Web-based Outage Reporting Tool

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KUB Background

- Knoxville Utilities Board was created by an amendment to the Knoxville City Charter in 1939.
- As an independent agency of the City of Knoxville, KUB provides electric, gas, water, and wastewater services to more than 400,000 service points in Knoxville and parts of seven surrounding counties.
- KUB has approximately 183,000 electric customers.
- Power is generated by Tennessee Valley Authority.
What Is KGIS

Tri-party organization to promote broad sharing and integration of geographic information through standards and joint participation in systems development

City of Knoxville

KUB

Knox County

KGIS

ESRI EGUG 2004

ESRI
KGIS Enterprise Systems

Design Files

MGE
FRAMME
Oracle 8i

GIS Maintenance System

Translate every 2 weeks

SDE External
SDE Internal

ArcIMS
ArcIMS

Public
Network Users

Asset Management

CIS
KUB Systems

OMS & Mobile Workforce Mgmt
Project

- Need to report electric outages over web for public and media.
- Information will be updated every 15 minutes
- Need to summarize by geographic area such as zip codes
Solutions

- Pdf generation of Map – common to websites and vector based, but unable to add addition data as user zooms in.
- Flash Map – High quality interactive graphics, specialized programming
- ArcIMS – interactive mapping software, can use existing graphics for map backdrop. Can add additional data as user zooms in on map.
- SVG – scaled-down version of Flash that is text file based and requires special programming
## Solution Matrix

<table>
<thead>
<tr>
<th></th>
<th>Download Fast</th>
<th>Map back drop easily updated</th>
<th>Hide and show data at different zoom levels</th>
<th>Developer staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDF</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Flash</td>
<td>N</td>
<td>N</td>
<td>Complicated</td>
<td>N</td>
</tr>
<tr>
<td>ArcIMS</td>
<td>N*</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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</tr>
</tbody>
</table>

* Initial download of standard product is slow.
ArcIMS Solution

- Scheduled job writes x, y, and number customers out per outage device.
- FME used to create geometry and determine zip code while writing data to ArcSDE.
- SQL scripts used to populated summary tables for web pages
- SDE commands used to rename layers. Feature class name contains “New” suffix and existing renamed with “Old” suffix to minimize transition time.
- The maps are generated on KGIS web server and wrapped in iframe tags on the KUB web server.
Initial Display
Adjusting Ranges

Ranges that work in low outages may Overload map image during a major storm event.

Some websites only report outages of 50 or more to minimize number of dots on maps.
Dynamic Data Addition

- As the user zooms, additional data can be added, such as zip code boundaries, neighborhoods, and points of interest.
- The level to which the user can zoom in can be controlled to avoid building identification during outages for security.
Time Issue

• Getting real time of data extract.
  » Data extracted from primary Server every 15 minutes.
  » Upload runs every 15 minutes.
  » Resulting in possible 30 minute delay in posting data.

• Time stamp was written to file and short Microsoft VB6 app written to push time to database tables.

• The time format: 20041004110209
  » YYYYMMDDHHMiSS
  » Year, month, day, hours, minutes, seconds
County Summary

- Since Zip code overlap counties and portions of Five counties are covered by electric services.
- Added County analysis to FME and each point is given a new attribute.
- Modification to SQL scripts to populate a summary table.
- Customers by county must be run once per month.
Archive Storms

Enhancement #1
Archive data for replay of storm events.

- Wrote custom Microsoft vb.net application that calls ArcIMS and write initial image to folder on internal server.
- File name has timestamp within name.
- Modified SQL scripts to track all points in Archive table.
- Wrote simple Visual basic app to show slideshow of last 24 hours which became enhancement #2.
Pros and Cons

Problems
- Many dependant steps
  - Four servers involved in data updates.
  - Dots may overlap if in close proximity.
- Need ArcIMS, ArcSDE, FME licenses and developers which is costs more than PDF output.

Advantages
- Biggest advantage is leveraging existing data and staff knowledge
  - News roads are displayed without editing application.
  - Political boundary changes automatically displayed.
  - Ability zoom in and display additional data.
  - Control how far a user may zoom in for customer security.
Questions

KGIS Supported websites

www.kgis.org
www.kub.org

http://www.waterqualityforum.org/asp/watershed.asp
http://www.ci.knoxville.tn.us/engineering/civil/surveypoints.asp