Location Aware

Article Abstract: This article discusses the emergence of the wireless Web as an entirely new medium, and discusses the role that MapInfo will play as a solutions provider in the wireless arena. E911, m411 and voice technologies are discussed, and an explanation of how concierge services use location is also offered. In short, the world is becoming location aware. MapInfo enables this awareness and is on the move with wireless.

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Contact: Jennifer A. Gould
jennifer_gould@mapinfo.com
MapInfo Corporation
One Global View
Troy, NY 12180-8399
Phone: (518)285-7125
Fax: (518)285-7090

Location Aware
MapInfo Is On the Move with Wireless

By Will Wilbrink

"We need devices and services to become aware of their location, both in space and time, especially if they are mobile," said Bill Joy, chief scientist/cofounder of Sun Microsystems.

In short, the world is becoming location aware. MapInfo enables this awareness and is on the move with wireless. To Mark Cattini, MapInfo president and CEO, wireless means mobile. "Intelligence around location is at the heart of mobile devices," said Cattini. "Location intelligence is MapInfo's core competency and it will drive the wireless world."

MapInfo's role in the wireless arena will mirror an already proven role in telecommunications: providing the solutions and services for organizations to plan, design, build, maintain, market and sell. Location intelligence is very much a part of the telecommunications and wireless networks. Cattini noted that MapInfo provides complete solutions to the wireless industry, whereas other providers are niche players, offering small bits of directions and mapping capabilities. "MapInfo offers a complete range of highly customized, reliable, proven, flexible solutions," he said. "Our solutions are accurate and scalable. The major players in the wireless space know this. They recognize us as a leader in location-based technology and are coming to us for mobile solutions."

According to Cattini, the wireless Web is not so much a technology play, but rather the emergence of an entirely new medium. "As a medium, the wireless Web is a platform for information, entertainment and commerce. However, it is not like other media. Mass media—radio, TV, newspaper, billboards—has one message for many. The wireless Web is more personalized with a one-to-one message. The mobile device allows me to pull information that I want and allows promotions tailored to my likes to be pushed to me. It's permission-based marketing, not mass marketing."

Permission-based marketing by definition is highly targeted and personalized to the individual consumer. With location-based services and a consumer profile that specifies when he or she can be contacted and with what information he or she is interested in, wireless providers will know where that consumer is as well as what businesses are near the consumer's location. For instance, a sales person may permit a carrier to notify her between 7 a.m. and 9 a.m. Monday through Friday when she is within 500 yards of a coffee shop. Then, the nearby business can offer that consumer 50 cents off a large coffee and a bagel. A family of four specifies to the carrier that they would like to know what the specials are for today, tomorrow or the next day at the neighborhood deli. In each case, the consumer allows a company to market directly to him or her.

Applications on a mobile phone or PDA need to be highly personalized. These applications must protect a person's privacy and at the same time provide them with content and relevant information. Location provides a context sensitive element to this information.

Mobile aware applications are based on the user's location and free the user from traditional "wired" restrictions. The applications take advantage of where the device is, where it is going, what or who is near the mobile device and how to get from the current location of the device to the next destination—offering the mobile user and invaluable service any time, any where.

For example, location is used within a concierge service following these steps

- First, position determining system (PDE) is used to determine where the person is located
- Finding a suitable vegetarian restaurant that takes credit cards requires some processing. Using geocoding, the business postal address is converted to a known location such as a latitude/longitude coordinate. This is usually done as a batch process and the results are then stored in a database

- When the sales person activates the request, a hybrid spatial/textual query provides the response. This query uses the PDE location and compares it geographically with the restaurant locations. It is visualized as a point with a rectangle drawn around it. The query processing searches for a restaurant inside the rectangle. In conjunction with the geographic processing, a text match is processed to determine whether credit cards are accepted. This type of processing is known as a "find the nearest" query

- Driving directions route the sales person to the restaurant. In theory, the PDE and restaurant locations are all that is needed to generate the route. (In a practical sense, some confirmation of the sales person's location may be required in a dense urban setting.); and

- A high quality street map can be downloaded onto mobile devices that support color or gray scale displays. X marks the spot of the sales person's destination.

"No matter how you slice it or analyze it, the world is becoming mobile," said Cattini. "Suddenly, wireless is an entirely new medium for commerce. Location is a key piece, because that mobile device moves with you. MapInfo's goal is to provide solutions that will add value to people's daily activities, access to information and personal productivity."

The problem is that today's mobile devices are typically short on memory and screen space. Sun has developed the Java™ 2 Micro Edition (J2ME™) Platform with these constraints in mind. Using this platform, MapInfo and Sun will provide dynamic maps and content in real-time with richer graphics and color, cross-platform compatibility and increased security, offering consumers on the move visually-enhanced location services. The platform takes advantage of Java's key functionality including, multithreading, memory management and communications and adding increased flexibility, scalability and security for use on a wide range of mobile devices. The mobile information device profile (MIDP) provides developers with an Application Programming Interface (API) for user interface, storage and networking that is device independent. MIDP applications use limited resources and provide smart user interfaces.

In addition to pulling and pushing information to consumers, location-based services are important to industries with large mobile workforces. Organizations use MapInfo solutions to link their mobile work force to the centralized database within the corporate walls: routing the workforce more quickly and intelligently, making operations more efficient and cost effective; and enabling services to reach the customers on time and as promised. Mobile work forces taking advantage of location-based services via handsets include field technicians, delivery people, sales people, law enforcement officers and emergency technicians.

MapInfo is focusing on three important segments of the mobile market: 1.mobile infrastructure, providing the technology for information services such as mobile 411, roadside assistance and E911; 2. business-to-business applications that allow carriers to offer location services such as advertising services and personalized mobile commerce; and, 3. business-to-business-to-consumer applications such as find the restaurants, ATMs and hotels nearby.

"Today, there are hundreds of MapInfo wireless solutions in use for everything from vehicle tracking to logistics to location-based emergency notification," noted Cattini.

m411

m411 or the mobile directory information module routes calls to the nearest merchant—find the nearest. For example, the handset key sequence *pizza would automatically route the call to the nearest pizza establishment. With m411, carriers can form lucrative business relationships with merchants of goods and services while providing a valuable subscriber service. This relationship will help carriers combat the very high cost of network planning, building and maintenance.

E911
Mobile location services received a big push from the U.S. Federal Communications Commission, which mandates that by early 2002 wireless carriers must transmit precise location information of emergency calls from wireless phones to public safety agencies. MapInfo has been working to assist several companies and state agencies to meet the enhanced 911 (E911) mandate. For instance, the State of New Hampshire has instituted an award-winning system that pairs MapInfo technology with advanced communications technologies, such as frame relay, to produce an extremely timely and effective response system for emergencies statewide. With MapInfo technology, New Hampshire continues to build and expand the cornerstone of its 911 system—the addressing database and mapping system that enables incoming call centers or public service answering points (PSAPs) to determine the exact location of emergencies.

MapInfo is at present working with Alcatel on an E911 solution that will allow service providers to quickly and accurately route E911 calls to the appropriate Public Safety Answering Points. This solution combines the best in intelligent networking software and spatial process software to deliver optimal solutions for service providers' E911 needs.

Voice Technology
Voice-enabled Internet services are based on the eXtensible Markup Language (XML), and are what some say will revolutionize the Internet industry. Simply, voice activation and response allows customers to access the Internet and gain information by using their voice. The technology translates the voice command into text and text back into voice. For instance, with voice recognition, drivers could command directions to the nearest gas station and mobile device responds with audible directions.

"About 50 percent of all wireless calls are while users are mobile or driving," said Cattini. "Voice technology and MapInfo's role in integrating our location-based technology as a voice interface is particularly relevant. We are seeing new regulations being implemented around the world banning the use of wireless phones in moving vehicles unless the phones are hands free. Voice technology and voice interaction is a critical piece of the mobile market."

The voice interactivity niche within the mobile market will be significant. Allied Business Intelligence predicts in its Voice Recognition Report that the number of voice portal sites used in the enterprise will grow from 2,000 in 2001 to more than 250,000 sites by the end of 2005 and that revenue via these voice portals will reach $50 billion by 2005.

MapInfo's Mobile Location Suite
Recently, MapInfo released an entire suite of location-based services for the wireless Web mobile market. The suite, called MapInfo® Location Management Platform (LMP), is all about businesses knowing where their customers are. The suite is a set of fully packaged, turnkey systems that allow carriers to customize mobile services to their customers; control the provision of information and thereby protect customers' privacy; and generate revenue. To fit businesses' needs, the systems may be hosted by businesses' preferred ASP or a MapInfo partner hosting service. Content can be prepackaged and formatted, or an organization can utilize its own content.

The LMP encompasses mobile location engines for call processing; mobile location applications for carriers to deploy new services to attract additional revenue; and, mobile location enablers, MapInfo's core tool set in MapInfo's mobile Internet platform. Using MapInfo's core servers, the platform comprises:

- yellow page management—data upload and geocoding of retail merchant data, as well as information categorized and tagged for easy searching;
- find the nearest—return of a distance-sorted list of retail merchants or other location data;
- annotated mapping—using MapInfo® MapXtreme®, maps show general overviews and can be drilled down into for details. With maps sent to Web browsers, W@P browsers and Java-enabled devices, users can pan, zoom and point and click, depending on the mobile device's capabilities;
- geocoding—using MapInfo® MapMarker® PLUS and the MapInfo® MapMarker® J Server to quickly convert a text address to latitude and longitude; and,
- routing—using MapInfo® StreetPro® and the MapInfo® Routing J Server, driving directions in both map and text, given a set of latitudes and longitudes.

With MapInfo® MapXtend™, a wide variety of mobile devices is supported with LMP, including SMS, WAP and J2ME phones, Palm Pilot, PocketPC and Mobile Explorer. Other MapInfo technologies incorporated into the suite systems include MapXtend and Oracle8*i* Spatial.

In short, LMP will provide systems for carriers to answer three mobile customer questions: where am I; where do I want to go; and how do I get there? LMP is already being integrated by leading organizations to provide location services. Broadvision, the leader in personalized e-business applications, selected LMP to provide sophisticated location and mapping technologies within the Broadvision® Mobile Solution™.

Oracle9*i*. The Oracle9*i* Application Server Wireless Edition, which assists independent software vendors, ASPs and system integrators in building wireless portals and wireless e-business applications, uses MapInfo location intelligence. With MapInfo's LMP, the Oracle server enables customers to deliver location-aware applications—such as get addresses, provide driving directions and find the nearest—to wireless users, particularly an organization's field work force.

Location-based Billing

MapInfo is also working to help carriers meet the demand of the mobile consumer. MapInfo is working with several companies to enable location-based billing, so the carrier will automatically adjust billing charges as the mobile user moves from one locale to another. VIAG Interkom, provider of wireless services since 1998 and which had 2.7 million mobile phone customers at the end of October 2000, has used MapInfo technology with its location-based billing home zone service, called Genion. With Genion, VIAG offers an automatic tariff switch to mobile telephone users, so the user of the mobile phone pays the fixed network tariff at home and on the road the user pays standard cellular phone tariffs.

It's Always There

Perhaps it's the total accessibility that is so exciting about the wireless Web and the wireless industry. "The mobile device is probably the most tremendous medium we've ever seen," said Cattini, "because it will always be with the consumer—unconsciously portable as car keys, a wallet or a timepiece. As a result, opportunities abound for the wireless service provider."

Will WilBrink

Will Wilbrink has 18 years of complex systems research development experience. He has been with MapInfo Corporation for 4 years and is one of the Company's lead Java technology developers. He is a Sun certified programmer for the Java(tm) 2 Platform and is the lead architect for MapInfo's location-based services and solutions.

Prior to joining MapInfo, Wilbrink was a principal consultant with several major wireless carriers including, SprintPCS, AT&T, Geographic Information Systems and Computer Aided Design Systems. Wilbrink is a graduate of the Ohio Institute of Technology with a Bachelor of Science in electronics engineering.