



Assisted GPS: Delivering Location-Based Services with Cellular Technology

By Suhas Uliyar, Chief Technical Officer, Dexterra

Location-based services (LBS) is a well-known technology that has been available for some time. Because of the expense involved in deploying it, however, LBS was largely confined to industrial applications such as automatic vehicle location (AVL). Now with the assistance of cellular technology, cost-effective LBS applications will soon be available to small businesses and consumers as well.

Until very recently, the typical LBS-enabled device was a massive black box physically mounted inside a truck engine to track metrics such as location, speed, direction, performance, pressure and so on. This kind of data is invaluable for trucking companies that manage large fleets, but it comes at a significant cost. Black boxes consume lots of power, require independent power sources and radio stacks, and use high-power satellite receivers and antennas as well. This put the technology out of reach for smaller businesses and consumers.

But over the past few years, market awareness of—and demand for LBS technology—has been growing. Google Maps, an extremely popular web-based application, introduced free LBS-type services to a worldwide audience. Car manufacturers began making smaller, more cost-effective GPS systems available to businesses and consumers alike. And wireless providers started enabling cell phones and other mobile devices with GPS capabilities.

Yet barriers remained to widespread adoption of LBS technology. GPS applications rapidly drain battery power from mobile devices, limiting their usefulness. Also, GPS technology does not work unless the user has line-of-sight contact with overhead satellite receivers. This means users inside dwellings or surrounded by tall buildings cannot use their GPS-enabled phones to find their location or track assets.

With the introduction of assisted GPS, however, all of that is about to change. Assisted GPS uses a combination of GPS technology and cell tower triangulation to determine location—even if there is no line of sight with the satellite receiver. Triangulation is accurate to within a mile depending on the carrier and distances between cell towers, and uses no more battery power than a normal phone call does. Essentially it relies on the same constant communication with cell towers that mobile devices already use, providing real-time location status without draining battery power. In fact, triangulation's real-time tracking capabilities give it an edge over satellite-based GPS solutions because they cannot collect data reliably or regularly without a line of sight which can be a problem with tall buildings or even trees.

Emergency response units have been using cell tower triangulation for years, but wireless carriers are only now rolling out applications for consumers. Legal and privacy issues no doubt contributed to the delay, although developing a profitable pricing model may have been wireless carriers' biggest challenge.

In any case, the technology is here now, and the market opportunity is huge. Assisted GPS literally puts LBS technology into the hands of anyone who owns a GPS-enabled phone or mobile device. By logging into a secure, web-based interface provided by the wireless carrier, small business owners can determine the locations of their mobile employees and dispatch the one closest to a customer's job site. On the consumer side, concerned parents can use assisted GPS to check whether their children are at school, at home or at a friend's house during certain hours.



The range of mobile tracking applications wireless carriers can offer with assisted GPS is also potentially huge. For example, by taking advantage of triangulation's real-time tracking capabilities, wireless carriers can allow subscribers to create "bread crumb trails" by collecting data samples at frequent intervals throughout the day. Graphically plotting these bread crumb trails makes it easy for subscribers to track the location, speed and performance of the people and assets they are monitoring. It can even be submitted to insurance companies to lower premiums for independent cab companies and other small businesses that maintain vehicles but can't afford proprietary black boxes.

Geofencing is another mobile tracking application that wireless carriers can offer to both businesses and end consumers. Subscribers use a web-based interface to set the geographic boundaries within which their mobile employees or family members are supposed to stay, and receive automated alerts whenever someone strays outside the geofence. While some may have concerns about the "Big Brother" aspects of this application, when implemented appropriately, it can help businesses keep their mobile workers productive, and help parents keep their children safe.

As assisted GPS technology enters the mainstream, we will continue to face questions about individual privacy and mobile security. Wireless carriers will be challenged to create LBS applications that provide easy tracking for subscribers while securing sensitive mobile data. With the opportunity to enable assisted GPS for every mobile subscriber worldwide at hand, however, it is a challenge wireless carriers will have to meet.