Title: Easy Web-Based Data Editing Using ArcIMS – Indianapolis Department of Public Works

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Abstract: From addresses and ZIP Codes to coordinates and countries, the majority of data has ties to geography. However, much of our data continues to be presented in a non-geographic format, through spreadsheets and other tabular databases. We have not harnessed the potential of geographic data because of cost, ease of use, and unfamiliarity with its applications. Changing the way we create and edit data to include Geography begins at data entry, which means it must be easy for all users. Using ArcIMS, the City of Indianapolis Department of Public Works has taken GIS data editing to the front lines. All Public Works Staff members have access to create and edit geographic data with ArcIMS and ArcSDE in an easy-to-use and familiar interface, a Web browser. This paper will discuss implementing ArcIMS as a department-wide solution to creating and distributing geographic data.

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Introduction
Located in the heart of Indiana, Indianapolis is the States’ largest city. Growing at a rate of over 15% per year over the past 10 years, Indianapolis finds itself amongst similar cities trying to maintain existing services while utilizing shrinking budgets. The City of Indianapolis is home to a population of over 850,000, containing more than 350,000 tax parcels located along 3,100 miles of road.

In the spring of 2004, the City Department of Public Works (DPW) decided to track all of their Capital Improvement Projects (CIP) graphically, moving away from their Microsoft Access based system that only provided the user with text based information. By changing over to a graphically based system, users can access projects visually in a real time environment on a citywide map.

The Indianapolis Department of Public Works in conjunction with AMEC Earth and Environmental created an easy-to-use web-based CIP Project Tracking System that supports “query-only” users as well as editing “power users”. The City of Indianapolis DPW staff interactively locate, draw, and edit CIP projects, stored in ArcSDE, using an ArcIMS website. DPW staff draw and edit the geographic CIP project location on the map as part of the project data entry/edit process.

The decision to utilize a web-based application promised a number of benefits to the DPW. Because it is a web application, there would be no need to visit each desktop to install software, furthermore all data is embedded in the browser during configuration, so the users do not need to locate the datasets from the various sources.

The web interface was specifically designed to look and feel like the existing interface; this decision had resulted in decreased “learning curve”, and has resulted in a more simplified transition with minimal application training.

While easy to learn and use, the browser is flexible and powerful enough to create customized maps, and being a web-based product, it is available to any City employee with access to a computer with Internet Explorer. This increases the usage and return on investment for the data capture and system infrastructure.

In addition to editing geographic and tabular project information the CIP Project Tracking application contains numerous reporting and printing functionalities. Reports such as the “Project Overlap”, “Project Address”, and “Excluding Studies/Non-Bid” utilize tabular and geographic data make DPW staff at every level more efficient and informed. The CIP Project Tracking also contains functionality to generate mailing labels for construction notices by using
buffers to select sets of land parcels and exporting their property owner and address information
to a notification list.

In order for the website to be a valuable tool, all layers available from The City of Indianapolis GIS
Department (Geodatabase, Shapefile, and Raster) have been added to the site. With the ability
to turn layer on and off so users can create a custom view.

Search functions have been configured for all fields within the GIS layers. The most common
searches are available, such as Parcel Number, Street Name, Property Owner and Project Number. In addition to the basic searches, there are also more advanced searches. The most
used feature is the Search by Address function where the user can enter the full property address
to find a location. For power users, there are built in queries to show projects that have been
entered without a geographic location.

Along with the GIS data, the application also pulls tabular project data from an Oracle database.
The data includes items such as project manager, start and end dates, contract information;
budget tracking and location information pulled directly from the GIS layers. This data is
seamlessly joined to the spatial data to create a unified picture of the CIP data.

Technical Architecture and Performance

At the City of Indianapolis, GIS and Information Technology are centrally supported from within
the Information Technology Services Division (ITS). The CIP Project Tracking application utilizes
existing hardware, software, and expertise in ITS, such as networking, data and web servers as
well as database administration.

The CIP Project Tracking Application runs on ArcIMS 9.0 and receives Geographic data from an
ArcSDE dissemination database maintained separately from the production database, thus
allowing query-only tuning and lesser downtime. ArcSDE runs with Oracle 9i, and all data housed
in a mass storage array. Replication software is used to synchronize the warehouse with the
production database.

Figure 1.0 Current System Architecture
Users within Indianapolis DPW

Primarily DPW staff uses the CIP Project Tracking application. All internal users have the ability to edit and create projects, while some external users only have the ability to view the data. Currently there are approximately 75 daily users, however this number is expected to increase significantly as staff and other divisions become more familiar with the system. Five divisions within the City Department of Public Works will make use of the Web-GIS solution including Transportation, Environmental Engineering, Operations, and Sewer Maintenance.
Case Study – Customer Service
DPW wanted the ability for the customer service staff to be able to look up addresses citizens calling by phone. The CIP Project Tracking application gives DPW staff members the ability to quickly view any projects that are in progress around the callers address.
Case Study – Mailing List Buffer
When a new project is starting, DPW wanted an automated way to provide notice to the affected customers. With the new tool, a buffer can be used to create this notification list. The buffer area can be created about the project polygon while selecting the results from the parcel layer to provide the addresses. At the top of the results table is the option to export to Excel for use with a mail merge to create mailing labels.
Case Study – Editing Project Area

Previously there have been hardcopy maps printed that are out of date as soon as the map is printed. With the new system, the projects can be edited in real time. This can be useful if there is a project that is under budget and can be extended to make use of the extra. For example, a paving project that is under budget could be extended for another city block. With the new system, the project manager can edit the polygon to graphically represent the change in project location.
Conclusion
While the web browser is currently available through the Intranet, the City plans to obtain approval to provide Internet access with limited functionality in the near future. The CIP Project Tracking tool has added Geography to the data entry process and, more importantly, has made it easy for all users to create and edit GIS data. The City of Indianapolis, as a result, has provided their staff with a valuable tool to improve efficiency and help users make more informed and better decisions.

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