

Business Issues and Opportunities in Location-based Services

A MAPINFO WHITEPAPER

OUR WORLD TODAY IS MOBILE, AND WITH THIS MOBILITY A NEW MEDIUM FOR PERSONALIZED, ONE-TO-ONE SERVICE IS BEING CREATED. IT IS CALLED LOCATION-BASED SERVICES (LBS) AND INCLUDES ANY TYPE OF CONTENT-RICH SERVICE UTILIZING A SUBSCRIBER'S LOCATION TO DELIVER PERTINENT CONTENT.

ADVANCES IN LBS TECHNOLOGY ENABLE THOSE CARRYING A MOBILE DEVICE TO: ACCESS NEEDED INFORMATION—LARGELY CENTERED AROUND THEIR LOCATION AND SURROUNDINGS—WHEN AND WHERE THEY NEED IT; TRACK PEOPLE AND ASSETS; AND, DIRECT AND ROUTE PEOPLE AND ASSETS.

LBS is of utmost importance to operators

With LBS, operators can attract and retain more subscribers, gain greater adoption of the wireless Web; achieve increased average revenue per user (ARPU), attract new revenue from business customers and open new revenue streams from applications. LBS helps operators achieve greater differentiation, provide better service and add new revenue-generating offerings. Differentiation is critical to operators, who must stand out in an increasingly saturated wireless market. To succeed in the LBS marketplace, operators must be able to offer more than “me too” services. They need to be able to customize their offerings to fit their customers’ needs and wants.

LBS offerings are attractive to both businesses and consumers for:

- *safety*—connecting to emergency services or roadside assistance
- *entertainment*—playing location aware- and location enhanced-games
- *convenience*—identifying where friends are now, locating the nearest gas station or finding the nearest restaurant and reserving a table—all without resorting to paper maps, hard copy phone directories or stopping at a pay phone
- *efficiency*—identifying other customers in a specified area while on a sales call with a particular client and also to route a mobile workforce such as a delivery fleet or field workers

Such valuable services will help operators attract new customers and keep customers. In a business world where customer churn is rampant, this is critical.

The LBS market is forecasted by industry analysts to be significant. According to the IDC *The Structure of the Mobile Location Services Market* report, ©May 2001, the worldwide number of subscribers to wireless services is expected to be 1.3 billion by 2004. In the long term, LBS is expected to exceed \$2.7 billion in sales by the end of 2006, representing 3.7 percent of all consumer wireless service revenue, IDC said.

ROI on your LBS Investment

LBS also provides a way for operators to recoup their significant investment in technology, their networks and infrastructure. With the LBS offerings today, operators can look to capture ROI from:

- increased use of multiple phones within families and businesses
- increased ARPU
- increased messaging usage and revenue
- increased usage/minutes of wireless web
- increased customer acquisition, providing users new reasons to switch from competitors
- increased customer retention, offering users more reasons to continue with their carrier
- increased new revenue streams with new value-added services

LBS generated revenue can be achieved in a variety of ways, including: per service fees; minutes of use; and, wireless web usage fee. Fees may also be charged for short messaging service (SMS) messages, advertisements, developer fees and application hosting for the enterprise business market.

LBS offerings can be sold to any business and consumer and be used in mobile commerce (m-commerce) applications. For instance, mobile device users can personalize their offerings by establishing preferences. Therefore, those users whose profiles designate they enjoy sporting events or art expositions can be sent information on shows, a discount coupon and/or a m-ticket (mobile ticket). Other examples include location-enhanced games, transportation directions, automatic vehicle tracking, city guides, traffic data, roadside assistance, sales force automation, asset management and risk analysis. The potential of LBS is endless. Its uses will include future applications that will leverage today's technology in new and innovative ways.

**THE WORLD'S NEW WIRELESS LIFESTYLE DEMANDS LBS,
PROVIDING SUBSCRIBERS WITH RELEVANT LOCATION
INFORMATION WHEREVER AND WHENEVER THEY NEED IT.**

Operators across the globe are faced with providing safety services via mobile devices. In the United States, operators are required by the Federal Communications Commission to identify the location of mobile phone callers within a half mile (.8 kilometers). Since U.S. carriers are implementing enhanced 911 (E911) applications, they are looking for other ways to earn a profit with this technology. For instance, the same platform implemented to fulfill the E911 mandate can be used by operators to offer location-sensitive call billing.

MAPINFO

BENEFITS

- *Proven technology and expertise*
- *Robust, customizable platform*
- *Open, standards-based approach*
- *Key partnerships*
- *Easy integration*
- *Fast time to market*
- *Unique, valuable services*
- *A partner, not simply a vendor*

This platform will also allow carriers around the world an opportunity to add revenue while answering a government and/or public safety mandate. In Europe, the European Union's E112 requirement also requires the location of mobile callers be identified during emergency calls. As yet, there is no such mandate in Australia, but recommendations are being drafted for 000 (Australian emergency number) guidelines. In addition, a similar approach is being considered in Malaysia, with police agencies being responsible for identifying mobile phone callers' locations.

LBS Business Models

There are various business models that operators can implement to obtain value from their LBS investment.

In early 2000, carriers made their first forays into the LBS market with their first generation of basic service offerings. This model saw Internet-based location portals partner with mobile operators to deliver standard web services to mobile subscribers. These services suffered, as they were not designed to meet the form factor of mobile devices. Although the services were created and implemented to provide revenues to the operator, they failed to adequately do so. This was due in part to the misconception—which was mistakenly reinforced throughout the user community—that “the web on your phone” was not a viable proposition. These services enabled operators to achieve WAP airtime revenues, which were shared with the location portal and its suppliers.

Through 2001, mobile operators launched their next generation of location-based services. These 2G services were/are offered in partnership with application service providers (ASP) under a hosted model. This model enabled application developers to offer packaged services to mobile operators. The hosted model worked reasonably well for both parties, since it provided a very clear business model under which to work. Several revenue models are supported, including revenue sharing, licensing and transaction charging.

Nevertheless, mobile operators have now begun to demand service differentiation, customization and ownership of their own destiny. This requirement is driven by the mobile operators' need to offer the subscriber a range of highly integrated services that deliver an excellent user experience and increase ongoing usage and customer satisfaction. Mobile operators and service providers are able to generate revenues from location-based services in several ways.

The mechanisms for billing the customer for their use of location-based services are no different to those of traditional mobile services. Therefore, the revenue opportunity is heavily stacked in favor of the mobile operator and service provider over the application provider. This will continue to be the case until provision for revenue sharing beyond that of messaging is made a reality. Revenue generation methods are:

- subscription
- airtime (2G)
- downloading (2.5G/3G)
- messaging (standard and premium SMS/MMS)
- advertising
- m-commerce

Application providers are able to generate revenue when their services are deployed across mobile operators' and service providers' networks in the following ways:

- revenue sharing
- software licensing
- transaction pricing
- hosted services

Revenue sharing offers application providers the opportunity to directly share in the revenues generated from subscribers' service usage. Operators favor this approach when services are new to market and untested—but are quick to move to more traditional licensing models when services become mainstream. The reality of billing under a revenue sharing model is somewhat complex, since billing systems handling subscription, airtime, download, commerce, messaging and advertising are not unified. This often means that application providers' revenues are generated through a combination of licensing, transactions and hosting, thereby reducing the application providers' revenue opportunity.

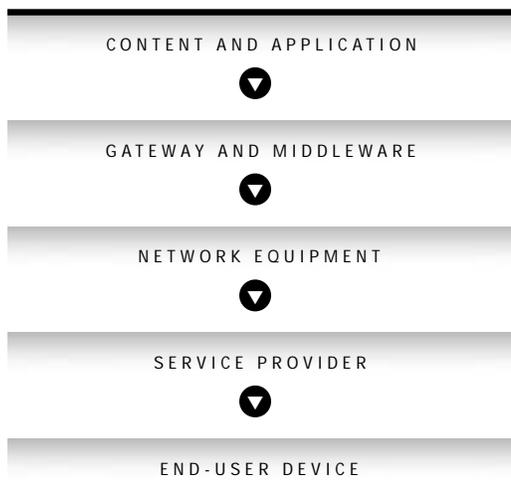
What Requirements Comprise A LBS Solution?

Location aware applications address common customer needs:

- where am I (location refinement)
- what is around me (search for points of interest)
- who is around me (search for people)
- how do I get there (help to reach these locations)
- let others know where I am (share location information)

In a wireless network, clients range from personal data assistants and cellular phones to telematic devices. These clients communicate via an operator's network to a gateway. The gateway platform integrates intelligent network protocols with Internet protocols, so an application can securely access resources within the operator's network. The location server integrates the operator's network with position determining equipment, allowing the application to determine the subscriber's location, thereby answering common location-based questions (where am I, what is around me, etc.).

Key to LBS success is how easily the application integrates into a network's infrastructure. Most developers use XML programming for LBS, as it is the standard for web services programming. The LBS platform contains all pieces needed to deliver LBS.



The LBS technology value chain incorporates much of the technology in which communications organization have already invested. LBS offers revenue based on the generated value of service, value of content and the core services customer are already using.

In the wireless network value chain, clients—ranging from PDAs and cellular phones to telematic devices—communicate via the operator's network to a gateway. The gateway integrates network and Internet protocols, enabling secure access. The location server within the network determines subscriber location and answers common location-based questions.

The MapInfo LBS Solution

MapInfo's LBS technology is the first of its kind in the market. It's real, available now and includes the *MapInfo® miAware™* platform and geographic data.

- *miAware* combines XML interfaces to core MapInfo servers with unique functionality for the mobile

THE NUMBER OF APPLICATIONS THAT CAN BE CREATED USING MIAWARE IS UNLIMITED. CARRIERS MAY BUILD THEIR OWN SERVICE OR USE A PACKAGE ALREADY CREATED.

Internet environment, including a yellow pages framework, find nearest, geocoding, reverse geocoding, position acquisition and profiling. Part of the *miAware* platform is *MapInfo® MapXtend®*, which application programming interface (API) is based on J2ME and J2EE platforms. *MapXtend* allows developers to create smart and user interface rich applications for mobile devices. Applications created with *MapXtend* give mobile field staff live access to the most updated corporate data on equipment and customers, helping increase efficiency and improve service.

- To offer comprehensive geographic data, MapInfo creates its own data sets, as well as partners with the world's leading data providers. At present, MapInfo products and relationships with leading data providers encompass global data for yellow page, street, landmark, event and public transportation content.

MapInfo® miAware™. *miAware* is a robust, scalable platform, enabling operators to create and deliver a wide range of unique mobile applications, including city guides and find nearest. By integrating the *miAware* platform, carriers can differentiate their offerings for all types of customers, resulting in a significant competitive advantage.

miAware is market-tested, scalable, flexible and standards approved (Java, Open LS and OMA). Based on proven location technology that has been in use for more than 16 years, MapInfo's feature-rich *miAware* patent-pending technology is comprised of processing engines, geocodings, map visualization, routing and content.

miAware provides:

- a concise, efficient, consistent and scalable XML environment for carriers to create and market LBS
- the highest possible performance with modular, n-tiered, multithreaded architecture, which is based on secure Java servlets, to offer significant service stability, persistence, flexibility, scalability and superior performance
- use of industry standard extensible markup language (XML) APIs, ensuring service creation is flexible and fast
- a first-to-market architecture employing server clustering, load balancing and other elements to achieve superior performance and eliminate system bottlenecks
- a LBS platform that has been tested in multiple operating environments and is being used throughout the world. Its multivendor interoperability ensures out-of-the-box integration with network infrastructures
- client-side device independence, so any Internet-enabled mobile device is supported

A primary value MapInfo brings to the LBS application development market is the ability of operators to differentiate their offerings. With the MapInfo *miAware* platform, operators can offer a myriad of services—all presenting significant opportunities for them to distinguish themselves among the competition. *miAware* services include:

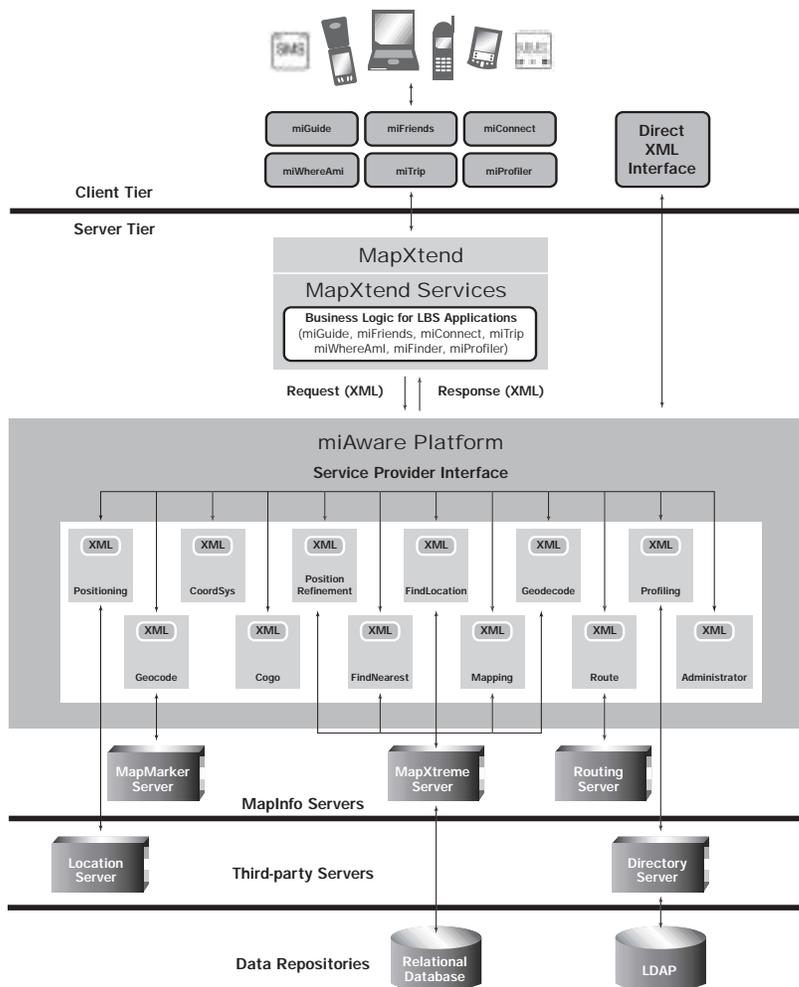
- mapping
- yellow page management—data upload and geocoding business and retail merchant data
- find location—to identify a geographic location, offer searching functions for either street names, business names or cross street names for a given street name
- find nearest—return a list of businesses/organizations/services nearest to the device/subscriber
- user profile—manage user preference information
- location profile—manage relevant location information based on the user profile
- annotated mapping—draw a map with annotations
- geocode—convert a text address to a latitude/longitude
- reverse geocode (or geodecode)—return address information associated with any given longitude/latitude to the nearest address, street intersection, postal code or city

- routing and directions—generate driving directions based on a set of latitudes/longitudes, particularly useful for navigating subscribers, as well as field staff in fleet management, salesforce management and technicians
- position acquisition—identify the device location, also known as position determining equipment
- position refinement—refine the position of a mobile user based on points of interest
- traffic—get traffic conditions

The number of applications that can be created using *miAware* is unlimited. Carriers may build their own service or use a package already created. For faster time to market, *miAware* offers carriers packaged application templates *miGuide*, *miConnect*, *miProfiler*, *miFriends*, *miWhereAmI* and *miTrip*.

MapInfo® miGuide™. *miGuide* provides users relevant information based on their current location or a desired future location, as well as directions on how to get there. It can be programmed with complete, up-to-date information on hotels, restaurants, points of interest and much more information. Also, carriers can use their own yellow page data. With *miGuide*, users may enter their personal preferences, such as preferred food vendors and preferred hotels.

MapInfo® miConnect™. *miConnect* enables carriers to deliver LBS to small- and medium-sized businesses. *miConnect* allows a central dispatcher to enter the address of a new job, locate the field person nearest that address and send information including a map to the field person's mobile device.



Client and presentation tiers are managed by MapInfo® MapXtend®, allowing subscribers to access services through any Internet-enabled mobile device.

Business logic tier manages LBS applications and integration with other applications.

The miAware XML API provides integration with core services used in building LBS applications.

The resource tier consists of centrally managed core MapInfo servers and data, along with data acquired from the wireless network.

MapInfo® miProfiler™ miProfiler is a web tool used to establish a profile, create and store information and recall information. Used in conjunction with other *miAware* packaged applications, *miProfiler* enables users to update personal preferences, such as types of restaurants, hotels and friends list. In addition, there is an enterprise variation of *miProfiler*, providing information on what services, devices and data users can access.

MapInfo® miFriends™ miFriends is a consumer application enabling subscribers to locate friends, family or colleagues. With *miFriends*, subscribers can access maps showing real-time locations of friends, obtain directions to them or send a message identifying a mutual meeting point.

WITH OUR CAPABILITIES TO BUILD CUSTOM PLATFORMS TO AN OPERATOR'S SPECIFICATIONS, MAPINFO LBS CUSTOMERS CAN OFFER UNIQUE AND TAILORED SERVICES TO THE MOBILE WORLD.

MapInfo® miWhereAmI™ miWhereAmI enables users to easily determine their location and then save the location in their profile or send the location in an email or short message service.

MapInfo® miTrip™ miTrip is an application template that can be used to provide point-to-point directions.

MAPINFO ADDS SIGNIFICANT VALUE
WITH DEMOGRAPHIC PROFILING

Using our core competencies in profiling and demographic analysis, MapInfo offers LBS providers the ability to personalize their messages based on a user's profile. By assigning sophisticated demographic profiles, which are unseen to end users, organizations are better able to target their offerings by prioritizing the content sent.

Core server technology

A critical aspect of MapInfo technology is its seamless integration of core MapInfo data sets and server technologies. This integration ensures that the subscriber receives consistent information. Market tested and proven, MapInfo's mapping, geocoding and routing servers are scalable and reliable, delivering the highest performance possible. For instance, *miAware* uses *MapInfo® MapMarker®, MapMarker® J Server, MapXtreme® Java Edition, Routing J Server, StreetPro®* and *SpatialWare®*.

Developer services

MapInfo *miAware* Developer Services assists developers and content providers in quickly developing commercially viable applications and content. The program includes: a developers' forum where ideas, concerns and questions can be discussed with fellow developers; 24/7 access to a hosted web server for creating and testing LBS applications; technical, sales and marketing support; and, training.

MapInfo's Competitive Advantage

Since our founding in 1986, MapInfo has been a leader in creating innovative technology to provide users with mission critical and perceptive location intelligence. It is with nearly 20 years of technological excellence that MapInfo maintains its proven history of answering the needs of the marketplace, solid financial position, strong customer commitment and global reach. Our technological innovation continues with LBS. *miAware* is a compelling platform enabling operators to build LBS applications that will be used by millions. MapInfo's superior LBS technology is architected to host a multitude of applications efficiently and cost effectively. With a number of LBS applications built and ready to go, operators can begin earning revenue on their LBS investment almost immediately. And, with our capabilities to build custom platforms to an operator's specifications, MapInfo LBS customers can offer unique and tailored services to the mobile world.

MAPINFO

OFFERS

- *Proven technological excellence and expertise in deploying and maintaining an LBS application. With more than 16 years of providing location intelligence, MapInfo is the global leader in location and spatial technology.*
- *Real deliverables—no hype, just real products in use around the world.*
- *A scalable, customizable platform in MapInfo miAware—enabling carriers to deploy unique, valuable services.*
- *A financially stable partner, supporting a carrier through the long term LBS investment and which will help enable the carrier to increase revenue.*

The MapInfo competitive advantage includes: superior, innovative and proven technology; expertise within the LBS marketplace; key strategic relationships with industry leaders; LBS platforms that are flexible, scalable and customizable to fit the carrier's needs; seamless integration with existing IT and network infrastructures; profiling and demographic data; and, a total end-to-end solution. Our professional services group and its LBS expertise are significant assets in deploying and supporting LBS technology.

Plus, our strong partnerships, offers a complete solution—a one-stop shop for LBS. Partners take advantage of MapInfo's proven platform to create commercially viable LBS applications and to deliver services. Also, partners take advantage of MapInfo developer program benefits: speed to market, ease of development, application integrity and early ROI.

Our product is real, on the market and being used by world leaders. MapInfo is working with Siemens Information and Communication Mobile Group (IC Mobile) in its Location Enabling Server, which is being implemented into Vodafone's mobile networks globally. The Siemens Location Enabling Server will enable Vodafone to offer customers value-added mobile location-dependent services and applications.

Summary

Location and mobility are very much part of our daily lives. People are busy and on the move. Wireless is no longer just a way to stay connected to the office—it is becoming a persuasive and indispensable part of life, affecting the way people work, live and play. The demand for LBS is present in the market today—and it is growing.

The world's new wireless lifestyle demands LBS, providing subscribers with relevant location information wherever and whenever they need it. LBS fundamentals answer these key questions: where am I, what is around me, who is around me and how do I get there.

Today, operators can use LBS to increase revenue. The world now has extensive wireless coverage, reliable networks and the ability to determine location, capable mobile devices and succinct delivery mechanisms. Operators partnering with MapInfo can quickly offer differentiated services that set them apart in the marketplace and offers them multiple revenue models and growth opportunities.

LBS is an exciting and natural evolution of MapInfo's leading-edge technology—proven throughout the world and ready today for carriers to use in generating new revenue and attracting and retaining customers.

