**Using GIS Server to Disseminate Transit Asset and Planning Information**

Brad Thompson and Hersh Singh

Regional Transportation Authority

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**Abstract**

Utilizing the latest in web-based mapping software, Planning staff at the RTA have developed web-based mapping applications that provide staff and the public with access to various data sets as well as the ability to perform geospatial analysis. The utility of the new software platform includes its interactive functionality, the ability to provide non-GIS users with access to geo-spatial information / analytical tools, and the ability to disseminate data sets in an enterprise format.

The authors’ have developed numerous mapping applications associated with, but not limited to, the following topics: Transit Oriented Development (TOD), Bus Rapid Transit (BRT) / Transit Signal Priority (TSP), Demographics, ADA Certification Assignment, and Political Jurisdictions. These mapping applications assist in the decision making process and the visual interpretation of a diverse array data sets. This poster session will demonstrate several of these applications and include insight on the technology based on the authors’ experiences.

**Introduction**

As the planning and oversight agency for three service boards (Chicago Transit Authority, Metra, and Pace Suburban Bus) the Regional Transportation Authority (RTA) warehouses planning and financial information on the transit system in northeastern Illinois area surrounding Chicago on the Regional Transportation Authority Mapping and Statistics website known as RTAMS. In the last few years the Environmental Systems Research Institute (ESRI) has made significant advances in web mapping technology by developing the ability to share and interact with geospatial information via the internet using ArcGIS Server software. These advances have allowed staff at the RTA to spatially map and perform geospatial analysis of various tabular datasets and share web based mapping applications.

**GIS Server**

ArcGIS Server is the currently the primary server/web based software developed by ESRI. ArcGIS Server allows users to manage web services in an enterprise environment and create mapping applications served via the internet. Traditional GIS shapefiles and geodatabases can now be managed and disseminated in a web based environment utilizing ArcGIS Server’s enterprise data management interface software ArcGIS Server Manager. The benefit of utilizing ArcGIS Server technology lies in the ability to share accurate, up-to-date geographic, centrally located information within and outside of an organization and with non-GIS users and GIS users alike. Agencies now have the ability to disseminate centrally managed information via the web instead of having to share shapefiles which often become out of date. In addition, by serving geospatial information on the web users are able to interact with the data allowing for user defined scaling, queries, and other functionalities which would not be possible utilizing hard copy, fixed scale paper maps.

Another benefit of utilizing ArcGIS Server is the ability to not only utilize your own GIS Server content but to incorporate other geospatial information into custom applications via web mapping services (WMS) and keyhole markup language (KML). The predecessor of ArcGIS Server, ArcIMS, is a stand along application and allows only for geospatial information to be served on the web for data viewing purposes only. ArcGIS Server software is more robust, allows for the user to interact with the data, and is aesthetically superior allowing for the utilization of various free basemaps including Bing Maps.

**RTA Software Architecture**

The RTA is currently utilizing ArcGIS Server 10 for the Java Platform 9. The data is housed in an Oracle 11g database using ArcSDE 10.0. Platform:  x86\_64 GNU/Linux  Red Hat 5.8 kernel: 2.6.18-308.4.1.el5

**ArcGIS Viewer for Flex**

The ArcGIS Viewer for Flex is a free client based software application available from ESRI. The ArcGIS Viewer for Flex is an out of the box configurable web application that allows developers to easily add and customize content and tools without extensive programming. By simply utilizing the default configuration the application allows developers to serve geospatial web content in a formatted website that includes a variety of different widgets and functionalities. Developers can extend the functionality of the application by customizing the included default widgets, creating custom widgets, and by utilizing free widgets developed by the ESRI community.

These widgets and tools include:

D***efault Widgets***

* Bookmarks - Pre-determined spatial extents. Widget allows for additional bookmarks created by the user.
* Search – User can enter text that is used to search text in attribute table. Search also allows interactive search by user defined graphics and parameters.
* Address Locator – Tool geo-codes the location of an address (or intersection) entered by the user. Includes a confidence rating on the geo-coded result (high, medium, low)
* Draw / Measure – Users can measure areas and distances. Also, users can add text and shape graphics.
* Print – Print function allows user to add a title and subtitle to the map.

***Additional Useful Widgets used at RTA***

* + Legend - Displays and describes the symbology used in the map application.
  + Google Street View – Provides Google aerial and Street View imagery where available.
  + Heat Map – Provides users the ability to create raster-based density layers based on selected data sets. Raster datasets are re-generated at each different zoom level.
  + Routing – Users can enter exact origin / destination addresses, intersections or manually add points. The tool provides turn by turn directions and travel times.
  + Export – Users can export the current extent of the map and save it as a .jpg image.

**Interactive Mapping Applications**

Since installing ArcGIS Server software and incorporating the ArcGIS Viewer for Flex, the RTA has deployed numerous web-based mapping applications for internal and external use. Examples include:

***External Applications***

Transit Oriented Development (TOD) Study locations**:**

This application currently identifies over 90 locations of RTA managed TOD studies. Locations are rendered by color based on the study status; a) completed, b) in progress and c) proposed. Users can click on a study location to identify additional information including: study title, funding grantee, funding source(s), current activities, and the RTA program year.

Inter - Agency Signage Locations:

This application identifies the locations where the RTA is demonstrating Inter-Agency signage. The locations are rendered according to the status of the signs - Underway, Phase II, and Proposed. Users can click on a project location to identify which transit agencies serve the location.

RTA Regional Transit Index:

This application displays a combination of demographics that are indicators of an area's potential to generate local transit trips, based on transit trip rates in the Chicago region. The combined index is displayed at the CMAP zone level and does not include factors such as pedestrian networks or drive access to a transit stop.

Regional Demographics:

This application displays demographic information developed by Environmental Systems Research Institute (ESRI) which is derived from the 2010 U.S. Census. The data is displayed at several different geographies based on the users zoom level. The data is managed and served by ESRI's Online Data Service.

***Internal Applications***

ADA - Facility Assignment Tool:

This application is a tool used for re- assigning potential ADA paratransit riders within a zip code to the next nearest ADA interview site. For example, when times at interview facilities become excessive the RTA needs to reduce the number of interviewees. This tool assists RTA staff by determining the next closest facility and providing turn by turn directions.

ADA - Address / Service Area Finder Tool:

This application is a tool used by RTA staff for determining if a potential rider lives within a ¾ mi. buffer of current fixed route bus service. The user enters an address into an automated geo-coder. The tool zooms to the address entered. If the location falls within the ¾ mile area, the rider meets the qualification.

RTA Transit Benefits Viewer:

The RTA Transit Benefit Fare Program helps employees and employers save money on transit. This application is used by RTA staff to manage the locations and other information regarding employers participating in the RTA managed Transit Benefits program. It is also used to identify potential enrollees to the program based on existing participants.

**Conclusion**

ArcGIS Server has allowed staff at the RTA to disseminate various geospatial datasets and helped achieve an enterprise data warehouse. By utilizing the internet, GIS analysis is now able to reach a wider audience and the power of geospatial analysis is further becoming realized.