

Leveraging Standardized Browser Technologies to Enhance Server Mapping Systems

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Introduction

Organizations with established ArcIMS solutions often desire to extend the client-side functionality of their systems without a major investment in system redesign. The use of client-side technologies such as Ajax and CSS in simple, creative ways, combined with modifications to server-side processes, can breathe new life into an application and generate new excitement for GIS in the organization at a minimal cost. DRH sought to redesign the front-end of its Reproductive Health Atlas with these principals in mind. The goals were to simplify the existing interface, add new functionality, and create a more responsive query system. These changes should be implemented such that future functionality and new datasets could be added in a predictable, standardized fashion.

Technology Summary

The following technologies were implemented in this solution:

CSS

Highlight map features on-the-fly on the browser.

AJAX.NET Library

The AJAX.NET library is a mature, open-source component that allows for AJAX implementation with very little knowledge of the mechanics behind it. It allows server-side classes to be invoked through JavaScript on a browser.

ArcIMS

Mapping engine.

ASP.NET

Development platform

ASPChart

Free charting component

HTML

HTML Image maps are created dynamically by the web service to allow client events to be fired based on the cursors position on the map. Image maps are created that trace the outlines of polygon features and define boxes around point features. Events fired from these tags may invoke DHTML functions, or initiate Ajax requests back to the server.

JavaScript

Calls server-side functions with the Ajax.NET library.

Application Architecture

Server-side AJAX-enabled class – AjaxFunctions

All functions called from the client are found in this class. This class must be registered with the Ajax.NET library in the Page_Load event of the ASPX page. Functions that reside here perform tasks such as calling the ID function of the webservice, updating the charting components, and updating text.

Dynamic HTML Image Maps

HTML image maps provide an excellent mechanism to “hook” events on the client to AJAX-initiated server-side processes. Each AREA tag of the image map contains coordinate information for a feature in that layer, and calls to JavaScript functions to fire callbacks to the server through AJAX.

Eliminating Interop performance issues.

Image map creation begins with an AXL GETIMAGEREQUEST is issued to retrieve the geometry for the selected features. For polygon layers, all vertices are converted from map to page coordinates and used to build a POLY value for the AREA tag. For point layers, a square is calculated for each point and used to build a RECT value for the AREA tag. Due to CLR Iinterop performance issues, all references to the ActiveX connector were removed from this process. The first version used the ActiveX Connector’s FromMapPt function as well as other ActiveX classes. The resulting code took over 4 minutes to process all Georgia counties. When the code was re-written without the ActiveX connector references, the processing time was reduced to 12 seconds.

Each AREA tag has OnMouseOver and OnMouseOut events defined for it. The functions fire AJAX calls to the server.

The results of this processing is used to build an image map that is included in the mapreturn object.

JavaScript Library

The functions in this library provide services in two areas. First, they manage Ajax callbacks to the server from the browser. Second, they control through CSS and DHTML on-the-fly highlighting on the map.

Results

The result was a more responsive application with fewer clicks required to accomplish core tasks, such as map creation.