

BIOGRAPHICAL INFORMATION

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Specific Responsibilities

Mark has been employed by Intergraph for the past 16 years in Ottawa and Toronto. In his current role as Executive Director of Global Government Solutions, Mark and his team are responsible for defining the solutions required by local, regional and national governments worldwide in the fields of infrastructure management, land management and enterprise data management and distribution.

Past Experience

Prior to joining Intergraph, Mark was employed by the Surveys and Mapping Branch, Energy, Mines and Resources Canada for 4 years. Mark has extensive experience in the business process redesign, database design, system architecture and software development of spatial systems in local, state/provincial and federal government. Mark also has in depth experience in GIS standards and has served as the chairman of the Canadian General Standards Board, Committee on Geomatics.

Educational Information

Mark holds a B.Sc. Eng., specialization Surveying Engineering, from the University of New Brunswick in Fredericton, New Brunswick, Canada.

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Finding Your Spatial Return on Investment in Local Government

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Abstract

The days of implementing spatial systems because others were doing it or because it “made sense” are over. More and more often, those tasked with implementing spatial systems in local government are being forced to demonstrate what the return on investment (ROI) will be so that decision makers can prioritize among the many requests for funds that they face. This paper explains ROI in local government terms which are often different than a private sector bottom line. The paper also describes ways to begin to measure ROI in local government and suggests where to find your largest ROI. Where to find your ROI can vary greatly depending upon the level of spatial maturity of your organization. In conclusion, several real world examples will be used to illustrate how ROI can be achieved and measured.

Introduction

Your City or County government has a new CAO or County Manager. His or her new IT planning policy mandates that all IT projects be justified with a Return on Investment (ROI) calculation. Do you:

- i) panic?
- ii) immediately hire an accountant?
- iii) tell him or her that spatial projects never use an ROI?
- iv) actually try to figure out an ROI for your project?

In the past thirty odd years the answer to the ROI question for spatial systems has often been item three above: “You can’t calculate an ROI for spatial technology!” or “It’s just something that we have to do!” This reaction has not just been limited to spatial systems as IT in general has had to come to grips with how to justify and quantify the benefits of IT projects. In any case, as spatial systems have matured and are now viewed as simply another operational tool instead of some type of voodoo magic, ROIs are being demanded more often. The calculation of ROIs for private sector spatial systems has led their adoption in the public sector. This would be expected as private sector entities, with a bottom line focus, have employed ROI calculations as a part of their corporate decision making process for

some time. However, more and more often, public sector expenditures on spatial technology must be justified with an ROI of some type.

This paper provides some definitions of what constitutes ROI, contrasts public sector ROI with private sector and gives concrete examples of where ROI can be found in local government. This paper is not a "how to" manual for ROI calculation but rather focuses on identifying where significant ROI is likely to be found.

What is an ROI?

What is a Return on Investment? Traditionally ROI calculations and justifications have involved the hard financial results of an investment. Many definitions exist but a general, straightforward definition is as follows: for a given use of money or resources in an enterprise, the ROI (return on investment) is how much profit or cost saving is realized. These financial based ROI calculations depend totally on hard metrics: usually dollars spent and dollars saved or gained. A number of different techniques can be used to calculate purely financial ROIs. Some of these ROI calculation techniques include: Present Value, Net Present Value, Return on Investment and Internal Rate of Return. For spatial projects which have defined cost and a well defined financial benefit these techniques can all be used to provide a justification for and a quantification of the benefits of a given project.

More recently, when performing ROI analyses, organizations have begun to take non financial benefits into account. These non financial benefits include improved services to the customer, reduced wait times, increased public safety, decreased operational errors and assuring public health.

In some cases, models or assumptions are used to translate these non financial benefits into financial metrics so that traditional ROI calculations can still be used. The models can be very complex and, as with any analysis which uses key assumptions, is based on the validity of those assumptions.

Public sector vs. Private sector ROI

As government is not driven by bottom line profitability in the private sector sense, some types of ROI justification which are used in the private sector can be difficult to apply to local government. For example, when implementing a new spatial system which reduces required manpower, local government typically does not perform a directly related reduction in staffing and related overhead costs to account for the increased efficiency. The budget for the division or department will likely still contain the same salary and overhead components even after the new system is implemented. If

staff has become redundant, typically they are dedicated to other priority tasks and activities.

This makes the government ROI case more difficult to make. Instead of seeing a decrease in costs, what typically results from a spatial systems expenditure in government are increases in services in other areas as personnel are reassigned. This does not make the ROI calculation impossible but it does mean having to calculate and quantify the benefits that will be obtained through the retasking of these resources.

Another major factor which affects local government ROI is the fact that many local government functions are delivered in support of the overall health and safety of the community or the support of necessary infrastructure. It can be difficult to quantify many of these softer benefits. For example, if a spatial based asset management system is used in support of the maintenance of a city's water system, it can be difficult to determine to what extent that system is contributing to the safe operation of the water network. Another example, it can be hard to determine the direct cost savings of a West Nile Virus mosquito control plan. One technique to address this is to focus on the discrete tasks instead of the big picture when trying to determine ROI. For example, when deploying digital information in the field in support of the water network: what are the real cost savings which result such as elimination of printing costs or reduced crew down time due to outdated or inaccurate information? In terms of the West Nile Virus plan: what savings resulted from the implementation of a spatial system for the collection and tracking of the information?

Another technique which can be employed to help to quantify softer benefits is to examine the costs of a mistake. For example, if current information is not deployed in the field, resulting in a cable break, what are the potential costs of this mistake to the organization?

Examples of ROI in Local Government

Where should you look for areas of potential ROI in local government? While many opportunities exist, this paper will examine high ROI opportunities available in the following areas:

- i) streamlining & modernizing operations;
- ii) enterprise systems;
- ii) citizen self service and;
- iii) application consolidation.

Streamlining & Modernizing Operations

Almost all of us have been exposed to a business process reengineering exercise at one time or another. The goal of the exercises is often to create new efficiencies in operations to reduce costs, improve service levels and improve system throughput. In spatial systems the opportunity for real efficiency gains exists when implementing new generations of data maintenance systems. Take for instance the City of Hamilton, Ontario, Canada. They replaced a legacy CAD system for the maintenance of the water and waste water network with a next generation rules based system. Using this platform, the City was also able to accomplish a tight integration with their asset management system. This meant that data only has to be entered one time as well as having many of the required data fields being auto generated. These changes have resulted in one person being required to perform this maintenance where previously three people were required. In addition to these immediate cost savings, this tightly integrated system has also improved data quality and made the network model directly usable by other engineering applications. This is resulting in further efficiencies which are just now being realized.

Another good example of ROI in streamlining operations comes from Cobb County Water System serving over 160,000 customer accounts in Georgia. By implementing a basic work planning system with a spatial component, this agency has reduced the planning time required by its crews in the morning by 40 minutes each day. The new system geocodes the planned work of each crew and automatically suggests a most efficient order to execute the jobs in as well as a suggested driving route. Previously, this job planning required the manual investigation and location of each job as well as the manual ordering of the planned work. This reduction in planning time has resulted in increased customer service as more time is now spent working jobs and less time spent in planning.

Enterprise Systems

All of us in the spatial domain have been exposed to the concept of enterprise wide systems for the past several years. However, whether for reasons of internal politics, incompatible systems or incompatible business processes, many organizations have not implemented an enterprise wide view of spatial systems. This often results in the same data being maintained multiple times or a great deal of energy and effort being spent moving data between systems and platforms.

Adopting an enterprise wide approach means that information is maintained only once and then reused throughout the enterprise. In local government this means, for example, that the parcel fabric should be maintained one time and then reused by other divisions and departments. This enterprise approach results in direct cost savings in terms of the reduction of data

maintenance expense. These direct cost savings can be used to calculate a return on the investment in an enterprise wide system. The enterprise approach also typically results in the softer benefit of ensuring that all departments are working with current data resulting in better decision making and reduction in errors due to stale data.

Enterprise availability of spatial information through the Intranet also has tremendous ROI potential. What are the real cost savings of having spatial information immediately available in a self service manner verses the staff time required to process one off map requests? Or the costs of having engineering and planning staff spending time pulling maps and plans from map drawers. When these costs are factored in, the ROI case for enterprise distribution of spatial information can easily be made.

Citizen Self Service

The wide-spread availability of Internet access has led to a revolution in the way in which citizens can interact with their local government. Initial efforts at citizen self service centered on making frequently requested information easily available through the Internet. A smaller number of local governments have moved actual business transactions such as permitting and facility booking to the Internet. In any case, both categories of spatial implementation can result in a significant return on investment.

A good candidate for self serve information access lies in access to property assessment information. For obvious reasons, rate payers are interested in knowing what their assessed property value is and often times want to know what their assessed value is in relation to properties which they consider to be on a par with their own. This can result in a large number of telephone or face-to-face queries which tie up valuable staff time. On top of this, these queries typically spike annually when the year's assessment is released.

To help deal with this the City of Winnipeg, Manitoba, Canada has implemented an effective spatial tool available over the internet which allows a citizen to quickly see their property's assessed value in relation to other properties in their vicinity. Figure 1 below illustrates the typical result of one of the queries.

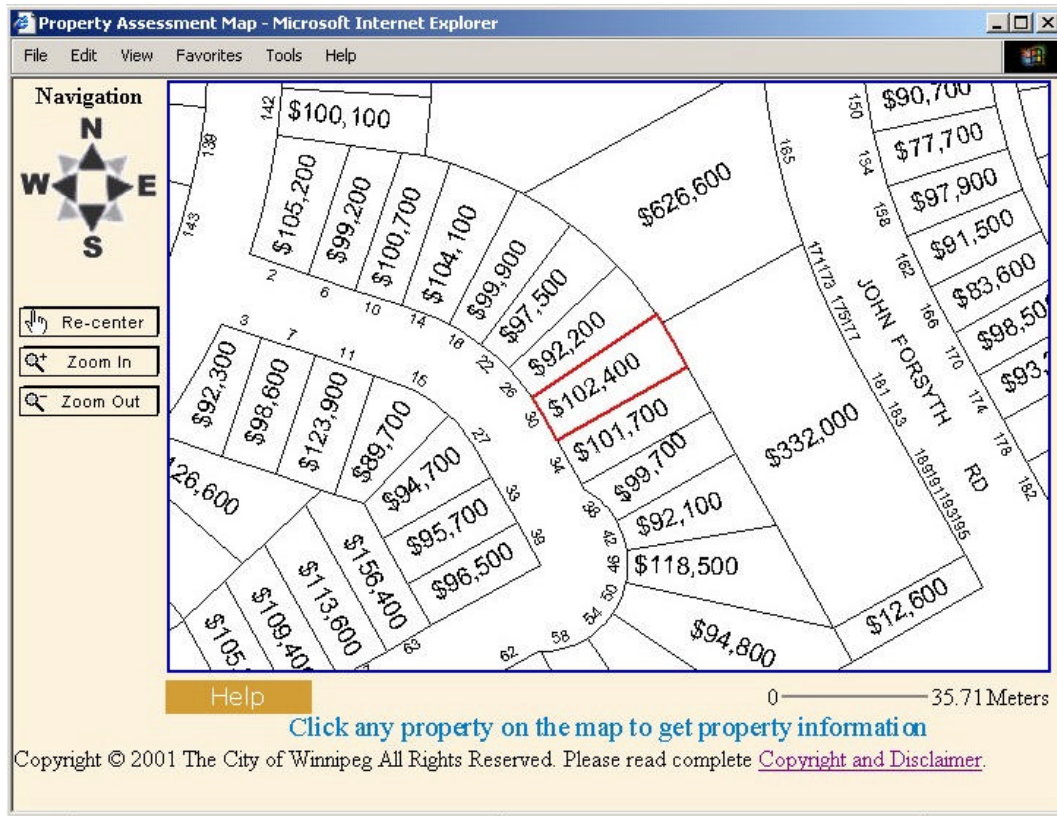


Figure 1

The implementation of this system has resulted in a reduced number of telephone and counter queries which must be handled by City Staff. This allows city Staff to remain focused on other tasks as well as providing faster turn around for those requests for information which come in via traditional means.

Implementation of these systems also has the soft benefit of providing an improved customer service experience for the citizen. Their query is answered quickly and efficiently and with the benefit of a map instead of a verbally provided list of addresses and property values.

As mentioned previously, other jurisdictions, such as the City of San Jose, CA, are providing actual business transitions like permitting in a self service manner through the Internet. As with the Winnipeg example, these systems typically reduce the workload on city staff and result in a positive experience for the end user.

Application Consolidation

As spatial technology has matured, its use throughout many organizations has become much more widespread. While this is a mainly positive development, it can have the negative effect of spatial capabilities being delivered throughout the enterprise by many different systems, on many different technology platforms using multiple data bases.

This proliferation of technology can result in significant challenges for spatial system support and development staff. Additionally, the enterprise may be losing out on economies of scale available by consolidating the purchasing of new systems and maintenance with several key vendors. Also, issues such as the portability of staff and training requirements are affected by a proliferation of spatial technologies.

By consolidating spatial systems on a minimum number of platforms and databases, support, development and maintenance costs can be substantially reduced. These can often yield directly quantifiable costs which can form the basis of an ROI justification for the consolidation of systems typically coupled with the implementation of an overall enterprise approach.

A good example of this approach can be found at the City of Edmonton, Alberta, Canada. Beginning in the year 2000, the City embarked upon the Spatial Land Inventory Management project or SLIM for short. A key objective which was met by the SLIM implementation was the replacement of 49 applications and 166 databases with a single enterprise wide system. This has resulted in the hard benefits of consolidated maintenance and support activities and a reduced set of spatial applications software. The enterprise approach resulting from this application consolidation has also resulted in the provision of new capabilities which were not possible when the data and systems were spread across so many application platforms.

Conclusions

Using ROI as a means to prioritize and justify spatial projects with local government is beginning to become more commonplace as governments attempt to allocate scarce financial and human resources. Many spatial projects within local government can be justified based on hard cost savings but just as many require the evaluation of soft benefits and the development of some means to quantify gains in productivity and the delivery of new services. What ever the case, many areas exist where properly applied spatial investments will result in significant returns.