 services with increased accuracy and faster query time.
- **Location based yellow page look up:** When you are traveling you will require many kinds

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