

ADD MORE VALUE TO CRM WITH GEOSPATIAL DATA

Spatial data warehousing solutions from IBM improve your analytical capabilities

Introducing spatial data warehousing

In a business landscape altered by deregulation, utilities and telcos have been forced to view consumers as much more than rate payers – they are customers who can choose where they take their business.¹ As a result, utilities and telcos are turning to business intelligence software to understand their customers better. These companies, after all, have amassed healthy volumes of data – why not use it to foster decisions that can help build the bottom line?

Data warehouses – the core component of a business intelligence environment – are useful in determining patterns and trends. But, because they usually contain data only about customers, products, revenues, sales and time periods, traditional warehouses only scratch the surface of the analytical insights they could deliver.

By incorporating geospatial data – data related to location or geography – into a data warehouse, utilities and telcos can benefit from a new dimension of analytical power. A spatially enabled data warehouse integrates customer, product and other business data with location-based data for analysis. It helps users visualise and understand how customer, product and other business data are impacted by geography,² empowering utilities and telcos to be much more efficient in customer relationship man-



Utilities and telcos have traditionally collected large volumes of geospatial data. Using it in a spatial data warehouse, these companies can add a location-based dimension to their business intelligence environment

agement (CRM) as well as customer service. And, IBM – with its DB2® family of products and alliances with geographic information systems (GIS) and business process engineering vendors – provides an end-to-end solution that can help utilities and telcos implement spatial data warehouses supporting their business intelligence objectives.

¹ For more information, refer to “Turning Utility and Telco Rate Payers into Loyal Customers,” produced by Frederick Busche, Peter Hoffman, Andrea Reid and Kathryn Zeidenstein of IBM Corporation, in the *Next Generation Utilities Management* journal published by Cornhill Publications in summer 2001.

² Gonzales, Michael L, “Seeking Spatial Intelligence: A data warehousing initiative offers the best opportunity to bring the business value of spatial data into your organization,” *Intelligent Enterprise Magazine* 3, no 2 (20 January, 2000).

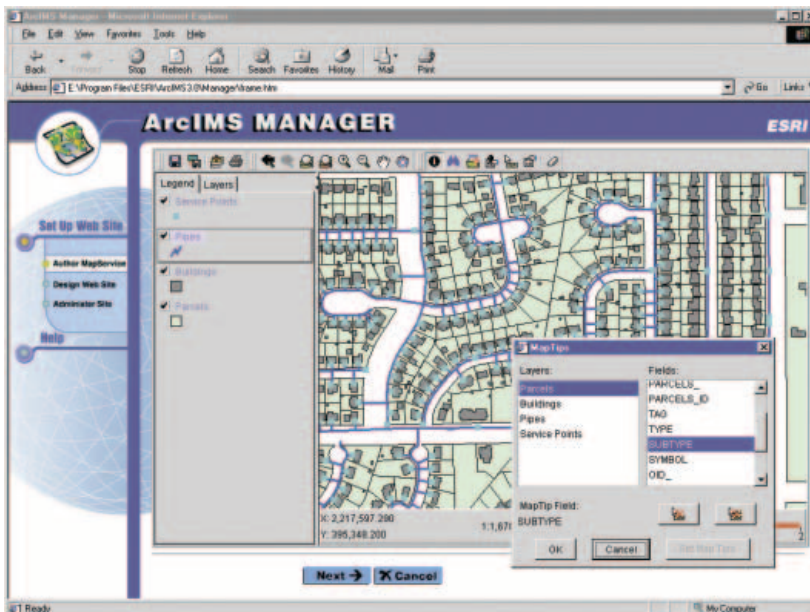


A visual representation of customer behaviour

Utilities and telcos are no strangers to geospatial data and GIS. For example, utilities collect spatial data for surveying, pipeline and preventative maintenance, and line routing.³ However, while they may use data warehouses, not all utilities or telcos are taking advantage of spatial data warehousing, still a relatively new way to marry the existing technologies.

- Where are the exact locations of defective valves or blockages in gas lines, and how quickly are these problems typically resolved?
- Where are the telephone service areas that generate the most revenue?

Without a spatially enabled database, utilities and telcos would be hard pressed to find the answers to these questions efficiently. Consider the example of telephone service plan coverage. Using the appropriate reporting and mapping tools against a spatial data warehouse, a telco can generate a map showing neighbourhoods and associated revenue rates, using the insight for upselling and cross-selling. Similarly, a telco or a utility could easily and quickly direct its customers to nearby service contractors for repairs by consolidating its customer and contractor location data in a warehouse and running a CRM application on top of it. When customers call, the company would have online access to their account information, with a map showing the nearest contractors.



ESRI ArcIMS brings GIS data from local data sources, such as DB2, together with internet data sources, enabling easy viewing and analysis from a web browser

Knowing not only who their customers are but where they are, can help a utility or a telco efficiently and effectively target marketing campaigns, service plans and other business programmes – launching them when and where they are likely to have the greatest impact. Consider these business questions that relate to geospatial data:

- In which neighbourhoods do your products sell at the highest and lowest rates?
- Who are your most profitable customers and where do they live?
- What are the customer retention rates in regions in which you experience the most frequent power or other system outages?

Improving service and fighting fraud

Revenue generation is just one area where a spatially enabled database can make a strong business impact. By visualising the analysis of their integrated spatial and business data, utilities and telcos can get the information they need to improve maintenance programmes, combat fraud and manage emergencies.

Take the example of gas line defects. A utility can examine gas pipes and pinpoint the location of blockages and other defects with special cameras. This data can then be loaded into a spatial data warehouse. An analyst using the appropriate reporting and mapping tools against the warehouse can generate a map that visually represents where the defective lines are. Otherwise, the analyst would have to manually research locations using a report listing the addresses of defective lines, and transfer the locations to a map.

To manage fraud and abuse, utilities and telcos can use a spatial data warehouse to generate profiles of customers likely to default on their bills, using mapping software to generate maps showing homes and businesses where they might need to discontinue and later restart service.

³ Coss, Rafael and Michael Gonzales and Kathryn Zeidenstein, "Picture This! A Spatially Aware Data Warehouse," *Journal of Data Warehousing* 6, no 3 (summer 2001).

In an emergency involving service outages, spatial analysis could help utilities and telcos quickly find available emergency repair crews and direct them to areas where they are most needed. And when customers call with urgent requests for repair, the companies, knowing the crews' locations, can readily provide their workers with best-route directions and their customers with estimated times of arrival. Spatial analysis can also help companies track locations of stored hazardous materials and quickly compile reports to meet government regulations.

DB2 data management software from IBM leads the pack in business intelligence

Building a spatial data warehouse requires a robust database at the core, complemented by sophisticated analysis tools. IBM, the leader in business intelligence and data warehousing solutions, and IBM's solutions partners provide an end-to-end solution that meets these criteria.

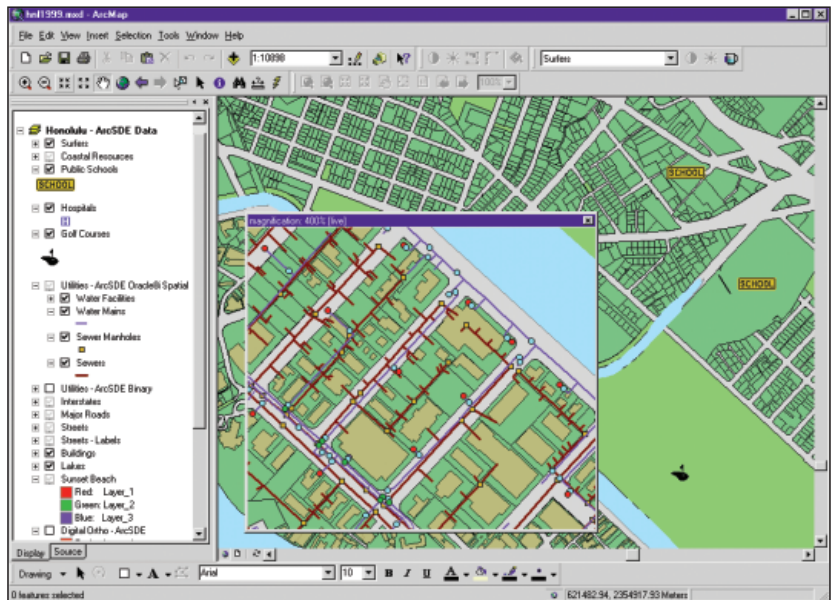
At the foundation of IBM's business intelligence platform is IBM DB2 Universal Database™. DB2 Universal Database provides a data management solution that brings together data from multiple sources, including CRM and enterprise resource planning (ERP) applications, e-commerce websites and more. To incorporate spatial analysis capabilities into DB2 Universal Database, companies can implement IBM DB2 Spatial Extender. DB2 Spatial Extender stores, accesses, manages and analyses spatial information along with other business data, providing multiple departments access to spatial data for their unique needs.

DB2 Spatial Extender ships with a US geocoder, and country geocoders can easily be plugged in from a variety of business partners. By adding a geocoding process into their environment, application developers can link geographic references to attributes, such as a street address, that have nothing to do with geography. Typically, an address in a data warehouse is geocoded to connect it with a physical location, such as longitude and latitude.⁴

To integrate analysis into a closed-loop business process – turning a customer's web inquiry into an opportunity to cross-sell, for instance – utilities and telcos need to have near real-time access to their

operational data. A data warehouse, developed with IBM DB2 Warehouse Manager, can serve as the point of access for this data. A distributed, heterogeneous infrastructure, DB2 Warehouse Manager handles the designing, building, maintaining and governing of DB2 data warehouses.

When transforming data warehouses into spatial data warehouses, companies should consider three categories of spatial data: entities (spatial features such as computer representations of streets, pipe sections and oil wells); attributes (descriptive characteristics about entities, such as



By using ESRI ArcMap against a DB2-based spatial data warehouse, utilities and telcos can zoom in on specific city blocks to locate customers or pipelines

income level of a neighbourhood, the type of pipe used in a particular section or the volume of oil pumped from a certain well⁵ and meta data (information about the data's origin, lineage and change). Incorporating entities into a business intelligence environment requires software that accesses and displays the objects, such as mapping programs. Attributes, on the other hand, enable use of traditional online analytical processing (OLAP) and SQL reporting tools. Meta data further enables the analytical processing of the data warehouse, allowing forecasting and planning for management.

⁴ Gonzales.
⁵ Gonzales.

Working together to help map out business insights

IBM and its business partners offer an array of analytical tools that can help utilities and telcos generate useful insights from their data. For example, IBM DB2 OLAP Server™ provides multi-dimensional analysis, enabling users to drill down into their data stores to compare properties such as highest and lowest revenue-generating customers in a suburban neighbourhood. A new feature of DB2 OLAP Server, DB2 OLAP Miner, extends the analytical capability by mining large volumes of OLAP data and quickly returning deviation reports – such as evidence of bill payment fraud among customers in that suburban neighbourhood.

While these analytical tools provide valuable reports, mapping software from IBM partners such as Environmental Systems Research Institute, Inc (ESRI) can provide spatial measures and a visual representation of that analysis. ESRI, which jointly developed DB2 Spatial Extender with IBM, offers a variety of desktop GIS mapping software that works with DB2 Spatial Extender, so users can map geo-spatial data from DB2 Universal Database. The IBM spatial solution, which includes IBM Informix® Dynamic Server™ and IBM Informix Spatial DataBlade® Module, has an open architecture allowing the use of many IBM business partner mapping tools, such as from MapInfo and Intergraph, as well as application providers such as Miner & Miner and Telcordia.

Through IBM Global Services, the company's consulting arm, IBM rounds out its spatial solution. IBM Global Services can work closely with utilities and telcos to help them gain a deeper, more useful understanding of their customers so they can tailor marketing strategies accordingly to increase profitability.

Metro Nashville maps its future

The Metropolitan Government of Nashville and Davidson County (Metro Nashville) has used DB2 and DB2 Spatial Extender to develop a spatial data warehouse that manages property and zoning information and other land-use related data. Most of the county's departments, including water and sewage, are relying on the warehouse, along with mapping software from ESRI, for a variety of geospatial analyses.⁶

Smart decisions require smart use of data

While traditional warehouses can be a rich source of insight for business decision-making, incorporating geospatial data into the mix can put companies significantly further ahead in the competitive game. Working with IBM, utilities and telcos can benefit from an end-to-end solution vendor who can help them leverage their most valuable pieces of data for smarter, better decision-making, which can generate cost savings and other benefits.

Andrea Reid of IBM Corporation contributed to this article.

⁶ For more information, please download the case study about Metro Nashville at ibm.com/software/data/solutions/pdf/metro.pdf

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