City of Las Vegas Geodatabase Design: Implementing an Enterprise Solution

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I. OVERVIEW

The City of Las Vegas spent the past year developing an enterprise-wide geodatabase design. Though the project started as a technical geodatabase design, it actually became the catalyst for moving Las Vegas into a true enterprise GIS, integrated with an extended business system. Throughout the new geodatabase design, the city used an iterative process of learning and re-thinking current business processes that resulted in more knowledgeable users, who will be better able to implement enterprise GIS in the future.

This paper highlights some of the insights and best practices that City staff developed over the course of the project. Many of these insights will be applicable to both small and large enterprises considering enterprise GIS.

II. KEY OBJECTIVES

The objectives of this project were:

- Include a variety of users and domain experts in the design process.
- Create a design to accommodate data owned by the City, also data owned by and imported from Clark County, Nevada, the larger region surrounding the City of Las Vegas.
- Allow distributed ownership and maintenance of geodatabase "layers."
- Allow robust integration with the City's enterprise tabular system, Hansen.
- Create a design which would facilitate a service-oriented architecture for the delivery of spatial information for viewing, workflow and data management.

III. CREATING THE DESIGN: BEST PRACTICES

Creating a database design for the City involved a wide array of participants: a consultant team expert in geodatabase and Hansen integration, the City IT team responsible for implementing the system, and a variety of users. A number of best practices were realized in the development of the design using Marshall's web-based GeoResults® Geodatabase Designer tool. These best practices are outlined below.

- **Change Management**

Because of the long and rich history of GIS in Southern Nevada, converting a coverage, tile-based system to a geodatabase structure required significant change; therefore change management was essential to the project's success. Introducing ideas early and getting constituents' feedback throughout the project were practices the City found effective.

- **Iterative Design Process**

A well-designed geodatabase improves the support of an agency's business processes. The team found the best way to achieve this goal was to iteratively develop the geodatabase design. This allowed the participants to gain an understanding of geodatabase design requirements, and the geodatabase designers to become familiar with the City's business processes.

- **Multiple Levels of Access**

Performance for City users had to be analyzed at several levels. The City currently has a view-only geodatabase, optimized for a large number of non-editing users. A second versioned, editable geodatabase instance was created for direct access by editors. It was optimized for data management through the use of domains, relationship classes, and topology rules.

- **ERP Integration**

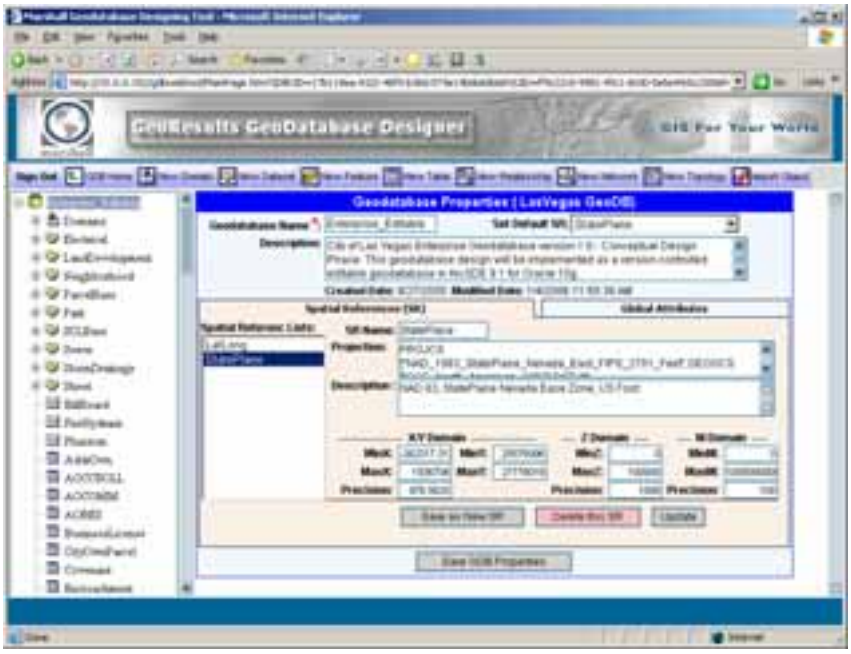
A key component to the City's design was to incorporate key fields and dependencies required for integration to Hansen. Hansen is a tabular-based ERP system used by many city departments. It was essential to design the key integration fields correctly so that Arc/Info can work like Arc/Hansen where appropriate. To do this, it is important to set up this attribute matrix between Hansen and ESRI correctly, and to maintain this matrix in the future. The team applied due diligence to this integration design step to ensure a system that would require minimal future modifications. Those attributes in Hansen to be linked to the geodatabase were identified in the GeoResults Geodatabase Designer. This tool allowed the export of the "integration matrix." This matrix will be used by the GeoResults application and GeoAdministrator in the future.

- **Top-Down Implementation**

Since a geodatabase design has many technical aspects, and seemingly a language of its own, it is important to clearly communicate with core users and managers, simply and early on, regarding what a geodatabase is and why it is being implemented. The City found that it had more success creating a high-level vision among users first, and then defining the details later in the process.

- **Multi-User Participation**

Though it is clear that allowing multiple City users to provide input to the geodatabase design is important, putting this into practice can be difficult. Marshall's web-based tool allows access by a variety of city users as well as by Marshall. This tool has an intuitive user interface for non-DBA's, and reduced the learning curve for mastering entity relationship diagrams. As the iterative design moved forward, users could easily change feature classes, domains, etc.



- **"Embedded" External Agency Data**

The City's GIS data is based on the Street Centerline and Parcel layers, which are maintained by and downloaded from Clark County as part of a Southern Nevada interlocal working group for GIS.. The design needed to accommodate the importing of data from the County and allow access to this layer, so that city-owned layers could be built on it. Also, the City needed to retain a level of independence from the external layer, in the event that the data from the County changed. Keeping track of the features dependent on the street centerline and parcel layers will help manage changes to them in the future.

IV. SUMMARY

In summary, the City established a variety of best practices for geodatabase design. These practices take into account both technical and non-technical components that are needed for successful implementation. These best practices are applicable to both large and small agencies considering designing an enterprise geodatabase.