

BIOGRAPHICAL INFORMATION

Linda Gerull
GIS Manager
Pierce County, Washington

Specific Responsibilities:

Ms. Gerull joined Pierce County over nine years ago as the GIS Manager. She is responsible for managing the County's enterprise GIS which includes software planning, design, development and implementation as well as database construction. Ms. Gerull's leadership has resulted in over 10 million dollars of data construction and Pierce County GIS supports 600 regional GIS customers in 25 county departments and 10 subscribing agencies. This regional GIS has developed and supports over 65 desktop and web-based GIS business applications that have won numerous national awards.

Past Experience

Ms. Gerull is a Civil Engineer with 18 years of GIS consulting and management experience. She has managed all phases of GIS system development and database construction for GIS projects in utility agencies, local government, departments of transportation, federal government (nationally and internationally) and commercial businesses. Her work experience includes: Intergraph Corporation as the Executive Manager for GIS Implementation and Integration Services and UGC Consulting as a Senior Consultant.

Educational Information

B.S. – Civil Engineering, University of Tennessee

Professional Membership

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INNOVATIVE GIS BUSINESS STRATEGIES TO “DO MORE WITH LESS”

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ABSTRACT

Have you always tried to “work smart from the start”? What a relief it would be to know that your business strategy was risk-free and achieved the lowest costs and quickest implementation. During lean budget years, there is even more pressure and expectation to “do more with less” and “get it right the first time”. Your business direction choices are further complicated by changing software and hardware systems, conflicting technologies, shrinking budgets and ambitious GIS users. In addition, the need to maintain mature legacy systems makes strategic change difficult, and the path to success can become hard to find.

This presentation will illustrate several innovative GIS business strategies that have proven successful for Pierce County, Washington. Pierce County’s GIS Division serves over 600 users in 25 county departments and 10 subscribing agencies. These strategies relate to modular software development, alternative methods of hardware procurement, intelligent database construction and creative customer service. The lessons learned at Pierce County GIS can lower costs and improve the performance of GIS operations, helping your organization achieve more with less.

PAPER

Professional organizations and conferences such as GITA provide opportunities to learn techniques for working smarter and lowering risk. Lean budget years challenge GIS professionals in local governments, utilities and commercial businesses to implement risk-free, integrated technology. . Ofcourse, good project management practices will significantly contribute to lowering risk and improving productivity, yet additionally, this paper describes innovative GIS business strategies for doing more with less. These strategies are applicable to startup GIS projects as well as mature enterprise implementations.

Database Construction

GIS is a data-driven technology, and many GIS implementations are delayed due to large on-going data projects. Database construction is a costly and perennial aspect of GIS. Streamlining data construction or leveraging alternative data sources can help your project show speedy progress and lower costs. How can you better generate data for your GIS? Consider the following:

1. *Use available data from other agencies.*

This simple concept is often difficult for organizations to apply. Some GIS users take pride in developing their own datasets and resist using other sources. If multiple agencies work cooperatively to build datasets that fulfill the needs of each stakeholder, then great efficiencies can be achieved. The sharing of data development costs can ease the burden on each agency and make it possible to create more sophisticated and useful datasets. In addition, the costs of data maintenance are not duplicated across multiple agencies. This is the concept behind the Framework and One-Stop initiatives. The cost savings of this common sense approach are hard to ignore.

2. *Share database development costs between departmental users.*

The upfront work of gaining approvals from many departments is time consuming. Yet, the result of requesting/justifying a \$20,000 contribution to a data project across 20 departments is a \$400,000 data construction budget! Some departments may not be able to budget the full \$20,000 in one year so allow two \$10,000 payments in two years. Typically this will not impact a large data project which could require more than one year to complete.

3. *Consider licensing a third party database.*

There are many commercial database vendors that can supply GIS base layer data such as road networks. Purchasing and licensing a commercial database can simplify and speed up your system implementation.

4. *Consider partnering with a vendor to build and license your database.*

What do you do if commercial vendors do not have data for your area? Consider partnering with a data vendor to build the dataset. The vendor can retain full license to the database in return for reducing the construction costs for your project. In this case, you will be restricted from providing the database to others (which may require some careful contracting due to public records laws) in order

to preserve the dataset's value to the vendor. The amount of cost savings for you will be proportional to the vendor's ability to license the database to others.

GIS Application Development

Generally, enterprise GIS systems are built on a commercial GIS product that can be used for various business functions. But these commercial products may not address your specific business process and uses. Two ways to solve this dilemma include: 1) the GIS department can perform the GIS functioning for your business process (e.g., make maps, perform analyses); and 2) customize the commercial GIS product to work as needed for your business process. How can you build specific business applications and do more with less? Consider the following:

1. Design/build times 10.

The "design/build times 10" guideline means that when designing and building a GIS business application the best approach is to factor your design 10 fold. If you are building an application for data viewing, factor in 10 times the amount of data handling. If you are building a query system, factor in 10 times the amount of data themes to query. The intent is not to overbuild your system, but to provide the capacity and flexibility to handle future growth in usage. A costly aspect of software development is overhauling existing systems to cope with increases in usage. If you plan from the start with expansion in mind, your system will be able to grow and accommodate more users without requiring substantial reworking and spending. Remember to factor up the hardware as well as the software.

2. Build applications with a functional, modular, reusable approach.

You designed your GIS application to support the maximum number of users and factored for expansion. You can further optimize the development process by designing the software in modular, reusable components and reusing such code whenever possible. For example, an address query interface and geocoding engine can be built in generalized modules and reused in any application that needs them. Similarly, you can build a generalized data query engine that displays reports and charts and use it in many applications. Creating reusable code may at first require some extra effort, but there are many benefits. First, software development time is saved every time code is reused. Second, software maintenance is simplified when code is used by multiple applications. Third, by using a modular software approach, applications can be quickly prototyped and developed. Fourth, the reuse of code can give your applications

a similar “look and feel”, which makes them easier for users to learn, and simplifies documentation.

3. *Build applications that the end-user can maintain without a software engineer.*

An innovative approach to software development is to build systems that users can maintain and enhance without assistance from software programmers. This gives users the freedom to change the system or manage security without waiting for programmer assistance. It also reduces the need for programmers to provide technical support. Examples of this approach that have worked successfully at Pierce County include web content management systems, web portal security systems, and data viewing systems.

Managing Software and Hardware Costs

It is not uncommon for GIS software and hardware costs alone to exceed 25% of an organization's budget. The funding of maintenance, three-year lifecycle replacements, upgrades, support personnel, and network usage costs are a substantial portion of GIS technology costs. The largest challenge is controlling the spikes in capital expenditure that are often needed to maintain systems. For example, a new data storage system may be needed, costing \$100,000, or a new data sever is needed, costing \$45,000 for the hardware and \$30,000 for the database software. Budgets are further pressured by new software releases and upgrades from your GIS vendor! How can you manage your software and hardware budget and do more with less? Consider the following:

1. *Adopt standards.*

Analysts have advocated this for years, and it is true that software operational costs can be lowered by adopting standards. Consolidating GIS systems and databases within an organization will reduce the system support costs and improve system integration.

2. *Share capital costs between departments.*

New equipment purchases can be overly costly for a single department to bear. Savings can be found by coordinating multiple departments in the sharing and funding of a server purchase.

3. *Negotiate a Software Master Purchase Agreement with your GIS vendor.*

Controlling your software costs requires efficient use of your GIS software licenses. If you are able to manage and control how your software licenses are

used and coordinate support calls to a central contact person, there is an opportunity for you to negotiate a Master Purchase Agreement with your software vendor. Generally the agreement will describe yearly software maintenance and upgrade costs as well as additional purchase costs. If you can coordinate licensing for your agency and package the terms into one agreement, there can be savings based on number of supported licenses.

4. *Lease hardware.*

To avoid capital equipment budget spikes consider leasing the hardware for three years. A three-year lease corresponds to the lifecycle of most equipment and will give you a “flatter” budget for the three years. It will also give you flexibility to change your system configuration while avoiding legacy hardware issues.

5. *Use Application Service Providers (ASP) for your public web applications.*

Generally your public GIS web applications are stable, reliable systems that could be supported by an ASP. The cost of using an ASP is typically equal to or slightly less than purchasing the equivalent server capacity. By using an ASP you can save the cost of supporting the application and server with your own staff. The ASP performs backups, installs security patches, and maintains software licenses, thus saving you from the time and money required for these tasks.

6. *Consolidate servers.*

Due to software incompatibilities and server funding mechanisms, Pierce County GIS was supporting 26 servers (Unix and NT). System support was limited, so resources were being stretched just to maintain the security patches, licenses, and upgrades on these machines. Additional server capacity was needed to upgrade to new versions of GIS software, but there would be no new support resources. Pierce County GIS had to find a way “to do more with less”. A careful review of each server’s lifecycle and maintenance costs showed that by consolidating servers the county could reduce the number of servers, improve performance and reliability, increase capacity, and reduce the maintenance workload. The configuration of the server consolidation was based on reducing the number of servers and optimizing architecture redundancy. The resulting consolidated system provides growth capacity for three years, and the annual lease cost equals the replacement/maintenance cost of the existing equipment.

Customer Service

A primary focus of Pierce County GIS's customer service is education and communication with management and staff. In a large organization this can be very time consuming. What are some good communication practices that do more with less? Consider the following:

1. Leverage status reporting to produce a newsletter.

If your staff members provide monthly status or progress reports, this information can be used to produce a monthly newsletter for distribution to your users. A newsletter can include a "Tips" section, describing ways to perform various GIS functions, helping users maintain GIS proficiency.

2. Identify centralized, knowledgeable experts for customer support

Providing excellent customer service by answering questions, providing advice and consulting on issues can take significant time. A GIS department can easily find that days are consumed by user questions and major projects suffer delays. A way to do high quality customer support with the fewest resources is to designate "GIS Experts or Super Users" in your departments who are the first to field a user question. If the question is beyond the department's expertise then a single point of contact in the GIS department can be responsible for responding with an answer. There are many benefits to a centralized method of customer support, which can include: saving time on similar questions, recognizing a global problem earlier, and lowering the ad-hoc resource demand on the GIS organization.

3. Find Partners!

Customer service is a relationship business and the more "partners" in the effort the easier the task and resources are leveraged. Examples of where partnering works well can include:

- Training – partner with local technical colleges or universities to offer GIS courses tailored to your GIS staff or users. Coordinating training with other agencies as opposed to duplicating the same course can result in more courses offered locally without additional resources.
- Technical support – partnering with other system support staff in your organization can help improve system reliability and customer service. The PC and server support staff are also part of the information system support environment and can help identify problems and solve technical issues.

Summary

Is it possible "to do more with less"? We cannot expect GIS budgets to increase in proportion to GIS use. Most likely, you have already surpassed the specifications of your original GIS feasibility study, and the continued costs of maintaining an enterprise system requires recurring budgetary defense and justification. The strategies described in this paper are both innovative and common sense. You can achieve cost savings while increasing the use of your GIS system by strategically managing database construction, applications development, hardware and software procurement, and customer service.