

JAVA™ LOCATION SERVICES

THE NEW STANDARD FOR LOCATION-ENABLED E-BUSINESS

ALL BUSINESSES ARE IN PURSUIT OF J

JAVA™

LOCATION SERVICES

All businesses are in pursuit of *just-in-time actionable information*—just the right information, at the right time, at the right location, on any device—with which they can make effective decisions and take immediate action. Nearly 40 percent of the American workforce is devoted to this pursuit. Businesses, government and society depend upon it. Actionable information fuels the global economy.

The future holds great promise for what can be achieved with the well-oiled engines of e-Business that will inject information services into every facet of our lives. The vast global information service infrastructure that is now emerging on the backbone of the Net will connect potentially every office, vehicle, mobile handset, and stationary device together in a gigantic web of information service producers, brokers, distributors and consumers.

The global information infrastructure may depend on computers, networks, and interoperable software, but the main ingredient is information itself. Over the past decade, and mostly over the last few years, we've all watched the Web accumulate a vast array of information resources. Collectively, search engines can't keep up with it. The URL is the mechanism that keeps it all linked together.

Initially a somewhat abstract concept to the average person, the URL now makes sense to most. Why? Because it is based upon a simple addressing scheme. The URL is location-dependent ... a known "location" on the Web that one can visit and be served. Sound familiar. Hardly a novel concept!

Location is a common denominator in every human endeavor. Where you are matters. Where you're going matters. Where you've been matters. What's around you? Where do you want to live? Where's the office? Grocery store? Church? How do you get there? Want to take a trip? How about a virtual trip?

So what makes location so important to your business? In business, location matters even more. Where are my customers? Where do I locate my facilities? What's my most effective approach to distribution or supply chain? Where are the hot prospects? Competition? Where are my fixed assets? Mobile assets? What location-based services can I provide my customers?.... *Effective use of location translates to business advantage.*



Location, Location, Location...

- Foundational role in our lives
 - Ubiquitous information ingredient **at home**
 - Fundamentally important to business
- ...Time and location are money!
- outdoors**
- at my desk** **global** **en route**

Many of us think of location information as the graphics and text that are captured on maps. But let's look beyond the map. There's geocoded information such as street addresses, postal codes and zip codes; positional data that are captured for navigation purposes, like GPS, GSM and LORAN; satellite and aerial imagery that represent our earth from a birds eye view, even capturing spectra that are imperceptible to the naked eye; route information and directions that tell us how to navigate from one place to the next; time-sensitive events, like accident reports, weather reports and the location of service fleets; directories, like the yellow pages; countless databases with demographic and psychographic data, customer data, asset inventories, and more; gazetteers with place names like Churchville, Letchworth State Park, New York City and Tibet; books, documents and reports that contain places, addresses, etc.; sites and landmarks that have special meaning to us; transaction reports; resource inventories; and so much more. (The list could go on, but I think you understand... location information is ubiquitous.)

But, let's ask ourselves: So what? What's the significance of the fact that everything we do happens somewhere? What do we do with all this location-based information we've collected? How can we improve our businesses and lives with it? I'll address these questions in this paper. But first, let's look at some of the challenges we all face in what is being called the "New Information Economy."

Meeting the Challenges of the New Information Economy

The Net is transforming the landscape of business by providing a broadly accepted framework for digital communications and internetworked applications and services. Creatively, and systematically, new and established businesses are exploring the impact of the Net upon their businesses. And the results are dramatic. The Net invites innovative, faster, cheaper and broadly accessible solutions. Barriers that once held competition at bay or limited growth are now disappearing. Business processes are in a constant state of flux. Business models that once worked well are under intense pressure from the changing marketplace. Companies are discovering the need to continuously refine the scope of their business offerings, markets, competition and technologies.

**"Services
are the key to
succeeding in the
net economy"**

**Scott McNealy, CEO of Sun
Microsystems**

Perhaps most dramatic are the forces of change that are driving the momentum of the New Information Economy. Disguised as lofty concepts like e-Commerce and e-Business, these forces are largely based upon underlying, key enabling technologies associated with the Net. In my view, the most important of these technologies today are Java™ and XML. Java is the language of the Net. XML is the new, flexible content delivery protocol for the Net. Java and XML technologies are good friends! Together they satisfy the needs for building industrial strength, cross-platform application service solutions for the Net.

Web visionary Tim Berners-Lee recently stated in an interview with Internet World (Feb. 2000) that the next phase of the Internet would see the development of a “semantic Web,” where meaning itself will be embedded in the framework of the Internet. I quite agree with this concept. I further believe that the semantic Web will need foundational, unifying principles that seek to organize and embed greater intelligence in the Web. I am convinced that location is one such principle. Location appeals to me in this role for two reasons:

- 1) the ubiquitous role of location in our lives, and
- 2) location is an intrinsic property that we can readily exploit to model reality (3D, or 4D, if you add time).

So, how will we get there?

We will experience two major developments in the next phase of the Net: the build-out of open application service frameworks and the construction of companion open information frameworks.

Open Application Service Frameworks

Application services will add increasing levels of automation to business processes, with more software dedicated to providing these services (“business intelligence”) when and where needed. But, for this to happen, software that is now locked in closed systems and applications must be reconfigured into open application service frameworks,

An Important Technology Trend to Follow...

| FROM CLOSED PROPRIETARY SYSTEMS | TO OPEN INTERNET SERVICES |
|------------------------------------|----------------------------------|
| Desktop Mapping | Mobil Location Services |
| CADD | B2C Services |
| AM/FM | CRM |
| Business Systems | B2B Services |
| | Decision Support Services |

such that their functions are then available to any client on the Net. This is a crucial technology trend to understand and bring to bear in IT modernization projects.

Understanding the importance of open technology approaches, vendors are busy recasting their technologies into open platform models. They have heard the cry of their clients for greater extensibility, flexibility, and scalability. They have also seen the value of fully leveraging their core technology products and services through open models that optimize interoperability with other technologies. Open, interoperable application service frameworks are fast emerging, and flexible Java and XML technology form their underpinnings.

What are Location Services?

- Any services that use location-based information
- Net-enabled...available to anyone, anywhere, any-time, on any device
- Integral to the enterprise
- Efficient, easy-to-use



Throughout the transformation from closed proprietary systems to open application service frameworks, businesses will be seeking new types of applications and services that they can leverage across their enterprise and customer base. Since location is a pervasive information ingredient in business, location services favorably fit the bill for enterprise-wide utility. Location services will provide business users and consumers with useful location information on a desktop, phone, dashboard, PDA, TV, notebook, and wrist, for shopping, work, recreation, emergencies, and more. They could well be the application services that distinguish your business in the marketplace and give you a competitive edge. Regardless of your business, location services can make the difference.

LOCATION FRAMEWORKS

Open Information Frameworks

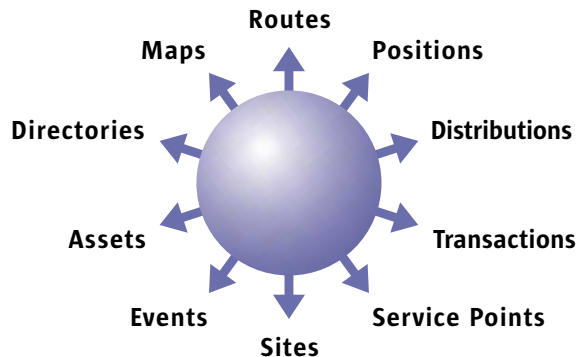
The next phase of the Net will place increasing importance upon information itself. (If you take one crucial idea away from this paper this is it!) The Web has given us a framework for easily sharing multi-variant information, and hyperlinks and URLs to navigate through this information, but the experience is mostly visual, and therefore, labor intensive. Web services sometimes provide a stunning visual experience, but often fail to provide the efficient “services” clients seek. The open application service frameworks described earlier will greatly improve upon this situation by providing greater automation and flexibility, but one other essential ingredient is needed: *open information frameworks*.

Open information frameworks are the means for organizing and modeling business information, including the interrelationships, meaning and significance of this information (semantics). Businesses have generally employed rather primitive information models, like files, documents, folders and tables. These models limit our abilities to represent business realities, and as such, have limited utility. However, it is now possible to employ a more potent information organizing and modeling construct: *location*. Location most certainly takes us one step closer to modeling the reality of our business.

How so? Let’s assume that a business has valuable information that is now buried in files, folders, documents and tables scattered around the enterprise and they want to get at this information more easily. Now let’s say that much of these information have some form of location content, be they messages, asset maps, documents, customer databases, delivery routes, transaction reports, or whatever. Now let’s add a *location application server* to the warehouse. The *location application server* keys on the location properties of warehouse holdings and organizes and provides location-based access to these data, accordingly. Likewise, the *location application server* makes it

easy to exploit business information holdings, keying on location properties to generate reports and maps with actionable business information.

Location Information Framework



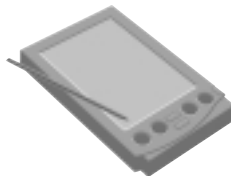
...a unifying information model supported by location services

Open frameworks are required for location services to reach their full potential in your organization. And this is exactly what Oracle®, MapInfo®, and Sun®, provide in their Java Location Service solution for the enterprise. You can now employ location as an organizing principle in your business. This adds a powerful and proven visual dimension (the map) to virtually any aspect of your business. But equally, and perhaps more important, it takes you well *beyond the visual realm into the realm of automated location-aware and location-sensitive services* that operate on rich, location-based semantic models of your business. (More on this later.)



The next few years will see the rise of location services as an integral part of the New Information Economy. Governments, businesses and consumers will benefit from location as a unifying,

foundational property that cuts across a wide spectrum of integrated applications and services. Powerful new location-based business services will dot the landscape of the Web. An entire new spectrum of mobile location services will emerge for the Palm Organizer, mobile phone, vehicle dashboard, and other mobile devices. And Java and XML technology will be parts of this equation, delivering robust location services to anyone, anywhere, any-time, and on any device.

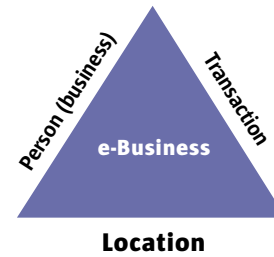


Location Services: Using Location for Business Advantage!

Location is a unifying theme in business. Spatial relationships, patterns and trends reveal invaluable business intelligence and add a critical dimension of information utility and understanding to business applications. Location services bring this utility to every facet of business.

Location is an Important Differentiator in e-Business

- Just-in-time & location business intelligence
- Know your (business) neighbors, customers,...
- Find a customer, place, asset,...
- Coordinate activities
- Provide delivery & travel services
- Plan your growth
- Organize by location & time
- Location-sensitive alerts & transactions
- And more...



Location services contain spatial information, or make use of spatial information, together with the functions that operate on this information, thus enabling you to incorporate “location-awareness” and “location-sensitivity” into your front-office apps, back-office apps, supply-chains, field operations, Web offerings, and more. They can play an integral role in your day-to-day business operations.

Location-awareness refers to applications or services that make use of location information. Location need not be the primary purpose of the application or service. In fact, location-awareness will often be an embedded capability in business applications and services.

Location-sensitivity refers to location-enabled devices that operate under transient conditions. Usually, a mobile device is involved, such as a business traveler with their location service capable mobile phone, where, for example, the level and type of service depends upon location. But it may well be a static device in a fixed location that records transient events, like an accident, weather report, and so forth.

The advantages of location services can be summarized in terms of:

- 1) helping businesses become more competitive,
- 2) locating and retaining customers and partners, and
- 3) improving bottom-line performance.

Becoming more competitive

Location-awareness and location-sensitivity add a new dimension of information utility and understanding to business applications and services. Location services provide

A UNIFYING THEME IN BUSINESS

better business intelligence across the full spectrum of your enterprise, from supply-chain to customer facing functions. Location services combine location and time to form powerful four-dimensional models that link together your full web of enterprise performers and customers, and tap into vast location-based resources scattered throughout your enterprise and the Net. There are a lot of location data buried in databases, and location services are a way of leveraging these data into our business processes for *just-in-time & location action*—decisive action taken at the right times and locations.

Location services that are based upon Java technology are ideal for rapid development and deployment of new Net-based *location-aware* and *location-sensitive* applications and services. Taking full advantage of the Java Platform, these services are flexible, easy to integrate, scalable, and secure. You can deploy them on any server platform (UNIX®, Linux, or Windows), taking full advantage of existing IT assets. Java Location Services not only enhance the competitive performance of internal mission-critical applications and services, they speed your time to market for new location-based offerings. They are well suited as core technologies for dealing with the dynamic enterprise and the rapidly changing marketplace, enhancing your enterprise's ability to modify and extend business processes as new needs and opportunities arise.

Locating and retaining customers (partners, etc.)

One of the immutable laws of a successful business is its ability to locate, attract and retain customers. Thus, the pursuit of effective and efficient customer profiling, targeting, capture, and relationship management (retention) are critical to all businesses. All customers live, work, shop, play, visit, ... somewhere. Location-awareness gives us an added dimension to better understand customer behaviors. Business and consumer demographics and psychographics become indispensable tools in characterizing these behaviors. You can find and exploit market niches you didn't know

were there, enhance your sales, and conduct much more effective targeted advertising and marketing campaigns.

Location-awareness also builds customer loyalty by adding a steady stream of value-added services to enhance:

- 1) your offering portfolio for consumer and business clients, and
- 2) Customer Relationship Management (CRM).

Java Location Services support the means to quickly introduce location-awareness into new offerings and CRM. Increasingly, users will demand location services that are interoperable, inexpensive, fast, easy-to-use, and accessible through a Web browser or mobile device. Using lightweight mobile devices that are based upon Java technology, enterprise application services and portal services can be accessed from anywhere on the Net, at any time, thereby combining the advantages of the Net (central management and low cost of ownership) with the advantages of wireless computing.

Improving Bottom-Line Performance

Java Location Services offer a fast track, affordable approach to implementing location-awareness in your enterprise. They lower the total cost of ownership by providing centralized access to location services across your full web of enterprise performers, right to their Web browsers. Large numbers of users can cost-effectively access location services, 24 x 7 x 365. Flexible, adaptive location services built with Java and XML technologies are easy to integrate with existing environments, thus leveraging your investments. They also give you the means to shave operating and maintenance costs by incorporating location-awareness (more effective business intelligence) into your business operations. Companies with vast holdings and/or global markets will see the best ROI's from location services, by using these services to more effectively exploit marketplace demographics/psychographics, optimize supply and distribution chains, manage assets, and coordinate and apply resources to be most competitive.

The following table shows examples of location services for each of the major market segments: consumer, business, and government. Examples are provided for the following general types of location information:

Positions Fixed locations. Expressed in terms of coordinates, positions on a map, named places, and so forth.

Events Time-dependent incidents (past, present, or future) at one or more locations.

Distributions (e.g. demographics) The densities, frequencies, patterns, and trends of people, objects or events within a given area(s).

Assets Fixed and/or mobile assets. Asset management. Inventories. Condition/status.

Service Points Points of service delivery. May also pertain to prospects or targets of interest. Further characterized by levels of service and quality of service.

Routes Navigational information expressed in terms of coordinates, directions (angles), named streets and distances, landmarks, and/or other navigation aids. Navigational logs.

Context/Overview Maps, charts, three-dimensional scenes (virtual reality) or other means for representing the context and relationships between people, objects and events over a given area(s).

Directories Catalogs. Listings. Directories.

Transactions Transactions for the exchange of goods, services, securities, etc. Trading services. Financial services.

Sites Characteristics of a given site (e.g. suitability).

| Types of Location Information | Location Services | | |
|-------------------------------|---|---|---|
| | Consumer | Business | Government |
| Positions | <ul style="list-style-type: none"> Where am I? (map, address, place) Where is? (person, business, place,..) | <ul style="list-style-type: none"> Contact nearest field service personnel. Where is this business located? | <ul style="list-style-type: none"> Location-sensitive reporting. What's your 20? |
| Events | <ul style="list-style-type: none"> Car broken down... need help. Medical alert! | <ul style="list-style-type: none"> Local training announcements. Traffic alert! | <ul style="list-style-type: none"> Local public announcements. Accident alert! |
| Distributions | <ul style="list-style-type: none"> House hunting in low density area. Vacationing near highest concentration of.... | <ul style="list-style-type: none"> High growth trend? Sales patterns? | <ul style="list-style-type: none"> Growth patterns? Per capita greenspace? |
| Assets | <ul style="list-style-type: none"> Where is my car? Lowest insurance rates? | <ul style="list-style-type: none"> Where are my dispatched repair trucks? Status of my holdings? | <ul style="list-style-type: none"> Where are the snowplows? Road maintenance. |
| Service Points | <ul style="list-style-type: none"> Tell me when I'm near where I'm going. Where are the sales? | <ul style="list-style-type: none"> Where are my customers, given target profile? Targeted advertising. | <ul style="list-style-type: none"> Economic development areas? New zoning. |
| Routes | <ul style="list-style-type: none"> How do I get there? (address, place) Fastest route (given traffic situation)? | <ul style="list-style-type: none"> Best delivery route given shipping manifest, traffic and weather? Taxi dispatch. | <ul style="list-style-type: none"> Traffic patterns? Emergency dispatch. |
| Context (Overview) | <ul style="list-style-type: none"> Nearest visible landmark? Show me the nearest___ (business, place,..) | <ul style="list-style-type: none"> What's near the hotel? Show me car rentals near the airport. | <ul style="list-style-type: none"> Collaborative economic planning. Local commerce. |
| Directories | <ul style="list-style-type: none"> Looking for nearest___ (specialist,..) Where can I buy? (product, service) | <ul style="list-style-type: none"> Best supplier within next two hours? Nearest repair services? | <ul style="list-style-type: none"> Public services. Outsourcing? |
| Transactions | <ul style="list-style-type: none"> Lowest shipping rates? Must purchase in specific location. | <ul style="list-style-type: none"> Low cost distribution services? Location-sensitive quickdial. | <ul style="list-style-type: none"> Tax revenues. Location-sensitive tolls. |
| Sites | <ul style="list-style-type: none"> Candidate properties to build my house. Places to visit? | <ul style="list-style-type: none"> Candidate store sites? Optimum cell tower locations? | <ul style="list-style-type: none"> New schools? Environmental monitoring stations? |

ION SERVICES SOLUTION

Bringing Java Location Services to Every Facet of Your Business

Location-based technology has reached the point where location services will soon be accessible to every Web-enabled device: stationary and mobile. And given the wide range of benefits that location brings to business, location services will most assuredly be an integral part of all e-Business systems. Oracle, MapInfo and Sun are marching down the path to make this a reality, each leveraging their best.

Oracle, MapInfo and Sun have combined their technologies to form a comprehensive Java Location Services solution for the marketplace. Why create a Java-based solution?

First, Java is the language of the Net. Best-in-class! All three companies fully appreciate the value of Java technology for fully exploiting the power of the Net. Starting with Sun, the inventors of Java language, each company has devoted vast resources to producing Java technologies. They are leaders in taking Java technology into mission-critical environments. In addition, each company has extensive background with location-based technologies.

But Java is much more than a language. It's an extensible software development and deployment platform (Java 2 Platform). Let's examine Java language and Java 2 Platform more closely.

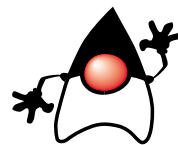


Java language

Java is a powerful object-oriented language for developing flexible, platform-independent components for highly scalable systems that can easily interoperate over the Net. Java is also the language of choice for lightweight clients such as Web browsers. The prominent characteristics of Java language that make it well suited for Net-based location services are:

- **Simplicity**—Java language retains most of the power of C++, but with far less complexity.
- **Object-oriented**—Java language produces reusable object-oriented components.

- **Robust**—Java language has features to facilitate debugging and avoid error prone situations, making Java ideal for rapid prototyping and development.
- **Secure**—Java language can be used to produce virus-free, tamper-free systems.
- **Platform-independent**—Java language runs on all platforms and is optimized for portability.
- **High Performance**—Java language takes advantage of performance-enhancing IT features like: caching, parallelism, partitioning, and high availability.
- **Familiar**—Java language is familiar to a large and rapidly expanding population of developers because of its widespread acceptance and its derivation from C.
- **Efficient**—Java Language supports highly efficient interpretation and compilation. Its virtual machine-based organization defines a highly compact set of byte codes that can be efficiently transported in the Net environment.



Java 2 Platform

Java 2 Platform is a universal Net software development and deployment platform—a core technology for location services. It is comprised of class libraries with nearly 1600 APIs. All hardware platforms are supported—from smart cards to Palms to notebooks to servers to mainframes. Java 2 Platform is employed to develop and deploy Java applications (thin client, full client, or servers), Java applets (browser plug-ins), and JavaBeans™ (reusable components). It provides the building blocks for rapid development and deployment of Java Objects (applications, applets, beans), and includes: development tools; a runtime environment; JavaBeans Package for building reusable components; the Java virtual machine to enable cross-platform independence; a rich set of reusable tools and core class libraries for security, internationalization, graphical user interfaces, database access, messaging for distributed object computing, etc.; and Library extensions for a wide variety of useful functions.

There are three editions of the Java 2 Platform:

- Java 2 Standard Edition (J2SE™) technology—provides a complete, secure foundation for building and deploying network-centric applications ranging from the PC up to the workgroup server.
- Java 2 Enterprise Edition (J2EE™) technology—builds upon Java 2 Standard Edition to offer full support for Enterprise JavaBeans™ components, Java Servlets API, and JavaServer Pages™—crucial technology for the enterprise. J2EE wraps existing resources required by multi-tier applications with a unified, component-based application model.
- Java2 Micro Edition (J2ME™) technology—bundles together the Java technologies for developing, deploying, and maintaining Java-enabled consumer devices. These tools include a range of Java virtual machines, a library of APIs, tools for deployment and device configuration, and market profiles of major types of consumer devices, such as smart cards, screenphones, pagers, cell phones, digital assistants, and set-top boxes.

Oracle, MapInfo and Sun are leading providers of Java Location Service solutions for the enterprise. Oracle is a leader in database solutions for the enterprise. Sun is a leader in “dot-comming” the enterprise. MapInfo is a leader in location-based business application services.

ORACLE

Oracle brings location data management and a commitment to Java to your enterprise. With its flagship product, Oracle8i, and its unique spatial data server, Oracle® Spatial, Oracle brings the same scalability, security, multi-user

integrity and recoverability to location-based data management as it has to non-location-based data management. Oracle8i and Oracle Spatial combine to form a leading technology for a seamless, robust solution for location data management. This solution provides location-awareness to e-Business services like CRM, ERP, and mobile computing, over the Net.

Oracle8i is the latest generation of the world's leading database and the first designed specifically to be a Net development and deployment platform. Oracle8i has special features that make it easy to create robust, scalable Net-based location services. Oracle8i extends Oracle's proven technology leadership in the areas of transaction processing, data warehousing, and high availability to handle the demanding performance, business intelligence, and continuous access needs of Internet users.

Oracle8i was the first commercial database vendor to include a server-side Java virtual machine—the Oracle8i JVM—making Oracle8i the first database management system to run Java programs within the database engine process, for exceptional speed and scalability. Oracle8i also provides an Enterprise JavaBeans 1.1 Server, a CORBA 2.0 Object Request Broker, and built-in support for JDBC™, SQLJ, and XML. Oracle8i supports Java 2 Standard Edition, version 1.2, and related programming APIs, making it fully compatible with Java 2 Enterprise Edition standards, and a sound foundation for J2EE-based applications. Oracle8i also has a native compiler. This means that Java code will run as machine code, not as interpreted code, thus providing a significant performance improvement.

“Internet and wireless location technologies are an integral part of e-Business solutions. Oracle8i has built-in wireless and location technologies—all Java enabled. Now applications and online and wireless services can integrate location services with business data to deliver e-Business information when and where it is needed.”

Steven Hagan, Vice President, Oracle Server Technologies

INFO AND SUN ARE THE LEADERS

Oracle Spatial extends Oracle8i to manage location data directly within Oracle8i. It provides spatial object type storage, SQL query, fast spatial indexing, and a wide selection of spatial operators—all within an object-relational DBMS. New and upcoming features include version management, geoinage management, R-tree indexing, geocoding, projection and coordinate transformation support, and linear referencing capability.

Lightweight devices like Web phones and wireless PDAs can store, query, and update location information using embedded, small footprint Oracle8i Lite—a Java object-oriented database.


Oracle Portal-to-Go combines advanced content transformation services with end-user wireless portal functionality. This allows mobile operators, content providers, or wireless ISPs to create custom location-based portal sites that utilize all kinds of location content—from existing Web pages, to Java location applications and services, to XML-based location services. Oracle Portal-to-Go also allows portal end-users to customize and tailor their wireless browsing experience to their personal requirements.

SUN

Sun gave us the Java language and the Java platform. Sun also gave us a splendid vision that they have been pursuing for some time: “The Network Is The Computer™”. And, Sun offers simply the best range of enterprise servers on the market.

Sun Microsystems™, Inc has always made reliable, scaleable and affordable high-performance computers. They provide a wide-range of workstations that are well suited for location-based application processing. At the low-end are the Ultra™ 5 and the Ultra 10 (supporting 3D graphics). Sun also provides high-end workstations like the Ultra 30 (single processor, dual graphics boards) and the Sun Ultra 60 (dual processor, dual graphics boards).

Sun Enterprise™ servers have been recognized as being the best available since their creation. The present set of Sun Enterprise servers, models 450, 3500, 4500, 5500, 6500 and 10000, span the range of needs from workgroups (5-50 clients) to large enterprise environments with several thousand simultaneous clients. The Sun Enterprise 450 is very extensible, accommodating up to four processors, 3 power supplies, 20 internal disks and 4 GB of RAM. The components of the Sun Enterprise server models 3500, 4500, 5500, and 6500 are interchangeable. This allows your location/enterprise data server, location application server, and/or your mobile positioning server to grow by adding components (RAM memory, more CPU boards, disk arrays, tape backups, etc.), at very affordable costs, as your business grows.



**“We need devices
and services to become aware
of their location, both in space
and time, especially if
they are mobile.”**

**Bill Joy, Chief Scientist and Co-founder of Sun
Microsystems and Co-chairman of
the Presidential Information
Technology Advisory Committee**

Sun Microsystems' computers provide you the following features and benefits:

- The stability of the Solaris™ Operating Environment, the number one selling UNIX operating system, so your business can be up and running 24 x 7 x 365.
- The processing power of the number one selling 64-bit RISC chip, allowing your business to do more in a shorter time.
- The ability to run MacOS, MS-DOS, Microsoft Windows and NT, Linux, and UNIX applications right on your Sun desktop, thus preserving your investments in application software.

MAPINFO

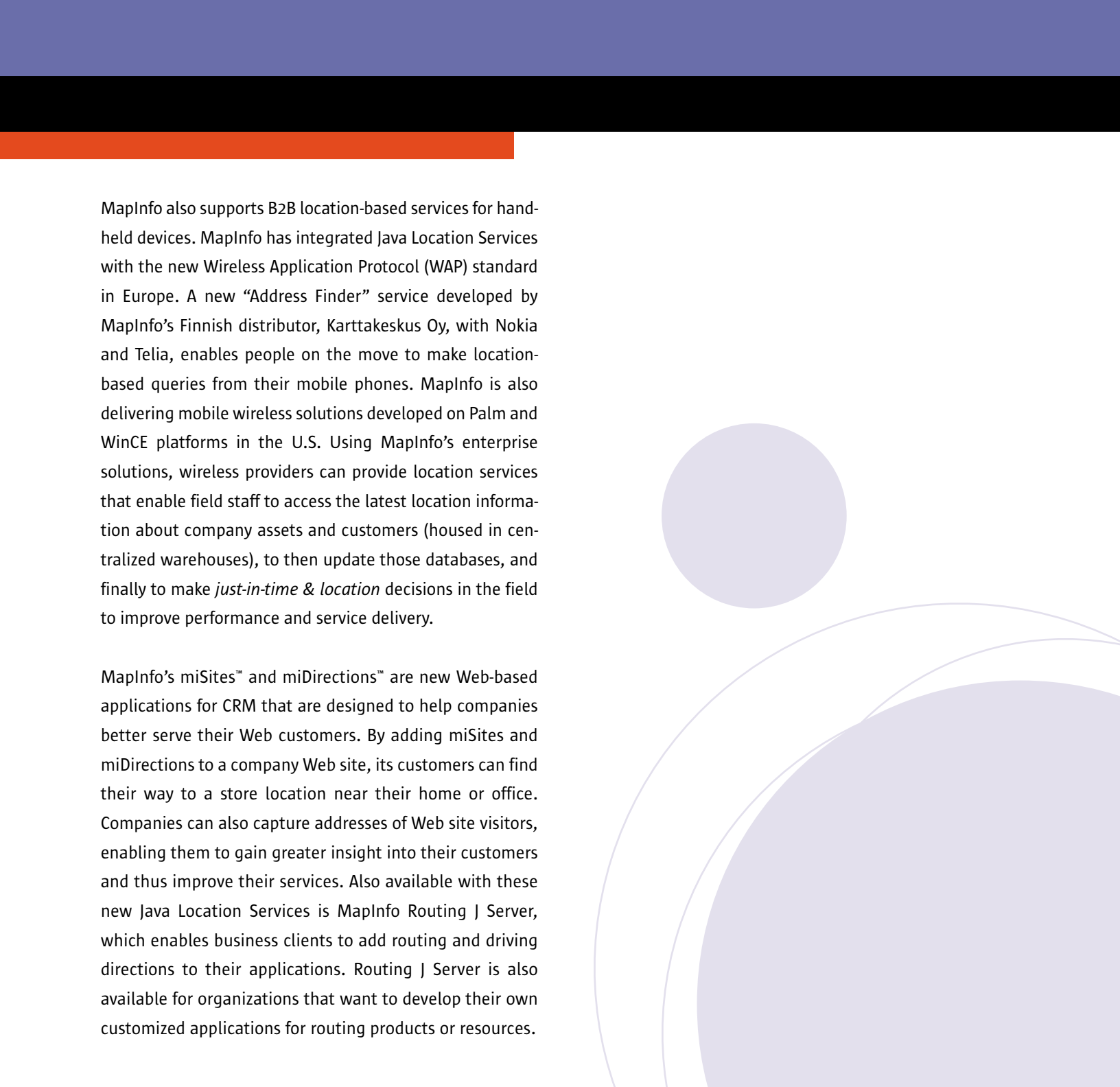
MapInfo provides location service solutions for business applications. Starting with MapXtreme® Java Edition, the first map server for the Web to receive 100% Pure Java certification, businesses can take advantage of the ubiquity and scalability of the Net to widely and cost-effectively

deploy location services throughout their enterprise. MapXtreme is a proven map server solution that is highly scalable, component-based, and multi-threaded for high performance. It makes location-awareness an integral part of your business.

MapInfo also provides “*just-in-time & location*” services that can vastly improve your company’s understanding of its customers and the levels of service to those customers—yielding business intelligence for business advantage. MapInfo’s ReportZone.com™ and Geo-locator Services assist in customer profiling, targeted sales and marketing, geocoding of address information, demographic analysis, pinpointing your customers’ or field service agents’ location, optimizing your sales territories, and other location services for enhanced Call Center, CRM, and sales and marketing operations.

MapInfo’s Location Services Play a Critical Role in Providing Business Intelligence

| | | | | |
|-------------|---|--|--|---|
| INFORMATION | <ul style="list-style-type: none"> • Customers • Points of Presence • Demographics • Streets, towns, parks | <ul style="list-style-type: none"> • Customer is within trade area for... • Within 10 minutes of... • Branch 501 overlaps... | <ul style="list-style-type: none"> • 85% of segment prospects are within 1 mile of location • Segment type uses the facility 20% more if they are within 5 min drive | <ul style="list-style-type: none"> • Target services at segment prospects within 5 miles of location • Allocate more resources to Zone A |
| | DATA | INFORMATION | KNOWLEDGE | DECISION |
| TECHNOLOGY | Link Business and Location Data <ul style="list-style-type: none"> • MapXtreme for Web • MapMarker® for Geocoding • TargetPro® for demographics | Enhance Business Rules with Location <ul style="list-style-type: none"> • MapXtreme for Web • Spatial Extenders • Online Geocoding | Analysis by Location <ul style="list-style-type: none"> • MapXtreme for Web • MapInfo Pro for power users • SpatialWare® spatial SQL for online analysis | Publishing, Reporting & Visualization <ul style="list-style-type: none"> • MapXtreme for Web • MapX® OCX for Visual Basic applications |



MapInfo also supports B2B location-based services for handheld devices. MapInfo has integrated Java Location Services with the new Wireless Application Protocol (WAP) standard in Europe. A new “Address Finder” service developed by MapInfo’s Finnish distributor, Karttakeskus Oy, with Nokia and Telia, enables people on the move to make location-based queries from their mobile phones. MapInfo is also delivering mobile wireless solutions developed on Palm and WinCE platforms in the U.S. Using MapInfo’s enterprise solutions, wireless providers can provide location services that enable field staff to access the latest location information about company assets and customers (housed in centralized warehouses), to then update those databases, and finally to make *just-in-time & location* decisions in the field to improve performance and service delivery.

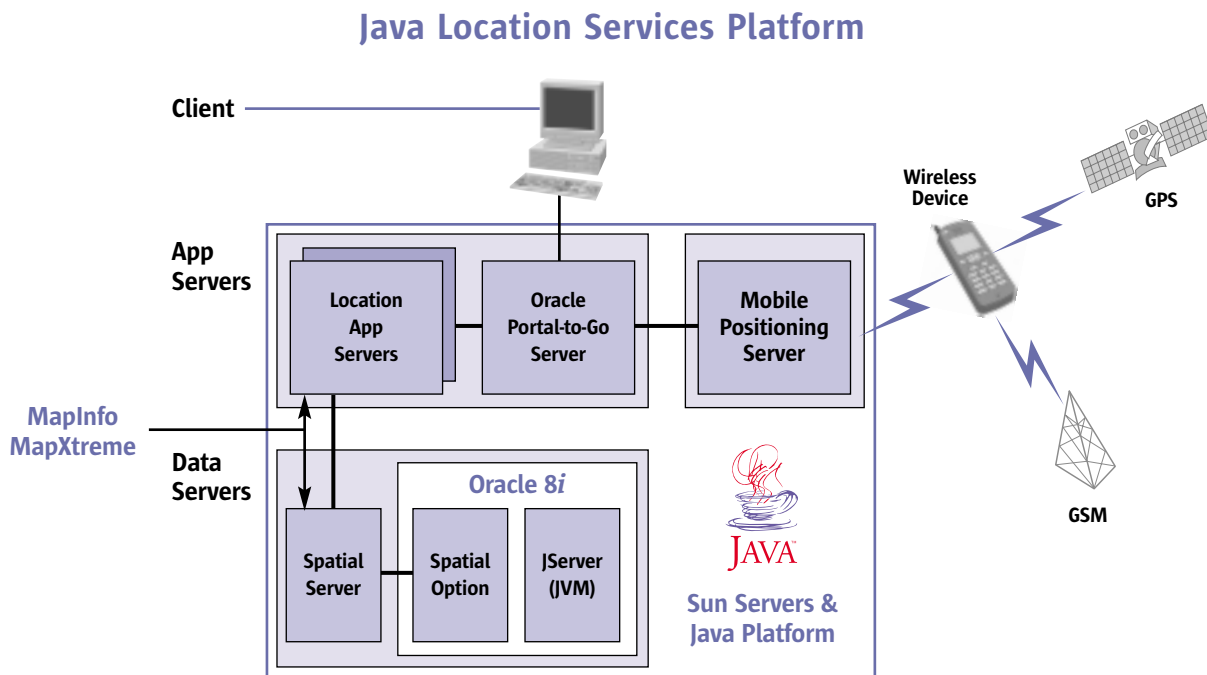
MapInfo’s miSites™ and miDirections™ are new Web-based applications for CRM that are designed to help companies better serve their Web customers. By adding miSites and miDirections to a company Web site, its customers can find their way to a store location near their home or office. Companies can also capture addresses of Web site visitors, enabling them to gain greater insight into their customers and thus improve their services. Also available with these new Java Location Services is MapInfo Routing J Server, which enables business clients to add routing and driving directions to their applications. Routing J Server is also available for organizations that want to develop their own customized applications for routing products or resources.

“We are committed to expanding MapInfo’s location-based solutions to enable our customers to acquire new customers based on their location-based CRM solutions; retain existing customers by locating convenient resources nearby; improve service delivery by siting facilities close to their customer’s locations; and predict and maximize customer potential based on demographic profiling.”

John Cavalier, President and CEO of MapInfo

In summary, Oracle, MapInfo and Sun offer a Java Location Service platform for the enterprise that combines proven Net technologies with robust database management, server, and location-based application service technologies. Oracle8i, Oracle Spatial, and Portal-to-Go allow clients to embed Java Foundation Classes or Enterprise JavaBeans at whatever level of an enterprise architecture they need to be, using native Java Database Connectivity (JDBC).

MapXtreme and Oracle8i can share the same address space on a Sun server running Java 2 Platform technology, utilizing server-based memory cache, eliminating context switching overhead, and reducing network traffic. Likewise, a MapXtreme map-rendering service can operate on a Sun application server, pushing out vector maps to a browser. Or, another MapInfo location server that tracks the position of a wireless handset can operate on the same Sun application server. Sun, Oracle and MapInfo put it all together, making Java Location Services an integral part of business.



Java Location Services in Your Future

The future holds great promise for businesses that understand how to best exploit their vast information holdings. Businesses will discover along the way that one of the keys to achieving efficient and effective operations and growth lay in building well-organized frameworks of information and the corresponding service frameworks that will develop and exploit this information. Fully optimized, these frameworks will seamlessly reach out to all vital operations nodes and service points that an enterprise depends upon, including sup-

pliers, partners, internal operations, distributors, and customers. And, in a foundational role, as part of the *lingua franca* of business, will be ubiquitous location information and services, providing the means to organize, view, relate and analyze disparate business information. By keying on location as a common property of business information, business users will discover information patterns, trends and relationships previously hidden or unknown, and they will be able to leverage these advantages in every facet of their businesses.

E OF THE WEB IS LOCATION

The ancient Greeks well understood the significance of location. Proper location description and knowledge impacted trade, the process of determining the sites of centers of commerce, military action, policy-making, and so forth. Aristotle wrote his thesis on planning as a study in location theory. Planning the location of a city required detailed knowledge of topography, access, lines of communication, conveyance of agricultural goods, and so forth. A well-known student of Aristotle, Alexander the Great, took these teachings to heart. He founded over 100 cities based upon these location tenets.

These ancient wisdoms have timeless meaning and relevance. With computers, we are able to build digital models of the earth. With the Internet we are building a Web of connected information... a much richer model of our world. And at the core of the Web is location, as a foundational, unifying semantic theme. *I can't foresee a new economy business that won't exploit location.*

For more information, visit the corporate Web sites of Oracle, MapInfo and Sun Microsystems:

www.oracle.com 

 www.mapinfo.com

www.sun.com 

Also, check out www.jlocationsservices.com for more information about Java Location Services.

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**“It is the task
of Geography, on the other
hand, to present the known
world as one and continuous,
to describe its nature and
position...”**

*(Geographike Uphegesis,
Ptolemy)*

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