



# Integrating technologies

GIS is critical to the true nature of an ERP. Geoenabled ERP solutions provide a single point access for interconnected data, enabling easy data sharing and analysis

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**GOVERNMENTS AROUND THE** world have to manage a variety of data and databases to serve the citizenry and to get their jobs done. This includes database administration and oversight of asset management software, billing, customer service, financials, human resources, and

a host of other Information Technology (IT) tasks that are department-specific. No single software product satisfied all these diverse tasks. Therefore, separate software products were acquired for each. This resulted in a hodge-podge of systems that did not communicate or share

data. Often data originating from one system was needed in another system. IT professionals were given the task of bridging the gaps from system to system. This required a high level of diverse programming and database skills. As new laws and ordinances

affected these agencies, the IT professionals had to ensure that these unrelated systems met the ever changing needs of their agencies.

Innovative software companies saw the need to integrate these diverse tasks into one integrated application to facilitate the flow of information from one task to another. Many software companies began to create these integrated applications. The term Enterprise Resource Planning (ERP) was coined to describe these systems. IT organisations have begun to issue Requests for Proposals, (RFPs) for these integrated systems in an effort to streamline their operations and improve the customer experience. Shrinking budgets and shrinking staff has made it more and more difficult to employ the fleet of experts necessary to maintain the old model of patching together unrelated systems. Many government agencies have or are planning on acquiring an ERP system rather than paying for the maintenance of their legacy systems.

Running parallel to this new ERP mindset is a corresponding shift in how an organisation should view Geographic Information Systems (GIS). Historically, GIS was a technology unto itself. GIS professionals were hired to create, acquire, and integrate the data to meet the needs of the organisation. Many government employees erroneously saw GIS as computerised mapping. They did not understand that the true power of GIS was in its ability to take data residing in existing IT systems and give that data meaning. Government officials were turning to staff and demanding analytical information on such diverse questions as where are a majority of our customer calls/complaints coming from? Where do we need to be investing in additional infrastructure? Where are our current assets? Where are we spending tax payers dollars? Where are areas of public safety concern? and What do we need to do to prepare ourselves for the next natural disaster? Many of these questions could only be answered through GIS analysis of

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the data residing in the existing IT systems. Creative GIS staff in tandem with their IT counterparts were able to access and geo-enable this existing IT data to answer some of these questions but only after untold hours of data mining and data scrubbing. IT and GIS professionals dreamed of the day when all systems within the organisation worked together. A time when GIS professionals could focus on doing analysis and not spending a majority of their time managing and massaging data from various sources.

ERPs have begun to bridge the gap of providing one source of interconnected data. For instance, a local government organisation can now view data spatially about a customer location, service calls at that address, building permits issued, historic occupants, code enforcement cases, and other data about a customer site through one portal. These ERPs have focussed on the data warehouse as the valuable asset and the application as a window into this wealth of data. Unfortunately, many ERP software companies have overlooked the most powerful data tool – GIS integration. It has been said that 90 per cent of all activity within government has a geographic component. That might be an address, parcel identification number, an x,y coordinate, or some other geographic identifier. Most ERPs house these data elements as fields within their databases. Unfortunately, some of these ERP software companies have overlooked the obvious – making their applications GIS-centric. In these cases, GIS professionals are still mining data in order to

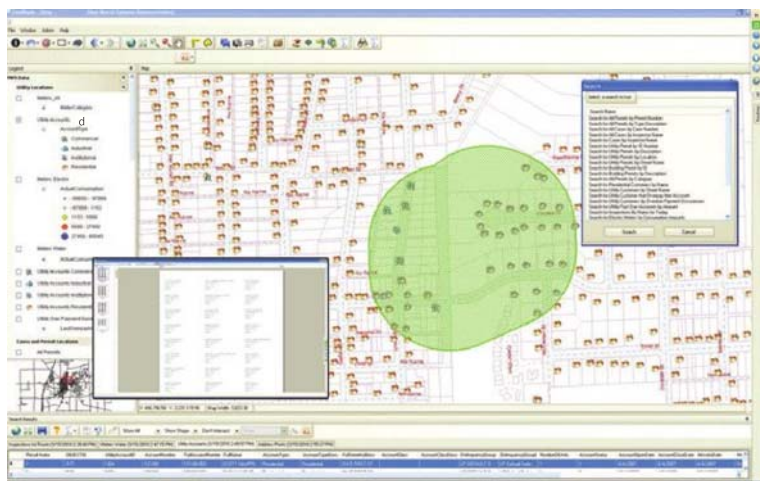


Figure 1: GIS connectivity model – ERP customer data available within a GIS portal

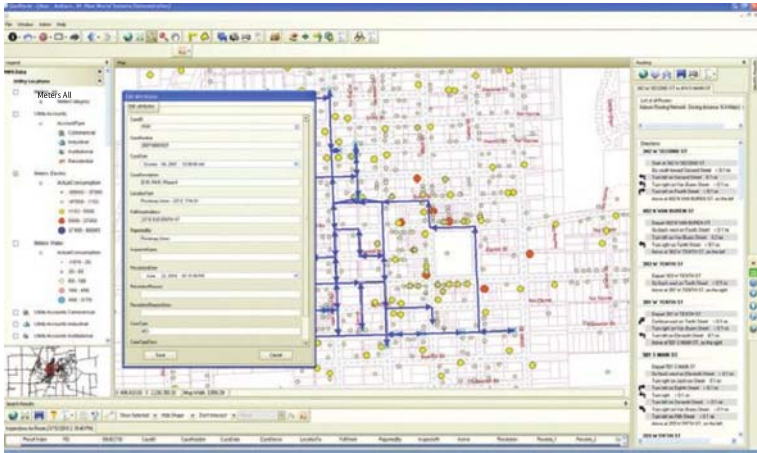


Figure 2: ERP work order interface with a daily route manifest

The GIS/ERP integration is being taken a step further by some companies as they leverage the latest in GIS software technology allowing GIS and ERP data to be mobile.

geo-enabled ERP data such as utility customer locations, consumption data, and work orders. The user can then utilise GIS spatial analytical functions to make decisions about the data. This combination of ERP data and GIS has been a boon for governments. Questions that once took a group of IT and GIS professionals an inordinate amount of time to answer can now be answered in a matter of minutes via the GIS portal. However, this model still has its limitations. A user can view data within the ERP but cannot affect changes within the ERP data itself.

**GIS integration**

Some ERP companies have moved beyond the connectivity model to a true integration model. In this case, GIS is interwoven into the ERP. A user can use the map as the data viewing, data entry, and data update portal for the ERP. Instead of being only a data visualisation portal, the GIS, in this case, is truly bi-directional. It can receive data from the ERP and it can push data into the ERP. This is much less commonplace in the ERP software arena. A majority of ERP vendors have implemented the GIS connectivity model. The integration model is much more complex and requires experts in GIS programming as well as experts in ERP programming. However, the end-user experience is much more robust and powerful. In the integrated model, the GIS and ERP interfaces are one in the same. A user can be manipulate data and see it via GIS whenever desired. Alternatively, the user can be manipulate the map/GIS data

provide the geographic analysis. Visualising the data on a map makes much more sense than presenting the data to the end-user via a computer-generated report or table. Some ERP companies understood the importance of data visualisation and analysis, and have embraced GIS as a must-have feature in their software. This has been manifested in one of two ways – 1) GIS connectivity or 2) GIS integration.

**GIS connectivity**

Some ERP companies created GIS applications that connected

to their databases. In these cases, the data entry and access screens for the ERP and the GIS tools are not related. The GIS application is written in such a way as to access and present the ERP data through a GIS viewing and analysis portal. Data being entered into the ERP was geo-enabled using backend tools that created connectivity between the ERP data and the GIS. In these cases, the users could view the data residing within the ERP as discreet GIS data layers. As Figure 1 depicts, a GIS user is presented with an interface that shows GIS layers in tandem with

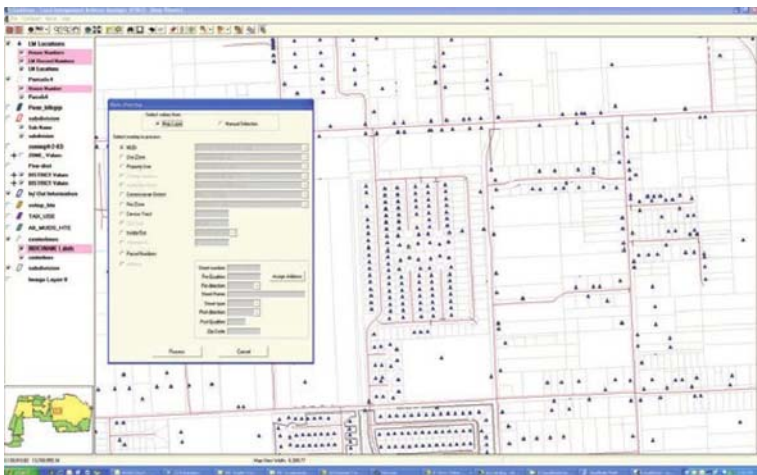


Figure 3: GIS interface for managing customer and address data with ERP auto-population

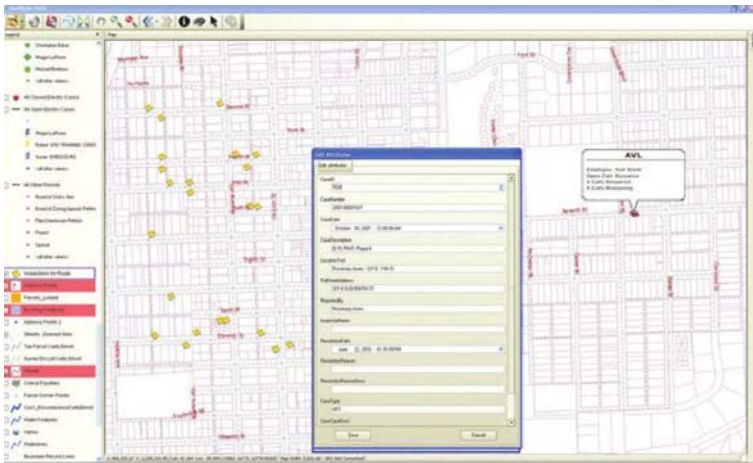



Figure 4: Mobile GIS/ERP work order interface with AVL support

Users are beginning to demand that their ERP software minimally incorporate the GIS connectivity model but preferably meet the GIS Integration model.

The challenge for ERP vendors is to understand and appreciate that GIS is critical to the true nature of an ERP. ERPs were designed as a method of pulling disparate systems together under one interrelated software umbrella. Users are beginning to demand that their ERP software minimally incorporate the GIS connectivity model but preferably meet the GIS Integration model. ERP vendors will push this integration model to include not only traditional ERP data and GIS data but also diverse technology such as imaging, visualisation, reverse dialing, and other IT systems. The logical conclusion of these ERP efforts will be one portal to meet all the needs of the user. The most successful ERP vendors will not be satisfied with the current model but will push to create an end-user experience that brings all needed data under one umbrella. The logical culmination for the end-user will be a viewing experience that starts and ends with the GIS. 

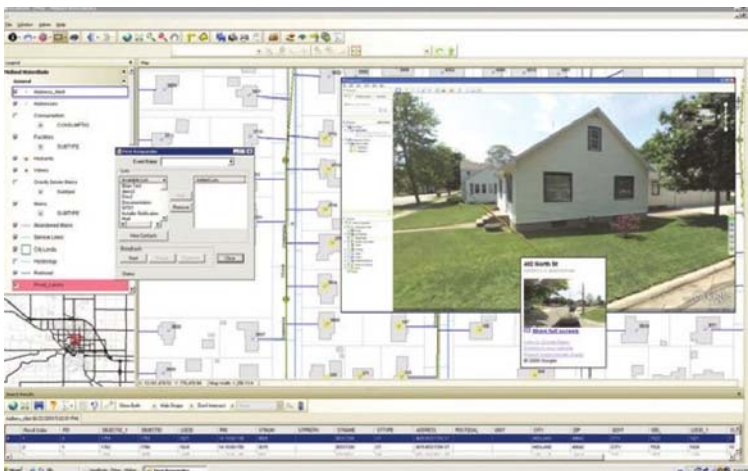


Figure 5: GIS as the One-Stop Portal – (ERP, Reverse Dialing, Google Street View)

while interacting with live connected ERP data. Figure 2 depicts just such an interface. The GIS user is able to utilise GIS to manipulate an open work order. The user can create a route manifest (through the GIS interface) of work orders from the ERP. The user can enter work order notes and close the work order from the GIS without having to go to the traditional ERP data entry screen.

Figure 3 depicts a bi-directional interface in which a user is managing a GIS layer of addresses. As the user creates a new address, the GIS automatically does a GIS overlay

process to auto-populate pertinent fields within the ERP such as zoning, land use, voting district, and tax value.

The GIS/ERP integration is being taken a step further by some companies as they leverage the latest in GIS software technology allowing GIS and ERP data to be mobile. Figure 4 depicts a mobile GIS interface (using ESRI's ArcGIS Server Mobile tools) that allows users in the field to update ERP data from a GIS interface. Additionally, the user's field devices are GPS enabled so that managers can track the user's progress and location while in the field.



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Geographic Technologies Group, Inc. (GTG) is one of the leading GIS consulting companies located in North Carolina, US. It has a tradition of deploying the best GIS solutions for the local government.