Microsoft Web Platform
Customer Solution Case Study

City Government Raises Staff Productivity and Taxpayer Value with Mapping Solution

Overview

Country or Region: United States
Industry: Government–Municipal

Customer Profile
Hudson, Ohio, is a city of 23,500 people located in northeastern Ohio. It is served by a municipal government with a long-standing commitment to using GIS mapping technology.

Business Situation
The city found that the Web-based GIS solution it had launched in 2003 had become labor-intensive to maintain.

Solution
The city revamped the design of the solution and implemented a flexible and highly accessible user experience based on Microsoft Silverlight 3 and ESRI ArcGIS Server.

Benefits

- Rapid adaptation for developers, resulting in early productivity
- Ease of access and use by staff and citizens
- Enhanced citizen confidence in government services
- A foundation for continuing improvements

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Paul Leedham, GIS Manager and Database Administrator, City of Hudson

Since 2003, the municipal government of Hudson, Ohio, has used GIS mapping technology originally based on an early version of ESRI software to better serve citizens. As the city's GIS solution grew, however, it became difficult to maintain. To address this challenge and enhance flexibility and functionality, the city decided to rewrite the solution. After evaluating Microsoft Silverlight 3, Adobe Flex, and other products, the city selected Silverlight for the project, along with ESRI ArcGIS Server, and started by creating new applications for sewer management and work order management. By using Silverlight, the city's software developers took advantage of their existing skills and experience in Microsoft technologies to begin work right away, and released applications that are engaging staff members and citizens alike, thereby enhancing productivity and optimizing taxpayer dollars.

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Situation

Founded in the early nineteenth century, Hudson, Ohio, is part of the greater metropolitan area of Cleveland and today has a population of more than 23,500. Citizens of Hudson are served by a municipal government that employs just over 150 people, three of whom are responsible for providing Web-based mapping services of the kind more commonly found in cities with much larger municipal operations.

As Paul Leedham, GIS Manager and Database Administrator, City of Hudson, explains, his office began its GIS work in 2003 by building and deploying an intranet solution based on ArcIMS GIS technology from ESRI, a solution that helped the city respond successfully to major floods just months after deployment. Over the years, the city used Microsoft .NET Framework technologies to add enhancements and specialized functionality to the solution, including a database of text, graphics, and video related to sewer and storm-water systems.

In 2005, the city made the solution available publicly, so that citizens could access it without having to take the time to visit a municipal office. Subsequently, the city expanded the solution to include large and rapidly growing data sets and applications focusing on public works, finance, utilities, the police department, roads, and other city services.

With the expansion of the GIS solution, however, came challenges for Leedham and his colleagues. "We needed to keep the solution up-to-date to help maintain transparency into local government services," he says. "But the more powerful and functional we made the solution—and even as it was helping the city save thousands of dollars yearly on the delivery of routine services—the more complex and costly it was to maintain. This was particularly the case as we added layer after layer of increasingly voluminous data sets. Clearly, we needed a new approach."

Solution

Leedham and his colleagues decided to move away from a design strategy based on a monolithic application and focus instead on developing separate, specialized applications united through a flexible and highly accessible user interface. After evaluating Microsoft Silverlight browser technology, Adobe Flex, and other technologies, they selected Silverlight, in addition to ESRI ArcGIS Server and ArcGIS API for Microsoft Silverlight/WPF, for the project.

Leedham cites two primary factors that led to the decision, the first being performance. "In a head-to-head comparison of Silverlight and Adobe Flex, we much preferred the way that Silverlight renders images," he says. "We found that through the antialiasing technology it uses, Silverlight provides a far smoother visual experience as a user zooms or pans."

The second factor that led Leedham and his colleagues to Silverlight was familiarity with the technology. "We felt that as developers we could come up to speed far more easily on Silverlight than on Adobe Flex," he says. "This is because of our existing skill set and considerable experience with the Microsoft .NET Framework, Microsoft Visual Studio, and other Microsoft development tools."

Leedham and his team began revamping the GIS solution by working on applications for sewer management and work order management. In the sewer management application, the city provides access to more than 150 gigabytes of video stored on a central server, enabling users to learn the location of and other details about a

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given sewer problem. In the work order management application, the city provides mapping data that is refreshed every 30 minutes, giving staff and citizens near-real-time updates on the location, type, and status of any one of nearly 150 work requests that are typically open at any time.

As Leedham explains, the sewer and work order management applications have been available through the city's GIS solution for the better part of a decade, and they continue to rely on ESRI software for mapping and analysis of geospatial data. But since they have been redeployed with ESRI ArcGIS Server and a Silverlight-based presentation layer, they are hardly recognizable as the same applications.

"Using Silverlight, we implemented collapsible panels for streaming video so that users can maximize either the video or the mapping portion of the applications with ease and filter information by adjusting maps with respect to time," Leedham says. "Users can also display information much faster now that pan and zoom processing are all done on the client, instead of requiring server-level processing through Web service calls, as was done in the prior solution."

Benefits

Leedham applauds his team's decision to use Silverlight for enhancing the GIS solution and points to benefits of that decision in three specific areas: staff and consultant productivity, greater transparency into local government services, and the ability to make ongoing enhancements to the solution.

Efficiency in Development and Use

By using Silverlight to revamp the GIS solution, City of Hudson developers worked far more efficiently than they would have using another technology because they were able to use their existing skills with the .NET Framework. "Had we used Adobe Flex or any other technology requiring us to learn new programming tools, it would have been days or more before we were truly productive," Leedham says. "By using Silverlight, we got down to serious work in just a few hours."

Developers worked just as efficiently throughout the endeavor, Leedham adds. "With Silverlight, it was easy to tackle this kind of project because of the tool sets and expertise available from Microsoft and the larger Microsoft community," he says.

Leedham's impressions are shared by David Martinez, Product Marketing Manager for Developer Products at ESRI. "When Silverlight was released, we found it quick and efficient for creating new concepts and prototypes, and this led us to create ArcGIS API for Microsoft Silverlight/WPF," he explains. "Now we have a framework for deploying new controls and capabilities within the API, and we are adding new functionality with each release of Silverlight."

Now that the enhancements are deployed, the productivity advantages of Silverlight are extending to many municipal employees besides the GIS developers, as well as the outside consultants with whom municipal employees collaborate.

"By having a GIS solution with a more responsive user interface, staff members can access the information they need for more intelligent strategic decisions," Leedham says. "For example, anyone who needs to study a sewer segment for a repair or upgrade can simply download a copy of a video to their PC. This saves the time and cost of having to burn DVDs and deliver them to consultants, as we did in the past."

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David Martinez, Product Marketing Manager for Developer Products, ESRI

In the City of Hudson Work Order Request System, part of the city's work order management solution, developers used Silverlight 3 to implement a user interface that simplifies access and understanding.

Transparency into Government Services

Whether it is a more productive working environment for developers and other city staff or more efficient collaboration with consultants, the City of Hudson is using the new GIS solution to deliver a higher return on investment to taxpaying citizens. The city is also enabling citizens to access more information, more easily, regarding the day-to-day activities of their municipal government.

"Combining Silverlight and ESRI software with geospatial data gives citizens an effective way to engage with their municipal government," Martinez points out. "For instance, someone might spot a damaged fire hydrant on the street; now they can go to the site, easily find the map showing the damaged hydrant, and enter a note informing the appropriate city staff that it needs repair."

As Leedham elaborates, citizens can use the solution to access information in a very direct manner. "Because of the responsiveness of the user interface, citizens are enjoying an entirely different experience," Leedham says. "This is the kind of thing that lends a greater transparency into local government services."

"A Paradigm Shift"

As Leedham is careful to note, the sewer management and work order management applications are only the beginning of the work that he and his colleagues are doing on the city's GIS solution—work he expects to go smoothly thanks to a design decision they made early on.

"Using Silverlight, we developed a universal template that we can adapt to create highly customized applications for various situations," Leedham explains. "This will simplify the development of single-focus applications to serve the needs of specific user populations. Compared with the approach we took in the past, it's a paradigm shift for the City of Hudson."

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