

# Leveraging the Power of Location Intelligence to Enhance Business Intelligence

WHITE PAPER:

ENABLING THE LOCATION INTELLIGENT  
ENTERPRISE

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## Leveraging the Power of Location Intelligence to Enhance Business Intelligence

### ABSTRACT

HISTORICALLY, A COMPONENT OF A NICHE TECHNOLOGY, LOCATION-RELEVANT DATA WAS LIMITED IN ITS BROADER MARKET ADOPTION BECAUSE IT HAD BEEN "SILOED" IN TECHNICAL DEPLOYMENTS OUTSIDE OF STANDARD BUSINESS AND IT SYSTEMS. THE EMPHASIS HAD BEEN ON CREATING AND MANAGING MAPS AS OPPOSED TO INCORPORATING CRITICAL DATA AS A RESOURCE FOR ANALYSIS. THE POWER OF LOCATION WAS LOCKED AWAY IN SMALL POCKETS OF EXPERTISE WITHIN ORGANIZATIONS.

## SMART BUSINESS REQUIRES ENOUGH LOCATION INTELLIGENCE TO UNDERSTAND HOW LOCATION RELATIONSHIPS IMPACT AN ORGANIZATION'S ANALYSIS AND OPERATIONS.

Think retail. Where a store is located impacts sales performance more than any other factor. Great managers, great marketing programs, and even great products — sometimes none of those factors matter as much as a great location.

Think insurance. Organizations that do not understand the location of their policies — commercial, home, even auto — don't understand the full risk associated with those policies. In a business where one bad storm can devastate a portfolio, intelligent organizations consider location and consider it often.

Think communications. The location of fiber lines, coaxial cable and cell towers—the network—is the driving factor in a healthy communications business. Those companies that are able to grow the right network of services in the right place, and effectively market those services, are the companies that will not only survive in the near future, but prosper.

These examples demonstrate the business capability that Pitney Bowes MapInfo has defined as “location intelligence.” Intelligence is typically thought of as the ability to learn or understand, or the ability to apply knowledge to manipulate one's environment. Relative to location-based technologies and data, Pitney Bowes MapInfo defines location intelligence as:

- An awareness of relationships between location information and business analysis and operations
- The ability to use the understanding of geographic relationships to predict how it impacts a business or organization
- The capability to react to how location influences an organization by changing business processes in order to minimize risk and maximize opportunities
- Location intelligence enables a business to measure, compare and analyze its data from business operations, in conjunction with external data such as transportation

networks, regulatory jurisdictions, market characteristics or its own customers. location intelligence solutions comprise:

- The analytical capabilities to quantify, measure, compare, analyze and predict spatial data patterns
- Technology that is easy to use, scalable, deployed to where users are, and integrated into business applications and systems
- Reference data, including geographic data (cities, states, streets) and the attributes of those data (demographics, consumer buying patterns, areas of high risk from earthquakes, etc.
- Competence in understanding and applying location analysis techniques
- Domain expertise and knowledge of business-specific operational and analytical issues

Given that location can be valuable to an organization in multiple ways, the decision as to the right level of location awareness that is necessary for an organization becomes critical. Smart business requires enough location intelligence to understand how location relationships impact an organization's analysis and operations, but not so much information that implementing systems and procedures to evaluate and act on the new information becomes paralyzing. Organizations need to predict the impact of location relationships, and have the capabilities to respond appropriately.

Historically, a component of a niche technology, location-relevant data was limited in its broader market adoption because it had been “siloed” in technical deployments outside of standard business and IT systems. The emphasis had been on creating and managing maps as opposed to incorporating critical data as a resource for analysis. The power of location was locked away in small pockets of expertise within organizations.

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Today, however, the lock on insight has been opened. New location intelligence solutions from Pitney Bowes MapInfo make the decision-making process easier regarding how much location intelligence is really enough.

One specific way Pitney Bowes MapInfo has brought location intelligence to the forefront of business analysis is by developing the ability to easily tap into location as a meaningful component in a business intelligence warehouse. In a hyper-competitive market where every dollar of investment must produce a return, intelligent organizations realize that location provides a fast, high-benefit reward. Just as licensees of business intelligence software have realized that those who invest in understanding the data that define their business gain an advantage over their competitors, users who embrace cutting-edge technology have realized that they can add location to their analytical processes, and that doing so may change an organization forever.

### Location Intelligence

By conservative estimate, approximately 80 percent of all data stored and maintained by businesses around the world have a location component. By that we mean that somewhere within the record there is information that can be tied to a geographic area. Sometimes the information is very specific. Many organizations store the latitude and longitude of warehouses, customer locations, physical assets, etc., alongside other attributes in the database. Other times the geographic data will come in the form of an address, which can be pinpointed as a place on a map, either manually or through a process called geocoding. Even when an address is not present, many database records contain a field for postal code, state or country. Each of these is a geographic indicator. Sometimes the geographic field is less obvious. The first 6 digits of a phone number (area code and following 3 digits) for example, are often used to tie a record to a place on earth.

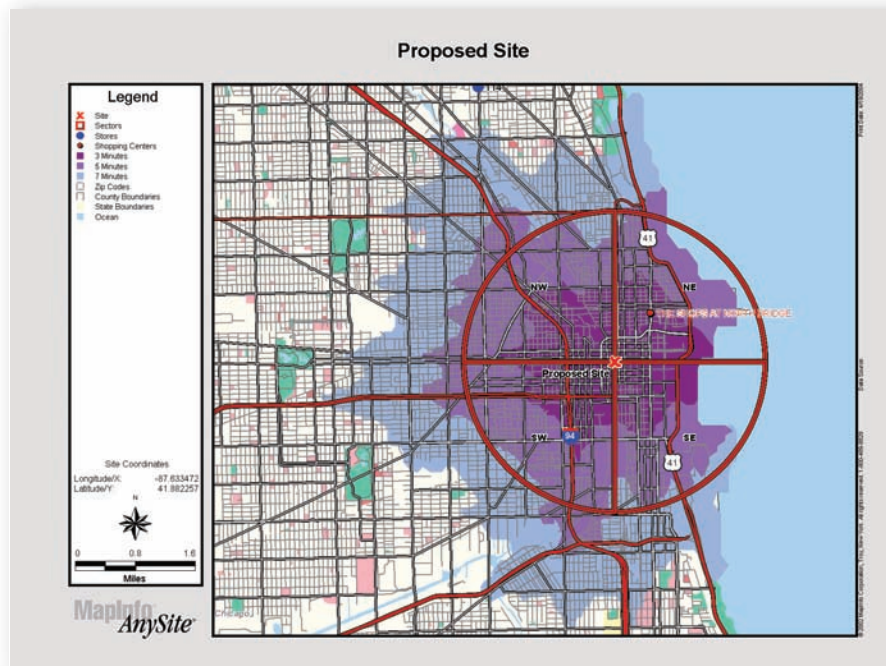
In the past, all of this geographic information led to a form

of software traditionally referred to as either a Geographic Information System (GIS) or desktop mapping. These software systems are used for a wide variety of purposes, including everything from managing tax parcels in your hometown, to analyzing ecosystems and climatic changes, to predicting revenue for the next, yet-to-be-built Burger King. Major organizations, both public and private, license these solutions in a variety of forms for a wide range of purposes. Look at the software installations of nearly every Fortune 1000 company and you will find at least a handful of licenses for some form of geographic analysis software. The same applies to smaller companies. Within industries and organizations where location plays a critical factor, such as telecommunications or in government agencies, hundreds, if not thousands, of users make frequent use of these powerful systems.

As the benefit of evaluating information geographically has become more well known, there has been a trend to expand the ways in which location is used and the number and types of users. Many desktop-based analytical tools have been migrated, in whole or in part, to the web, and new applications, including call-center tools, consumer-facing websites and add-ons to sales-force automation systems, have become increasingly popular.

The return on investment for these broader solutions has been well documented. British Telecom announced a cost savings of £23 million over 5 years as a result of implementing a Pitney Bowes MapInfo-built location intelligence solution for its 17,000 field service engineers. The solution allows the engineers to respond to network problems more quickly than they previously could.

The clear trend to a broader use of location information throughout organizations has led to the development of a new category of business software, location intelligence. Evolving from GIS (single user, desktop information management systems) and drawing on its capabilities for spatial analysis, location intelligence (organization-wide, analytical and operational solutions) enables an organization to



Solutions such as AnySite® are used by analysts to identify areas of high demand in order to maximize the potential of a retail network.

explore, analyze and respond to relationships between location data and business data. Not simply providing technological capabilities, location intelligence solutions are designed to impact and enhance business operations by tapping into the power of geographic information already stored within the database. Often location intelligence solutions are not solely mapping applications—they are operational and analytical solutions that rely on geographic data to measure and trigger key processes.

One of the tenants of location intelligence is that the solution should fit within corporate standards. That is, since location intelligence requires broad access in order to have a maximum effect on an organization, applications that create this type of intelligence cannot exist in a stand-alone environment. The locational component must be accessible via the operational and analytical solutions that business users access frequently every day. That is why the develop-

ment of a Pitney Bowes MapInfo location-aware business intelligence solution is important. The ability of Pitney Bowes MapInfo to enhance business intelligence with both geographic visualization and querying capabilities allows the thousands of knowledge workers within large organizations to access location-based information without leaving the familiar framework of their daily applications. It also means that the IT departments of these same organizations are not required to maintain separate solutions. The business intelligence environment handles the work of accessing and administering the data warehouse and maintaining security within optimized data models. The location intelligence component operates within the existing framework and makes full use of the investment already made in preparing the organization's data for effective business intelligence applications. This saves money in the form of user productivity and machine power.

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### Examples of location intelligence

It's well documented that the value of broadcast marketing has steadily diminished as consumers have diversified the media they choose for entertainment. Where it was once considered wise to saturate network airwaves with ads promoting the newest toothpaste, paper towel, automobile or e-business, marketers are increasingly aware that mass media is less effective as a vehicle for increasing brand recognition and product sales than in the past. Many marketing executives would rather spend their money on an interactive web site, a 'blog,' or web-based bulletin boards, than throw money at a TV audience that won't sit still for a 30-second commercial.

At the same time, consumers are becoming more discriminating with regard to other forms of advertising. Direct mail can be wasteful or effective, depending on the skill with which it is executed, especially with regard to segmenting and analyzing a target list. A mailer is only successful if it is interesting to the recipient—if it contains the right message, for the right recipient, at the right time, in the right place. Analysts have a variety of tools at their disposal when it comes to this effort. There are many business intelligence and data mining solutions that let them rank, sort and segment lists on any number of criteria.

One way in which the direct mail process can be greatly improved is via the addition of location to both the market analytics and campaign management process.

The benefits of using business intelligence platforms during market analysis are documented by many sources. They include the ability to de-centralize analytics and distribute accurate decision making to a large number of users. By giving multiple users in the organization the ability to access sales and customer data, business intelligence shortens the distance between analysis and action. Regional marketing managers, store managers, program managers can all access the data they need quickly—without having to know table structures, SQL queries, etc. This leads to the ability to segment markets and execute campaigns more

effectively, resulting in increased ROI. Put simply, the ability to tap into business intelligence for marketing allows managers to fine-tune their message, fine-tune their medium, and fine-tune the target they are addressing. Rather than gut feel, marketers that use business intelligence use sound analytics to define a campaign.

This is good. But is it the best that we can do? The infrastructure to be successful is in place, the heavy lifting has been done, and now with relatively minimal incremental investment, the solution can be made far more complete. An intelligent marketer will look for ways to take his or her craft to the next level. One way to enhance the process of analyzing and segmenting data is via the integration of location intelligence with the business intelligence platform/solution. Where business intelligence refines the process, location intelligence makes it razor sharp.

An example of this is provided by Cox Communications.

Cox is the third largest cable provider in the United States. The variety of services Cox offers—cable and digital phone service, for example—are dependent upon a network of fiber and cable that Cox maintains in its service areas. Cox determined that in order to effectively analyze markets and execute campaigns, its analysts needed to tap into the wealth of information housed in its corporate databases. The analysts also realized that the application of the business intelligence data could be greatly enhanced if it could be used in relation to the geographic data that Cox already maintained regarding its fiber, cable and customers. In other words, they believed they could be more successful if they had a way to intelligently exploit the relationship between supply (its assets or future assets), and demand (its customer and prospects).

The location intelligence solution that Cox has implemented uses software from Pitney Bowes MapInfo and MicroStrategy. This solution is unique because of the sophistication of the integration; it fully utilizes both systems, the business intelligence platform and location intelligence solution. Similar solutions in the past have enabled an analyst to

Customer Report, MicroStrategy 8 - Microsoft Internet Explorer

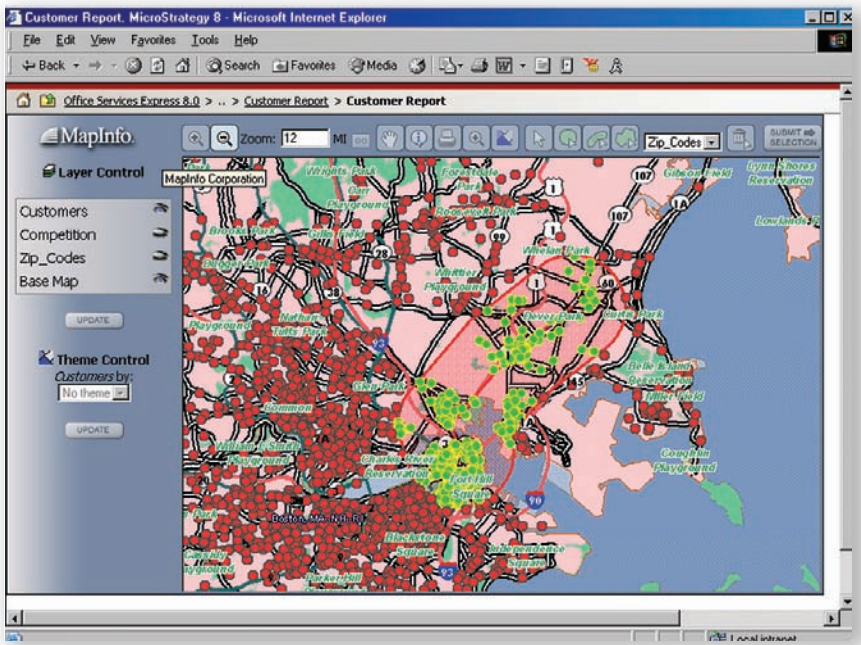
Office Services Express 9.0 > Shared Reports > Macro Reporting > Customer Report

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Rows: 1 - 50 of 7902

AttCustomer	AttCusAddress	AttCustomer_Longitude	AttCustomer_Latitude	AttCustomer
1 DAY ALL DAY EMERGENCY LOCKSM	437 HUNNEWELL ST	-71.236315	42.295656	147882
1 WITH ONE INC.	PO BOX 35404	-71.1505	42.3468	148388
100 HIGH ST CONDOMINIUM	100 HIGH ST	-71.11318	42.419141	147117
102 MIDDLE STREET LW OFFICE	102 MIDDLE ST	-71.465361	42.989871	186974
128 MARLBOROUGH STRT PRKNG LLC	87 TERRACE HALL AVE	-71.215447	42.499328	147909
138 HAPPY CHILDREN FOUNDATION	5 CEDAR AVE	-71.179548	42.418176	145231
15 17 UNIVERSITY ROAD LLC	78 HANCOCK ST	-71.005032	42.200449	147981
1574 WOODBURY DVLPMT LLC	1574 WOODBURY AVE	-70.790329	43.088571	186645
1ST CIRCUIT BOSTON LIBRARY	1 COURTHOUSE WAY	-71.0424	42.3459	145590
1ST STEPS CONSULTING GROUP	21 KENNESON RD	-71.091588	42.391093	142238
200 FOUNDATION	PO BOX 3449	-71.4027	42.3278	147170
21ST CENTURY LEARNING PRO	17 ALBIN RD	-71.542589	43.161341	186878
22 CENTRAL LLC	22 CENTRAL ST	-70.927394	42.528021	147475
25 SCHOOL STREET INC.	1 FLORENCE ST	-71.128629	42.284903	145381
29 33 VNTN STRT DVLPMT LLC	7 HARVARD ST	-71.118721	42.333467	145115
3 PLAY INC.	61 ENDICOTT ST STE 32	-71.217585	42.17898	147350

These two screen shots demonstrate the ability to take tabular data from a reporting solution such as MicroStrategy Web Universal™ 8.0 and visualize the information via a map created using the Location Intelligence Component for Business Intelligence.



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export data in batches that could be imported into a geographic solution on the desktop. That is valuable, but not optimal by any means. The more advanced solution from Pitney Bowes MapInfo allows for back-and-forth integration between the business intelligence and location intelligence systems; i.e., the report and the map. Data in the report can instantly be mapped. The map can then be used as a means to further query the data. When work is complete in the map, the report is updated to reflect the impact of the geographic filters that have been applied by the map, such as a filter based on the physical proximity of a customer or prospect to the network. This can only be achieved by a system that understands the physical placement and relationship of objects on the earth's surface. This is the domain of location intelligence. This type of interaction, one in which the process is not slowed by the need to import and export, increases the efficiency of the work flow and allows the analyst to better interpret the data.

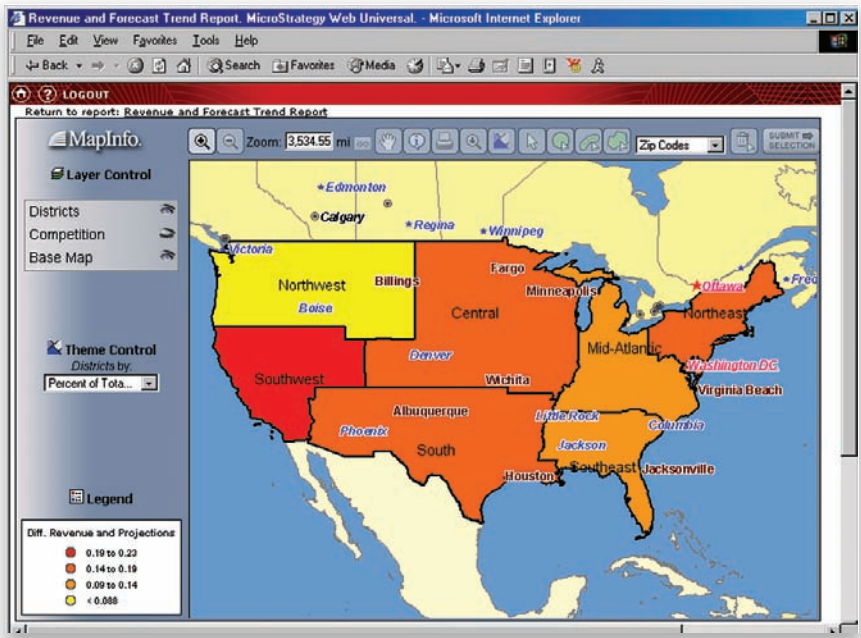
Pitney Bowes MapInfo refers to this type of interaction as bi-directional integration. This integration is useful because the key data elements never leave the environment where the typical marketing analyst is using them—the business intelligence reporting platform. Without leaving the MicroStrategy environment, for example, a communications company like Cox can easily perform analysis and execute campaigns taking full advantage of location intelligence.

A typical campaign might entail growing the commercial business in a new market via direct mail. Such a campaign would normally require that the marketing analyst pull a list of target prospects for the entire market. In even a medium-sized market that could include tens of thousands of prospects. At only one dollar per mail piece, the cost of the campaign would be \$100,000 or more. What location intelligence allows the analyst to do is refine the campaign geographically, so that only those prospects that are precisely within the service area of the communications provider are targeted. This eliminates waste and maximizes efficiency.

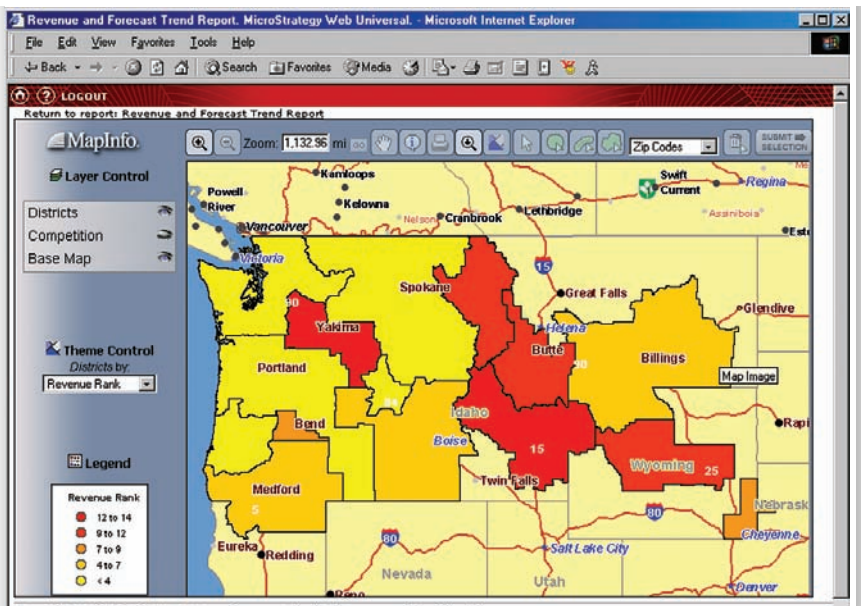
Using the Pitney Bowes MapInfo Location Component, the analyst would first generate a report showing all possible prospects in the market. Presumably, the report would already be filtered by various attributes such as SIC code or company size. The user would then press a single on-screen button and the records from the report would be transferred to an accurate and intuitive map. The map would have been predefined to show the relevant layers from the provider's infrastructure—the cables that go in and out of buildings. The user would click his or her mouse to select the relevant wires or other assets on the map, and within a few mouse clicks would create an area on the map called a "buffer." This area surrounds the selected wire lines. The records of prospects that fall within the buffer appear as selected on the map. With another click, the user returns to the report; however, this time the report shows only the records within the buffer. The report can be exported and sent to the direct mail provider—or used within the business intelligence framework as part of a campaign management solution. Now the marketer can throw away the old adage: "When in doubt, mail it out." Pitney Bowes MapInfo just removed the doubt.

In a conservative example, a communications provider might be able to eliminate as many as 50 percent of the prospects in a market based on their proximity to the network. This is especially true in a market where service is just being launched and the network is not yet mature. A reduction of the list by 50 percent would lead to a substantial savings—possibly as high as \$50,000 dollars—in campaign costs, at least for this example. Some of that money could be reinvested, perhaps increasing the number of prospects from within the service area that are targeted. Or the money could be used to repeat the campaign some time later.

In the past, a seemingly simple operation like the one described above could have taken hours or even days to accomplish as analysts in different sections of the organization worked around each others' schedules, importing and exporting data in an attempt to develop a useful list. This clumsy integration fell within the "too hard pile" for most,



These two screen shots show how a geographic interface can be used as a mechanism to drill down to a more detailed level of data within a BI system. The map on top shows large customer regions. From the larger regions, the user can drill down to the smaller markets shown in the image on the bottom.



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and only incredibly determined users stayed the course. With the location intelligence solution used by Cox, the same query takes only seconds to complete. The end result is a more targeted list, a higher response rate, increased impact for the campaign, and a huge savings in direct mail costs. For reference, see the November 1, 2004 KMWorld Magazine article “Business Intelligence Branches Out.”

This type of solution can be applied in other industries as well.

In the insurance industry, for example, the need clearly exists to have an accurate, real-time picture of the geographic distribution of policies being underwritten. This is especially relevant during periods when natural disasters have occurred or are imminent. In other words, everything insured is somewhere, and it is the concentration of the somewhere that risk managers need to be acutely aware of when evaluating risk. Too much exposure in one flood area or hurricane alley can critically damage an insurer in the event of a large claim.

The bi-directional characteristic of a location-enabled business intelligence solution is important to this critical type of analysis. In addition to geographic visualization, these solutions provide the ability to further query a data set. For example, a regional manager could view an on-screen map that shows the aggregation of policy values by geographic region—such as a U.S. state. Using the map itself, the manager can drill down to the next geographic level of interest. A map and corresponding report would be generated for a more detailed geographic area—counties, ZIP Codes or neighborhoods, for example. With each drill down, the associated data are updated. Risk can be seen at the county level, with areas of high-risk shaded red, for example. The map is being used as a vehicle to access additional, detailed data that are desired because visualization makes it instantly apparent that the geographic area needs further investigation.

In addition, the user can access additional geographic data or create new geographic areas by either tapping into work

done by a Pitney Bowes MapInfo power-user in the organization or by simply drawing on the map using the computer’s mouse. This type of work could be done to estimate the likely path of a hurricane. The likely path could be drawn as a line or a series of line segments. Like with the Cox Communications example, the lines can be buffered, perhaps by 50 miles, in this example. The buffer is then used to access additional data from the report. The system is able to query the business intelligence database, asking only for the policy records that are within the specified geographic area. Within seconds, the user can create and compare multiple “what-if” scenarios related to the organization’s potential risk.

When the report is updated to show only those policies that are within the area on the map that represents the proposed path of the hurricane, the manager can use that to estimate risk. The list can be used to implement a call campaign that either warns policy owners of the impending risk or informs them of claim procedures. As many business intelligence solutions now come with broadcast services of some type, the list can be used to generate a broadcast event—sending messages via email or by cell phone to the policy owners in the report.

Another example of how location can be utilized within a business intelligence solution relates to new technology being implemented within retail and manufacturer supply chains.

RFID (Radio Frequency IDentification) Tags are a hot topic in many industries. RFID technology uses radio signals to allow for tracking of objects or entities. Major manufacturers and retailers around the world are turning to RFID to solve critical problems related to supply chain management, store-level inventory, smart-shelving displays, homeland security and many other important processes. While a topic rife with controversy related to privacy, industry standards and other issues, RFID is also a topic with potential. Organizations as diverse as the Department of Homeland Security and Wal-Mart have announced pilot programs or

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full-out strategies that will take advantage of RFID technology.

These programs will naturally produce voluminous quantities of data. All of the data will, interestingly, contain a location component. The Red Cross, for example, has piloted programs that will allow them to attach an RFID chip to a package of blood donations. Handheld devices are typically used to receive the signals emitted by an RFID chip and the information—including the location of the handheld and consequently the chip—is sent to a central location for storage and analysis. This process means, theoretically, that the Red Cross can quickly know the location of every bag or box of Type B-blood in the nation. This would allow the organization to react instantly in times of crisis, such as in a natural disaster.

For those of us familiar with managing large volumes of data, the advent of RFID technology provides additional metrics. The creation of data that track product shipments, inventory, even people, begs for a powerful business intelligence tool—one powerful enough to allow analysts and operations managers to monitor and measure the status of the business. Since every record in the RFID database will also have a geographic component—the location of the receiving device—the right business intelligence solution is one that can be enhanced via location intelligence.

A great example of how location intelligence can influence this process relates to the desire many manufacturers and retailers have to share data regarding inventory and supply with each other. Using a location-enabled business intelligence platform, retailers can allow suppliers to view and query reports that describe the movement of pallets and cases through the retailer's warehouse and outlet centers. For example, the supplier could see a map showing:

- the volume of shipments of a product by location
- the outlets where shipments have been received
- the location of the warehouses and the inventory of the product in those warehouses

- the supply of the product at the supplier's warehouses and the location of those warehouses
- the presence of pallets at intermediate waypoints throughout the supply chain

As a result, both the supplier and retailer would see in near-real time the supply and demand related to specific products. The retailer could participate in a just-in-time ordering process that is fine tuned to the point of allowing the retailer to pick the warehouse, or even truck, that will suit its need best. Considering the demands major manufacturers and retailers already put on the supply chain, this example seems very plausible. It does, however, hinge upon the convergence of various technologies. Pitney Bowes MapInfo has taken the lead in the industry to bring about the necessary convergence of location intelligence and business intelligence. Defining and implementing the right processes and the correct RFID technology will certainly remain a difficult operation for most companies new to the technology; however, current and prospective users of the technology can rest assured that a key piece of the puzzle is already in place—the technology to exploit the information contained in millions and millions of location-coded records that will be generated. It is through the analysis of these data that a major value of RFID will be unlocked. What are the patterns of movement and why—blood in bags, products on shelves or tankers unloading goods in New York Harbor—those are the questions that RFID technology will ultimately be used to answer.

### The Implementation Process

The process of location enabling a business intelligence solution is now quite easy—even for users who want sophisticated functionality like the bi-directional querying capability described above.

The most common integration point is from the business intelligence solution's ad-hoc reporting module. Work is also being done to integrate into the dashboard modules of com-

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mon vendors. Both are ideal access points when it comes to turning textual data into locational data.

There are 3 main phases of the integration process. Going backwards, they are:

1. Configuration of report data
2. Installation of software
3. Preparation of the data warehouse

When these are done, any report accessed by any user can usually be mapped without additional effort on the part of the consumer or designer of reports. Any administrator or report author who has some familiarity with geography—at least geography as related to his or her business—can usually undertake the process necessary to configure the report data. This knowledge is easily transferred to the report authors or administrator in a one-day training class. The configuration process involves determining what data elements in the warehouse have a geographic nature. These elements include attributes such as postal code, country name, province name, latitude and longitude, etc., of a record. This information is stored in a configuration file. Assuming the installation of the solution has occurred, when the configuration file is complete and loaded on the server, any report can be visualized geographically by whatever level of geography is defined in the configuration file. The data, once bound to the map, can be further queried using the associated mapping tools and functions.

In the solution offered by Pitney Bowes MapInfo, the configuration process leads to the creation of Data Binding Definitions. These definitions are stored in an XML formatted schema file residing on the Web Server. It stores the references to the ID's of mapping data and ID's from the business intelligence report. The file can also be used to store information related to how the areas are labeled on the map, for example "10012," or "New York, NY," for a ZIP Code in New York City. The file also contains information related to the drill-down functionality in the map. For example, when a user clicks on New York State using the

map, the configuration file stores the information that tells the system that the drill from U.S. states is U.S. counties, or ZIP Codes, or whatever geographic level makes the most sense. The same file is also used to define which metrics from the report can be thematically mapped. A thematic map is one in which areas like ZIP Codes are shaded different colors based on a metric or attribute, like total population.

It is important to point out that the geographic areas that are studied can be either standard, publicly-defined regions—like U.S. ZIP Codes—or proprietary, confidential regions defined by the licensee—like sales territories. Any geographic region that the licensee can define can be made part of the system.

The installation of the software itself is relatively straightforward. Usually the vendor will provide a consultant to work with IT staff on hand to do the installation, but Pitney Bowes MapInfo has done much work to ensure the interaction of the relevant technologies. The basic steps that need to take place during the installation of the Pitney Bowes MapInfo solution include:

- Installation of MapXtreme® v4.7 (the Pitney Bowes MapInfo Java-based, web mapping technology)
- Installation of Location Component Application for the business intelligence solution
- Installation of Base Mapping Data (these are the base maps that will be presented when maps are created; streets for example)

The core mapping technology is deployed to an application server. The installation itself is straight-forward. The most complicated portion involves copying of various jar files to the Pitney Bowes MapInfo context and vice versa. This allows the applications to work together in the form of the Location Component. The Base Mapping Data can be installed on any server. The various configuration files will reference the location of the mapping data.

## THE PROCESS OF PREPARING AND IMPLEMENTING A LOCATION INTELLIGENCE SOLUTION SHOULD BE RELATIVELY SIMPLE WHILE THE RESULTING VALUE IT BRINGS TO AN ORGANIZATION IS SIGNIFICANT.

Prior to installation and configuration there will usually be work completed to location-enable an organization's data. The process is to look at the raw data that go into the business intelligence warehouse and determine what tables can benefit from further enhancement. Typically, such enhancements would include the appending of fields for latitude and longitude. These will commonly be added to customer records, prospect databases or as attributes for an organization's other assets—distribution centers, store locations, etc. Additional work can be done to prepare custom boundaries that represent store trade areas, sales territories or even precinct boundaries. If these boundaries exist, adding an attribute to the relevant records that denotes the territory or trade area it belongs in can further enhance the database. In many cases, someone in the organization has already accomplished the work necessary to complete this data preparation. Getting that data out of the silo where it already exists is the end goal of the entire process.

The resulting application is a zero-footprint, browser-based solution that is accessed by consumers of business intelligence reports from directly within the business intelligence solution.

From an end user's perspective—the perspective of the person who consumes the business intelligence reports—the integration is completely seamless. The report consumer will view the report, modify the report, and drill into the report, etc., just as normally done during the ad-hoc reporting process. However, at some point the user will choose to 'map' the report. At that point, data from the report itself will be bound to the mapping data and the result will be displayed within a refreshed view of the browser.

From within the map itself, a variety of tools and options exist for the report consumer. Standard mapping functions are present, such as zooming and panning tools. These allow a user to move in and out of the map, seeing additional details, very easily. Depending on the setup of the mapping data, different images will appear when the screen refreshes

after each zoom. For example, when the user zooms to a level that shows a single market, such as New York or Los Angeles, the map can show boundaries representing store trade areas, or dots, stars or points representing the locations of customers or competitors.

Other tools within the map view include the ability to drill down and to select items. These tools are critical to getting the most value out of the location intelligence solution. As a result of drilling down, the map refreshes to show a new set of information. This information would include the base map data as well as a more detailed layer of geographic boundaries with their associated metrics. For example, from the table of U.S. states and their associated metrics, we could drill down to sales territories and their associated metrics.

The various selection tools include "select by boundary," "select by radius," "select by line," and "select by pointer." "Select by boundary" would let a user perform a query such as selecting all prospects within a ZIP Code, or selecting all ZIP Codes within a store trade area. The selection could then be submitted to the report so that a document listing the areas and their metrics would be generated. "Select by radius" entails choosing a starting point and selecting all of the records that are located within a circle drawn around that point. The concept of "select by line" has already been discussed. A user can draw a line on the map and convert it into an area by defining the size of a buffer to be created around the line. We could use the tool to trace the path of a highway for example, and then create a five-mile buffer around the line. That would allow us to select all of the deliveries that need to be made within five miles of a driver's route, for example.

Other functions and tools exist within the map as well. A simple information tool, for example, allows the user to get information about any record he or she selects on the map. The tools are generally intuitive and minimal training for users is required. Notably, solutions like the one from Pitney Bowes MapInfo can be easily customized to include addi-

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14 tional tools, although such customization usually comes at an additional cost.

### Conclusion

In the end, there are only a few fundamental ways to measure, understand and analyze information, whether it is alphabetically, numerically, categorically, statistically, temporally—or spatially. Tools of incredible sophistication and power have been developed to maximize those fundamental ways to new levels of understanding. To the detriment of the organization, those tools often ignore a critical element of understanding—location.

Are stores not sited somewhere? Are insurance policies not underwritten for homes and buildings somewhere? Are telecommunications infrastructures not located somewhere? Is crime not committed somewhere? The answer is clearly yes. Do business intelligence systems natively understand the relevance of location to the analysis they perform? The answer has always been no. Business intelligence solutions deal with the first fundamentals of analyzing information. It is the venue of the location intelligence solution to solve the geographic problem, to extract the value of place and integrate it with a high-performance, scaleable business intelligence system in order to bring understanding to a new level. Today, this is possible; yesterday it was in the domain of the patient, persistent and visionary few.

The process of preparing and implementing a location intelligence solution should be relatively simple while the resulting value it brings to an organization is significant. The design is meant to allow an organization to quickly enable an existing business intelligence platform. The goal of the location intelligence solution is to allow an organization to leverage its existing investment in both business intelligence and location intelligence software and data in order to maximize the value of both investments.

The solution is most relevant to an organization that has a business problem where there is geographic relevance. The

convergence of location intelligence and business intelligence is not meant to provide only tools for visualization. The resulting solution is not meant to simply be a new, fancy chart. Instead, the end result is a solution that allows a user to interact with data to identify and explore geographic relevance, in a manner and with ease not previously available to the traditional consumer of business intelligence reports. In the cases where we have seen the solution implemented, it is clear that the results are successful. A good measure of success is the number of people that access the geographic output of the business intelligence solution every day. Those numbers can easily reach the thousands. That is often a thousand times more people than were previously able to access the power of location—a thousand times more analytical ability and insightful decision-making. With this new power in hand, decision makers throughout an organization can have a more immediate and powerful impact on day-to-day business.

## ABOUT THE AUTHOR

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Jon Winslow is the director of business development at Pitney Bowes MapInfo Corporation. During his ten-year tenure at Pitney Bowes MapInfo, he has played a key role in developing the company's international strategy with regard to predictive analytics and market analysis solutions and the integration of location capabilities with business intelligence platforms.

Winslow is recognized as an expert on the impact of location on business processes and consumer behavior. His recent analysis on the 2004 Presidential Election and the impact of neighborhood-level demographics has been written up in American Demographics magazine and several other market-analysis journals. He has also been quoted as an expert source in publications as varied as the Wall Street Journal and Directions Magazine. Winslow recently returned from a one-month assignment in Australia where he analyzed the dynamics of the retail market and the demand for location-dependent, analytical solutions.

Prior to joining Pitney Bowes MapInfo, Winslow was with Claritas Inc. in the area of business development. At Claritas, Winslow was responsible for managing technology relationships with partners in a variety of industries with a special focus on technology companies and geographic market analysis. Before joining Claritas, Winslow worked for the NYC Department of Education and the law firm of Cravath, Swaine and Moore. Winslow received his graduate and under-graduate degrees from Binghamton University



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