URISA Exemplary Systems in Governments (ESIG™) Award Application

Richmond’s Data Extract Tool
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A. System

1. Name of system and ESIG™ category:
   Name of system: Richmond’s Data Extract Tool
   Category: Single Process System

2. Authorization letter from executive administrator:
   See Appendix A.

3. Summary:
   Historically, retrieving data from the City’s various databases was a long, labour intensive manual process. Richmond’s Data Extract Tool automates this process, reducing the amount of staff time required to process data requests by approximately 90%. Additionally, it improves the consistency of retrieved data and reduces turnaround time for data requests by up to 99%. The combination of a new FME Server and Safe Software’s FME (Feature Manipulation Engine) Desktop allowed Richmond to create an automation that used the FME Server and ArcMap to achieve these efficiencies.

   An extension in ArcMap was created to act as a front end and a user interface tied to ArcMap and ArcObjects was created using VB.NET. This interface collects the data request parameters and formulates the FME Server request. Once the FME Server processes the request an email with a hyperlink for downloading the result is sent to the user. A quality control process is applied to the resulting data file and the data file is sent to the client.

   Future expansion of Richmond’s Data Extract Tool will likely include a web-based self-serve system that will allow the public to request and download data without engaging a staff member.

4. User testimonials:
   See Appendix B.

B. Jurisdiction

1. Name of jurisdiction:
   City of Richmond

2. Population served by the organization:
   2014 population is 207,000

3. Annual total budget for jurisdiction:
   $874,801,000 (For 2014)
4. **Name, title, and address of chief elected and/or appointed official**
Malcolm Brodie  
Mayor, City of Richmond  
Mayor’s Office  
6911 No.3 Road  
Richmond, British Columbia  
V6Y 2C1 Canada

5. **Name, title, address, telephone, FAX, and email for contact person for system.**
Wilfred Batke  
Mapping Technologist  
City of Richmond  
Engineering & Public Works  
6911 No.3 Road  
Richmond, British Columbia  
V6Y 2C1 Canada  
Tel: 604-276-4174  
Fax: 604-276-4197  
wbatke@richmond.ca

**C. System Design**

1. **What motivated the system development?**
The City of Richmond receives a significant number of requests for digital data extracts from our GIS system for use in a wide variety of projects. This extraction process had previously been a manual process consisting of many steps. This tool improved this labour intensive process.

2. **What specific service or services was the system intended to improve?**
This tool automates the process of extracting data from Richmond’s GIS databases.

3. **What, if any, unexpected benefits did you achieve?**
The magnitude of the staff time reduction was much greater than was anticipated. The level of automation achieved was much higher than expected which resulted in a larger reduction in staff time required to process each request as well as a better than expected turnaround time benefit.

4. **What system design problems were encountered?**
The biggest challenge was the wide variety of data formats and information needs. The City receives data requests from a variety of stakeholders requesting various data formats.

5. **What differentiates this system from other similar systems?**
There are no similar systems that allow customized data extracts from our databases. Previously, GIS staff manually extracted requested data from the databases, processed the extracted data and converted it to the requested format.
D. Implementation

1. What phases did you go through in developing in the system?
The phases in developing the system were:
   - Execute procedure manually and document steps;
   - Create a basic FME script to demonstrate procedure automation in a single user environment. (FME Desktop);
   - Refine and expand script to include all required data subjects;
   - Add variable user inputs and outputs;
   - Move script into a multi user environment (FME Server);
   - Create a user friendly interface in ArcMap (Custom ArcMap Extension); and
   - Repeat design cycle (Analyze, Refine, Test and Deploy).

2. Were there any modifications to the original system design? Why? What?
There have been constant improvements and enhancements. Originally, this tool was limited to one task and it was running on one computer. Over time, it evolved to provide the user with options that makes it more versatile, such as running on the network and using a multi-user environment (FME Server). Another improvement from the original system was a user friendly interface in ArcMap which improved usability. The process for improving the system is ongoing to meet the evolving requirements of users.

E. Organizational Impact

1. What user community does the system serve and how?
This tool is designed specifically for City Staff to process data requests from clients, but future expansion could make it available for public as an easy-to-use tool for extracting data.

2. What are the ultimate decisions/operations/service being affected? If appropriate, provide a few examples including, but not limited to: screen input/output forms, paper products, or other descriptive graphics.

For the City of Richmond, the Data Extract Tool is being used to respond to data requests in a fast and efficient way, in a standardized format. Following steps explain how to submit a data request:
Step 1: Draw a rectangle for area of interest in ArcMap: (Red Line)

Step 2: Run the Data Extract Tool in ArcMap:

Step 3: Select the requested layers and output file format on the form, and provide an email address.
Step 4:
The FME Server processes the request and sends an email indicating success or failure and a link to download requested data.

Step 5:
Quality control by the user, followed by sending the requested data to the client.

3. **What were the quantitative and qualitative impacts of the system?**
This tool improved the consistency of data request outputs. The resulting data is created in a consistent manner and with the same steps. Once the initial request has been submitted, the entire process is automated and therefore requires no further attention until it has been completed.

4. **What effect has the system had on productivity?**
This tool simplified the process significantly by automating the procedure and freed up resources for other tasks. The staff time required to process a data request has been reduced by approximately 90%.

5. **What, if any, other impacts has the system had?**
This task can now be performed by less experienced staff without sacrificing quality or integrity of the data.

6. **How did the system change the way business is conducted with and/or service delivered to clients? Give specific examples comparing the old way with new.**
For example, Sanitary Sewer can have up to twenty layers. Using old system, each of these layers would have to be dealt individually, and other subjects must be treated in the same way. This new tool automates all steps while maintaining consistent and reliable outputs.

**F. System Resources**

1. **What are the system’s primary hardware components? Give a brief list or description of the hardware configuration supporting system.**
The system includes:
- A server that hosts the FME server;
- Second server that host the Enterprise ArcSDE database; and
- A Windows desktop computer with a network connection to both servers.

2. **What are the system’s primary software components? Describe the primary software and, if a commercial package, any customizations required for the system.**
The primary software components are:
- ArcSDE which houses out source GIS data;
- FME Server which accepts the data requests and executes the work;
- ArcGIS Desktop to house the Custom Extension; and
- The Custom Extension itself which was designed in house using MS Visual Basic dot Net.
3. **What data does the system work with? List and briefly describe the database(s).**

This tool works with Richmond’s in-house databases:
- Oracle;
- SQL Server; and
- MS Access.

These databases contain the following datasets:
- Aerial Photos in TIF or JPG format
- Cadastral
- Drainage
- Sanitary Sewer
- Water
- Right of Ways
- Street Lightings

The output can be:
- AutoCAD;
- Shapefile; or
- Geodatabase.

4. **What staff resources were required to implement the system? (i.e., report approximate staff and consultant time as FTE’s)**

Staff resources required to implement the system were one GIS staff to develop FME scripts and design GUI for automation in a single user environment, and one IT staff to expand the tool to send requests to FME Server and utilize the tool in a multi-user environment.

5. **Comment on anything unusual about the resources used to develop your system, such as data, software, personnel and financing.**

The development of Richmond’s Data Extract Tool was completed using existing software, hardware, and staff resources, so no additional costs were incurred for developing this new tool.
Appendix A: Authorization Letter
April 4, 2014

2014 URISA ESIG™ Award Committee
701 Lee St, Suite 680
Des Plaines, IL 60016

Dear URISA ESIG Award Committee:

Re: 2014 ESIG Award Application for Richmond's Data Extract Tool

On behalf of the City of Richmond, I am pleased to submit Richmond’s Data Extract Tool as a candidate for the 2014 URISA Exemplary Systems in Government Award under the Single Process Systems category.

Richmond’s Data Extract Tool was developed to improve the process of retrieving requested data from multiple databases. Previously, this process was labour intensive and could take up to 2 weeks. Richmond’s Data Extract Tool reduced this period to a few minutes.

The Data Extract Tool utilizes a user friendly interface and automates the process of retrieving and processing data requests. Richmond’s Data Extract Tool has also improved the consistency and reliability of results.

Please contact me directly if you have any question regarding this submission.

Yours truly,

[Signature]

John Irving, P.Eng. MPA
Director, Engineering

Jl:yjd
Appendix B: User Testimonials

At present, the Data Extract Tool is a staff-only facility used by two GIS staff:

1. Serene Pang
2. Wilfred Batke
Serene Pang  
Mapping Technician 2  
City of Richmond  
Engineering & Public Works  
6911 No.3 Road  
Richmond, British Columbia  
V6Y 2C1 Canada

March 12, 2014

Re: ESIG Award Application for Richmond’s Data Extract Tool

I provide City of Richmond Engineering data to both internal and external clients. Richmond’s Data Extract Tool is an efficient and convenient tool to export data into different file formats including AutoCAD, Shape, and Geodatabase. In a data request, the client provides me with a map outlining the area of interest and specified layers or subjects needed. All I need to do is to create a polygon in ArcMap that identifies the area of interest and then select the requested layers and output file format on the Data Extract Tool form. The data extraction will be processed immediately. When the data extraction is complete, I receive a notification email with the link where I can download the data output. This tool allows me to extract several layers of data at the same time. Because the data extraction does not run on my computer, I am able to work on other applications without any interruptions. Therefore, the Richmond’s Data Extract Tool is a great tool to extract data accurately while maintaining data integrity.

Serene Pang
Wilfred Batke
Mapping Technologist
City of Richmond
Engineering & Public Works
6911 No.3 Road
Richmond, British Columbia
V6Y 2C1 Canada

March 12, 2014

Re: ESIG Award Application for Richmond’s Data Extract Tool

As the designer and developer of this tool, I feel it does a fantastic job of freeing time for more productive activities. The development cycle means that this is a living project and is constantly being improved and refined. In subsequent versions we would like to include more data type to output and include more data to be included on each item. We would also like to consider making this a public self-serve system that could free staff completely from the common requests. This move into the public realm would probably require several more cycles of development but all the components are readily available now. The main challenge would be time and labour.

Wilfred Batke

[Signature]