

The Challenges of Implementing Enterprise GIS at the City of Fort Worth

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ABSTRACT

During the past year, the City of Fort Worth, Texas has been implementing an Enterprise GIS based on ESRI's suite of software products. This paper will give an overview of the technical and administrative challenges involved in coordinating Enterprise GIS in all City Departments. Specific examples of the methodology will be shown to illustrate both the successes achieved and the lessons learned throughout the implementation process.

INTRODUCTION

The City of Fort Worth, Texas with 5,500 employees serving a population of 540,000 residents covering an incorporated area of 340 square miles has had its share of challenges. Many cities are in the process of implementing Enterprise GIS in their organizations and each will have their own unique set of challenges. Enterprise GIS implementations generally fail to meet expectations of all the stakeholders and the City of Fort Worth falls into that category. However with that said, the City has made some amazing progress with our implementation efforts over the past year and this paper looks at some of the reasons.

The paper is divided into three sections that cover most aspects of implementing Enterprise GIS in an organization. The first section - **Getting Started** covers what it will take to get going, the required support, the necessary planning and some obstacles you may face along the way. The next section - **The Building Blocks** deals with the six main components of GIS that include staff, data, software, hardware, management and applications. And finally the last section - **The Results** looks at the outcome or consequences of a successful Enterprise GIS implementation.

GETTING STARTED

Support from Senior Management

One of the key predictors of a successful Enterprise GIS implementation is the level of support the technology has from its senior decision makers. Without a long-term vision with committed financial support, most implementations will fail to meet expectations. GIS has been identified as a core competency at the City of Fort Worth and has received the requested level of funding and support over the past several years. All Cities are looking for ways to reduce expenditures in these tough economic times, however the City of Fort Worth continues to invest in GIS as a way to reduce redundant tasks, improve staff efficiency, customer service, and decision making.

Eliminating Barriers

One of the first challenges faced was giving all City departments' easy access to the latest ArcGIS software and available databases. In 2001, a small GIS group in IT was funded by the individual departments through a monthly fee paid to the ITS Department for access to a centralized file server. Departments were responsible for purchasing their individual software licenses and maintenance. Many departments therefore established their own file servers and maintained their own databases with little or no data sharing. Later in the year, the GIS Division of the IT Solutions Department was charged with the responsibility of coordinating and supporting Enterprise GIS at the City of Fort Worth. The first step was to change the funding model from a Service Fund to the General Fund thereby removing the controversial monthly fees and charges. This generated a great deal of renewed interest in the technology that resulted in the GIS user base in the City to double in less than a year. The elimination of this fee also prompted a relatively easy migration to a centralized database model based on ArcSDE and SQL Server. With agreement from all City departments and ESRI, the City transferred all single user licenses to a lesser number of concurrent licenses administered through a central license manager. These changes allowed easy access to ArcGIS software and centralized databases at no further cost to any City Department.

Establish Enterprise Direction

Prior to 2001, the City had commissioned several GIS User Needs Assessments and Implementation plans from various vendors, however the studies primarily looked at individual departmental needs with a shopping list and not with an enterprise vision. A new GIS Master plan was written by City staff to establish the City's enterprise vision and to act as the road map for GIS implementation. It includes a description of the enterprise vision with the GIS Division roles and duties clearly defined in order to set realistic expectations. Included in the plan is a description of all enterprise pilot projects. This document is distributed to all City Departments for review before acceptance and is updated annually.

Create Awareness and Improve Communication

To create better communication and a better understanding of the technology by senior decision makers, a GIS Steering Committee was established with representatives from each of the 26 City Departments. Each committee member in turn reports back to their Department Head to ensure a consistent message being presented to senior management. In addition, the elected Chair of the Committee reports on a quarterly basis to the IT Board of Directors consisting of the City Manager, Assistant City Managers and Department Heads.

Communication among the 150 GIS users in the City had been relatively effective considering the disparate nature of City departments and this was strengthened by quarterly GIS Users Group meetings, the continuation of monthly user lunches and last November the City hosted for the first time, GIS Day which turned out to be a great success.

THE BUILDING BLOCKS

Training, Education and Staff development

To improve the understanding of GIS at the City, the GIS Division has made GIS training available to Citywide GIS users. A training committee was created with members from various departments to oversee and incorporate the needs of all departments.

This committee is responsible for:

- Identifying GIS training needs
- Fielding individual training requests and arranging training courses
- Creating curriculum and training materials
- Delivering training classes

To date, this committee has trained over 100 City staff in a variety of courses including a half-day Principles of GIS class, a one-day Creating Metadata instruction and a two-day Introduction to ArcGIS class. Future courses will include instruction on Exploring the Geodatabase, and Basic GIS Tools.

As a specialized technology group in charge of implementing Enterprise GIS throughout the City, the GIS Division staff has a responsibility to their customers – all City departments to provide them with excellent technical support and to develop efficient GIS applications that integrate with their business processes. GIS and related technologies are continuously evolving with new

software versions, techniques and processes. In order to take advantage of these technological advancements, our staff requires focused training on a regular basis to continually develop their skills and abilities.

Customer Service and GIS Support

The GIS Division is fortunate to have the capabilities in-house to offer a wide range of technical support services to the City's growing customer base. It is important to set realistic service level agreements with customers so as not to over commit staff resources.

These services include:

- Production of ad hoc maps
- Trouble shooting software, hardware and data problems
- Public information requests
- Geodatabase design
- Application development
- Project management
- Custom GIS solutions
- GIS training

Develop and Maintain High Quality GIS Data

In August 2002, the GIS Division also took over responsibility for maintenance of all the City's basemap layers (street centerlines, lots, blocks, zoning etc.). This had been an elaborate process involving multiple departments and the data was being maintained in multiple formats. A new workflow process was developed that eliminated duplication of effort at the same time improving efficiencies and data quality. The new process involved streamlining the workflow based on update events such as new plat submissions, annexations or new zoning cases. New procedures were developed and individual technicians now update all affected base layers. A new QA/QC process will verify the edits in compliance with National Map Standards for 1"=200' scale mapping. Progress is reported through an on-line report that is updated daily.

Define Data Standards and Ensure Compliance

Another important factor in implementing the City's Enterprise GIS depends upon establishing, agreeing and adhering to a clear set of GIS and data standards. Standards are essential for efficient sharing of geographic data, integration among different GIS technologies and integration

with other non-GIS applications.

The GIS Division has the responsibility for developing standards that will include positional data accuracy standards based on National Map Standards. Metadata and other geospatial standards will be developed in accordance to standards set by Federal Geographic Data Committee (FGDC). These documents will be available on-line for all GIS users.

Provide a Stable and High Performing GIS Infrastructure

In March of 2003, the City of Fort Worth engaged the services of Mr. Dave Peters of ESRI to conduct a system architecture design review of our GIS implementation. The System Architecture Design process defines the technical issues associated with the design of an effective Enterprise GIS deployment with specific guidelines to support hardware and network solutions based on existing and projected needs. This one-day on-site review followed by a system design report, outlined specific recommendations for sizing ArcSDE and ArcIMS servers based on client and platform loads. It also gave configuration alternatives based on budget considerations and City security policy. This document now serves as a foundation for future planning of the City's Enterprise GIS implementation.

THE RESULTS

Create a User Friendly and Informative GIS Web Presence

One of the best ways of showing results in the early stages of an enterprise implementation is to compete several focused pilot projects using ArcIMS. It is a great way to demonstrate to senior management and potential GIS users some of the functionality of the technology. The GIS Division has developed a customized HTML viewer with all of the out-of-the-box functionality for City Intranet use and a customized ASP viewer designed for public Internet use with a user-friendly toolbar and help file.

Identify and Prioritize Enterprise projects

When the GIS Division became a General Funded entity in the IT Solutions Department, the demand for results and the interest in GIS grew dramatically. The floodgate of requests for projects and services opened immediately once Departments were no longer charged additional fees for these services. To manage these requests and to set realistic expectations, the GIS Steering Committee with representatives from each of the 26 City Departments became involved

in selecting and prioritizing all enterprise projects. The first step in the new process is for the sponsoring department to draft a standardized project charter outlining:

- Project background
- Objectives
- Benefits
- Critical Success Factors & Assumptions
- Project Timeline and Resource Requirements

The project charter is reviewed by each member, which is then presented to the GIS Steering Committee (GSC) by the sponsor. The GSC then votes on whether the project can be considered to be an enterprise project. If the majority of members agree, the project manager drafts a detailed project plan and assigns a project lead with input from all interested departments. The GSC committee then prioritizes all finalized project plans before work commences by the GIS staff. At the present time, the GIS Division is working on three enterprise projects and the GSC is considering several more projects that are in various stages of the approval process.

Integrate GIS with City Business Processes

The City of Fort Worth is looking at integrating GIS in many of its business processes and enterprise systems including records management system (RMS), permitting, customer resource management (CRM) and work order management systems. The interoperability of ArcGIS technology now allows for the integration with these technologies and systems. In addition, GIS is currently being used in many of the City's business processes that have replaced legacy systems including Computer Aided Dispatch (CAD), address verification, owner notification, platting, zoning, capital improvement bond program, water and sewer infrastructure, solid waste routing, crime incidents, redistricting and street closure permitting.

Promote your Successes

GIS professionals as a rule do not do a very good job at promoting themselves and their accomplishments. It is important however, to spend time with senior management to update them on the progress made through demonstrations and presentations. A written report and some examples of map output is not sufficient to capture the interest and attention of busy senior executives. Be creative and never show all your cards at once (remember they are busy people too) and always leave them wanting more!

CONCLUSION

Through the tremendous effort and hard work of many individuals, the City of Fort Worth has achieved a great deal of success in moving towards our goal of implementing Enterprise GIS. Although a great deal of work still remains, both the staff and management remain committed to achieving this goal.

Author Information

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