

Moving from Client-based to Web-based GIS Mapping improves workflow at Greater Cincinnati Water Works

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The Greater Cincinnati Water Works (GCWW) has been using GIS since 1989. Over these 22 years, they have managed to stay abreast of the rapid changes and expansions of GIS as it applies to many different facets of water utilities. The latest change has been the development of a fully functional, interactive web-based GIS platform. With web-based mapping, there is no longer the need for regular updating and maintenance of the GIS on individual workstations. And with over 100 GIS workstations at GCWW, responding to and solving functional GIS problems is greatly reduced.

GCWW works closely with the Cincinnati Area Geographic Information System consortium (CAGIS). This consortium provides GIS services for departments in Hamilton County, the City of Cincinnati as well as municipalities throughout the Greater Cincinnati area. CAGIS went live with a web-based county wide GIS interface in January of 2010 (Figure 1). This provided a base for which all consortium members could use to build or expand their own GIS layers and their respective attribute information.

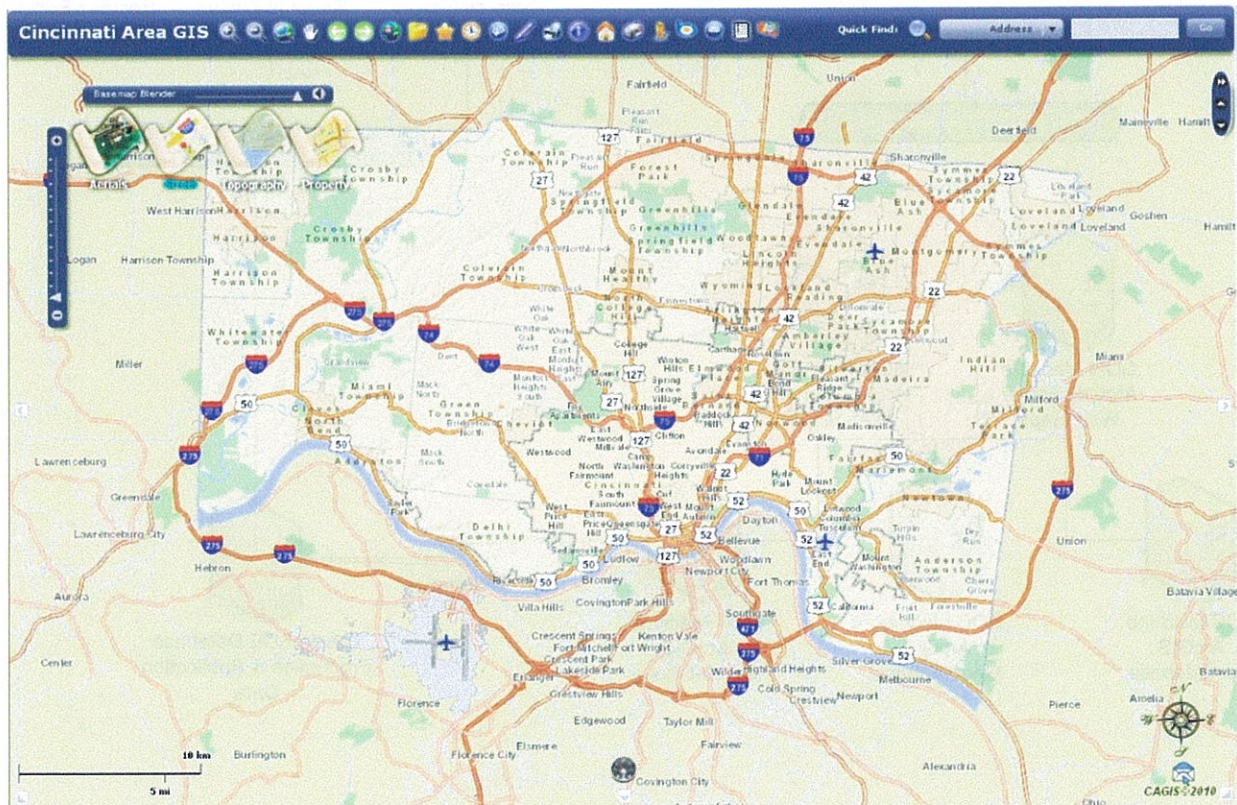
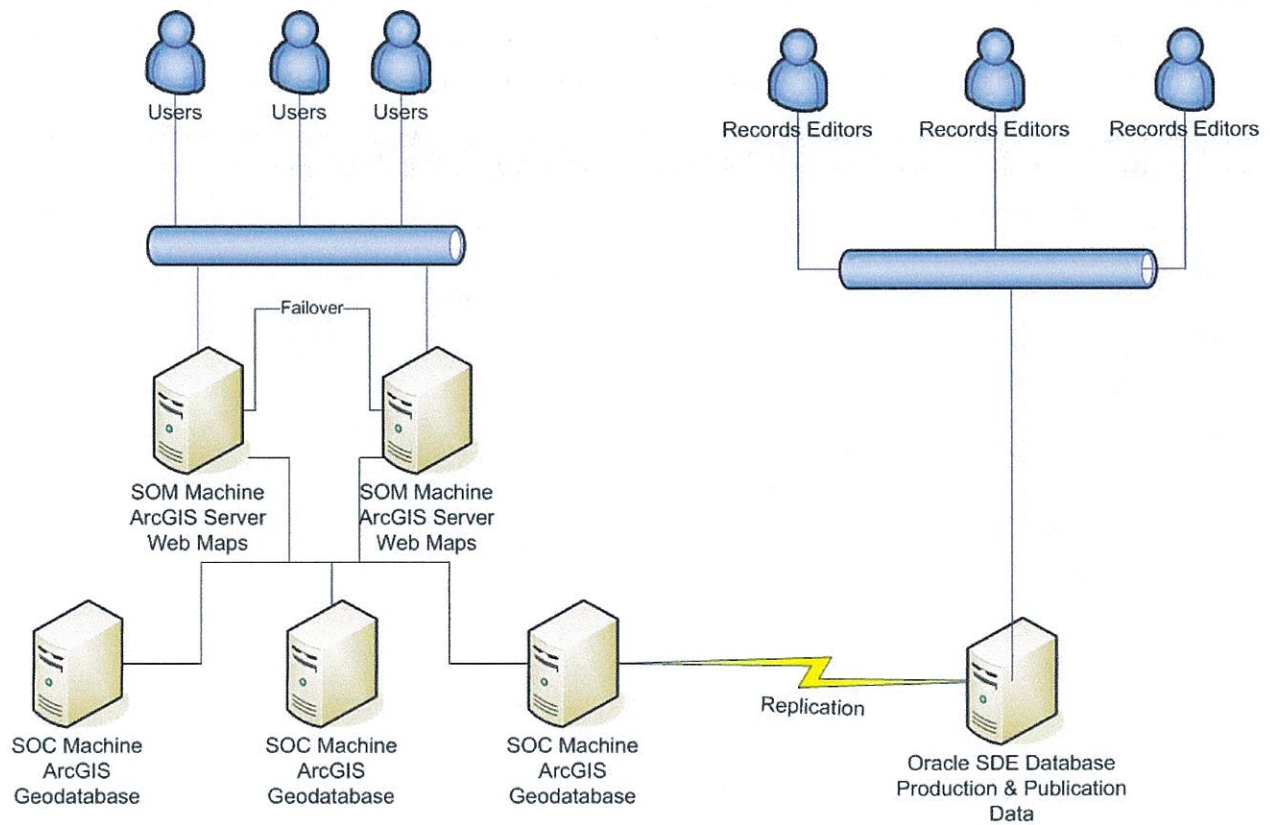


Figure 1. View of the Cincinnati Area Geographic Information System (CAGIS) homepage.

The front end interface was developed using Adobe FLEX API, Adobe FLEX Builder IDE with MXML and ActionScript and ArcGIS Server web services. GCWW is currently migrating all of the water data over to this web-based interactive map. When completed, users will be able to see all water main data throughout the service area along with, Facilities, Hydrants, Branches, Valves, Fittings, Critical need customers, Premises and Capital project areas as an overlay of CAGIS, aerial photography, topography, and planimetric tiled layers.

The back end of this system supports these web maps, and potentially 100 or more internal users. It is a distributed environment involving five servers. These five servers consist of two ArcGIS Server Object Manager (SOM) machines and three ArcGIS Server Object Container (SOC) Machines. The SOM machines are “Server Managers” that handle all incoming requests. They manage the SOC machines and off load all processing to the three SOC machines. The SOC machines are the work horses. All data is stored on the SOC machines in ESRI’s File Geodatabase format (FGDB). The FGDB exists on all three machines and each FGDB houses GCWW’s water data and other planimetric data. The data in each FGDB is replicated from our production Oracle database. The SOC machines spawn processes for each request generated from the SOM. These processes that spawn perform the work to provide data back to the map. This created a distributed environment that provides processing power, data redundancy, and fail protection.



One of the problems faced by the GIS users at GCWW was the increased complexity of the GIS as it evolved over time. Figures 2a and 2b show the old and new interface when using the zoom tool to locate a specific water service area. The new version made the process much more user friendly by eliminating the display of all the layers, tools and options that were formally on one window. With the new web-based version, tools and options relevant to a user's requested function are displayed inside the "widget" or window that pops up when a tool is selected from the main tool bar across the top of the main page.

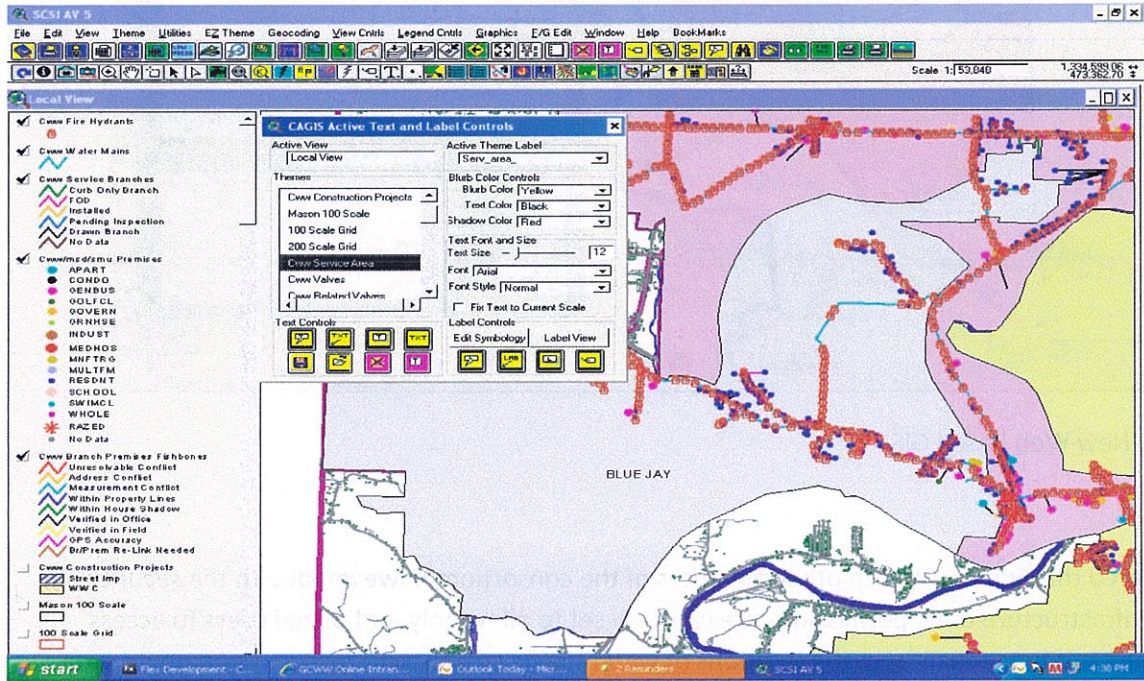


Figure 2a. Old Client based GIS

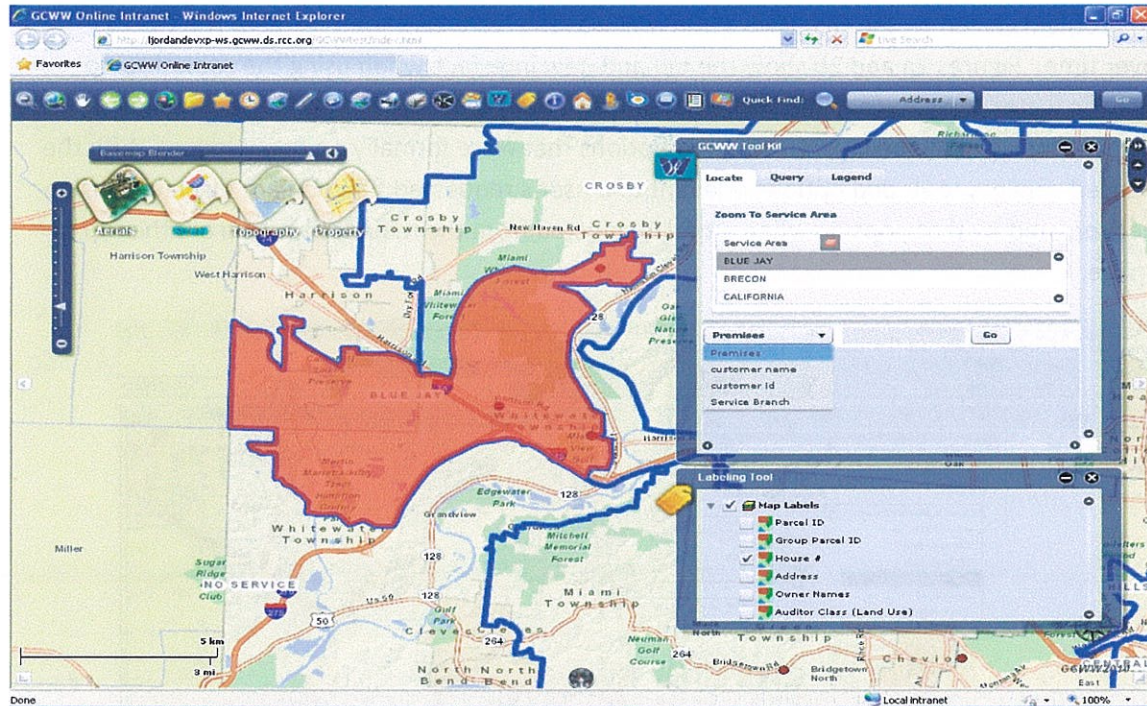


Figure 2b. New Web based GIS

Data is shared through CAGIS with other members of the consortium however, due to the security of sensitive infrastructure data, permissions are carefully set to allow only authorized users to access certain tools and functionality i.e. the locations of water mains and all their respective attribute data such as flow rates, pressure, pump station statistics etc. will only be available to GCWW engineers and distribution/supply personnel.

GCWW's move from client-based to web-based GIS services has increased production for current users and has made inroads for new people to learn the system due to its user friendliness. The fact that it is now web-based allows easy access for users limited to a web connection. Field personnel with laptops can access it with a simple wireless connection.

An interactive web-based GIS service eliminates a huge portion of maintenance and troubleshooting normally done with local client-based services. The future time and labor hours saved by moving in this direction can be significant, especially if the organization is responsible for hundreds of client workstations. One measure of the Return On Investment (ROI) can be realized in just a few months after deployment of the web-based service by measuring the reduction of the time spent on maintenance and updates to client workstations.

Keith Wempe and Lorraine Jordan of GCWW contributed to this article

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