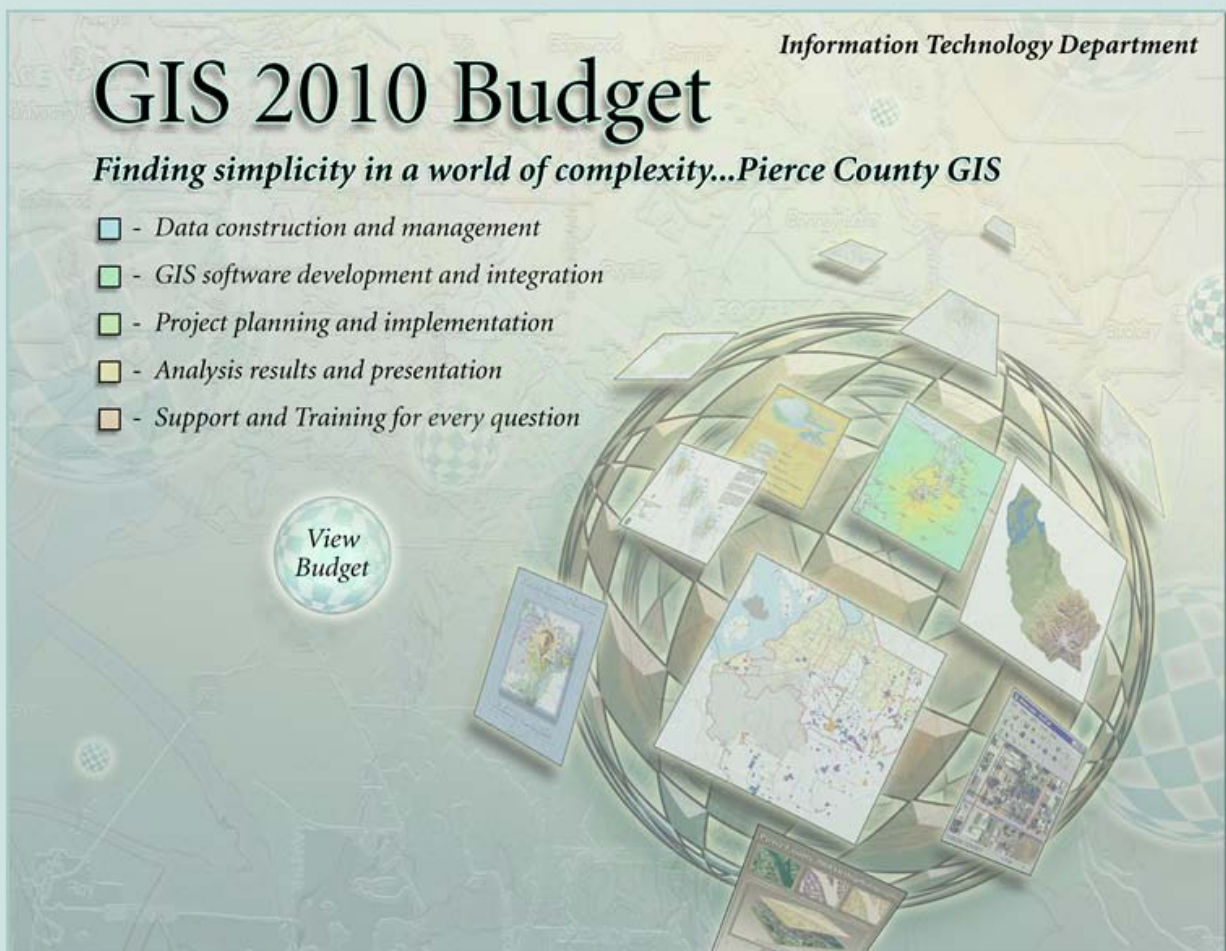


PIERCE COUNTY, WASHINGTON

Pierce County GIS Online Budget System



Information Technology Department

GIS 2010 Budget

Finding simplicity in a world of complexity...Pierce County GIS

- Data construction and management
- GIS software development and integration
- Project planning and implementation
- Analysis results and presentation
- Support and Training for every question

[View Budget](#)

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2010 URISA Exemplary Systems in
Government (ESIG™) Award Application
Single Process Systems Category

May 2010

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A. System

1. **ESIG™ Award category:** Single Process Systems
2. **Executive administrator letter:** see Attachment A
3. **Summary:**

The Pierce County GIS Budget System qualifies as an exemplary single process system because it provides County officials and department directors with detailed budget information about the data, applications, and services that GIS provides in a simple and easy-to-use format.

Tough economic times have had an effect on the budgets of many county and local government agencies across the nation. As governments feel the budget crunch, it is tempting to eliminate geospatial information services and systems in favor of free applications such as Google Maps or Microsoft Bing. The GIS division developed the online GIS Budget System to show the value of GIS within the County in a comprehensive way.

The online intranet application provides easy access to reports and charts that showcase all GIS services and how funds provided by various entities are allocated. Detailed departmental reports help individual directors determine the level of GIS service use and whether resources should be added or reduced based on projects and available funds.

The system was built using freely available Java and JavaScript libraries to keep costs down and ease future maintenance of the application. Budget data are easily maintained by the GIS manager in Microsoft Excel® spreadsheets, which are then converted into styled html pages via Apache software. JavaScript and styled html pages provide a sleek design that has received kudos from multiple departments and budget officials.

Though the system itself is not geospatial, the useful and streamlined budget information it provides keeps the GIS enterprise in operation. In addition, the associated cost allocation model has become a new standard for maintaining other divisional budgets in the Information Technology department.

4. **User testimonials:** see Attachment B

B. Jurisdiction

1. **Name of jurisdiction:** County of Pierce, Washington
2. **Population served by agency:** 813,600
3. **Annual total budget for jurisdiction:** \$791,598,541
4. **Chief elected official:** Pat McCarthy, County Executive
Executive Office, County-City Building
930 Tacoma Ave S, Suite 737
Tacoma, Washington 98402-2100

5. System Contact: Art Seeley, Interim GIS Manager
950 Fawcett Ave, Suite 300
Tacoma, Washington 98402-5603
Ph: (253) 798-3688, FAX: (253) 798-6507
aseeley@co.pierce.wa.us

C. System Design

1. What motivated the system development?

The County Executive and County Council rely on divisional budget reports to set budget priorities each fiscal year. The GIS division of Information Technology is an internal service fund whose budget is based on costs allocated to departments. Common budget questions related to any internal service fund include the following:

- What is my department getting for this service?
- How can my department control cost increases?
- How are my costs different from other departments?

In order to address these questions and improve customer service to departments, GIS designed a new cost allocation model and developed a new intranet site to present the data.

Cost allocation models can be difficult to design because user behavior can change based on how costs are structured. For example, basing GIS costs on usage rates could discourage departments from using enterprise GIS services, which would reduce their return on investment. In addition, heavy users of GIS often contribute and maintain departmental data that are essential to the value of the enterprise system. Therefore, the cost allocation model had to be designed such that it continued to encourage use, not discourage it. The model also had to appropriately allocate the costs of GIS staff support to individual department needs and avoid associating new project innovation with added costs.

The new methodology (see C.2) met these challenges by providing a measure of budget control for departments, adding transparency in an open system, and raising the level of confidence in technology spending. Departments can view one another's charges via the online GIS Budget site, which has created a sense of equity and fairness in the process.

Having detailed and up-to-date information from divisions is critical in the current tumultuous economic cycle. The GIS division chose to provide a new cost allocation model and present their budget online to provide clear and concise information to the County Executive, County Council, and individual departments. This project has resulted in departments having a better understanding of GIS services and costs, and how GIS services benefit both their current and future operations.

2. What specific service or services was the system intended to improve?

The Pierce County GIS budget supports a large enterprise GIS environment with over 1,000 users, 24 county departments, and 45 subscribing agencies. The total annual budget is

approximately \$3,400,000. The GIS budget funds a staff of 20 FTE, hardware, software, and data storage.

The GIS Budget System was developed to improve the understanding and provide justification for GIS technology rates and cost allocation across the County. The online reporting system provides easy access for stakeholders to understand the revenues, expenditures, staffing, datasets and projects that they support through their individual budgets. The system is based on a cost allocation model that is comprised of multiple metrics. Table 1 describes each metric and how the cost structuring represents usage while promoting continued growth.

3. What, if any, unexpected benefits did you achieve?

By placing the budget online, all departments have a much clearer understanding of the activities that GIS provides for them. Online intranet access also supports the County's Sustainability Strategy to reduce waste and greenhouse gas emissions by reducing the amount of paper used for budget reporting.

4. What system design problems were encountered?

The only system design issue was how to minimize the impact to the GIS manager's workflow while maximizing the distribution of information to all County entities. How should a budget that sits within a sophisticated Microsoft Excel® workbook be distributed online in an easy-to-use interface?

GIS did not want to spend a large amount of time and resources developing a new workflow process, nor did they want to develop anything too complex. Therefore, the software design goal was to keep the system as simple as possible without breaking the budget. See section D for more information.

5. What differentiates this system from other similar systems?

The GIS Budget System is the first online system in the County to providing a comprehensive reporting capability via a simple Java/JavaScript software solution that converts a Microsoft Excel® workbook to HTML pages that include charts and reports.

Table 1. Metrics of the Pierce County GIS cost allocation model.

Cost Component	Description	Purpose
Enterprise Cost	The GIS Enterprise Allocation is the service cost for the management and operation of the GIS Enterprise Systems. Departments each pay this service fee as a minimum for the availability of the GIS technology in the county. The cost to support the web sites: Public GIS, CensusView, Map Gallery and GIS Department are included in this cost.	All departments and funds pay this mandatory cost. This encourages use because if a department is paying for the technology, it is more likely to use it.
User Fee	The Use Service Fee is for the maintenance, operation and enhancement of the CountyView Web system and the CountyView Pro system. System users are charged a service fee (for 2010: CVWeb is \$1,400/user, CVPro is \$3,300/user) for unlimited use of the products. If staff use both CVWeb and CVPro, the user is only counted for the CVPro use (not counted twice). The service fees cover costs for the hardware (\$250,000), software licenses (\$140,000), GIS software system staff (2 FTE), GIS database management (1 FTE), data storage (\$60,000), IT data network charges and IT Operations staff support for the servers (1 FTE).	This is the one fee that is a direct per user cost. This cost does have the potential to discourage use but it is a smaller portion of the overall cost for a department and the rate is kept the same over time to avoid a drop in users. The positive aspect of this fee is that the departments can control the number of users and subsequently the cost.
GIS Projects and Systems	For each department the number of projects (mapping or analysis) or custom applications is listed. For example the Auditor uses: <ol style="list-style-type: none"> 1. Info-by-Address for Voters Department Contact: Mary Johnson Hall GIS Contact: Michael Payne 2. Animal Licensing Map application GIS Contact: Linda Gerull 3. Agent Location Trade Zone Analysis Department Contact: Mary Schmidtke GIS Contact: Linda Gerull 	Pierce GIS supports over 80 custom business applications and this is where the department's projects and systems are noted in the budget process. This section lists the projects and the next section describes how costs are allocated.
Service Plan	The service fee represents the Department's level of implementation of GIS and the degree of benefit achieved. The service cost is divided into 5 tiers: Basic, Good, Better, Best and Dedicated. Each GIS service level corresponds to the number of GIS users, projects and systems in the Department. Each year these projects are forecast for the next year or included from the previous year. The services levels are the following: <ul style="list-style-type: none"> • Basic: \$500 per user, no software systems or projects • Good: \$20,000 per year for 1-15 users, 1-2 software systems, 10 support calls/mo, no custom training classes • Better: \$35,000 per year for 16-40 users, 3 software systems, 20 support calls/mo, 1 custom training class 	The service plan is a measure of the overall support services that are needed by the department. It is based on the number of users, number of software systems, the number of support calls and any custom training. This allows the department to determine the amount of central GIS support services that are needed. If a department hires a GIS Specialist who can perform advanced projects and answer support calls then the central staff time is reduced. The levels are established to allow for growth in any one of the areas without a corresponding increase in cost. This "range" cost model gives the departments flexibility and encourages an increase in GIS use.

	<ul style="list-style-type: none"> • Best: \$55,000 per year for over 50 users, 4 or more software systems, unlimited support calls, 2 custom training classes • Dedicated: average of \$85,000 per year for a dedicated GIS FTE to support projects, software development, data construction and implementation. <p>The service plans are designed to allow Departments to increase use of the system (users, systems and projects) thus increasing benefits without additional cost.</p>	
Data Requests	<p>GIS coordinates public digital GIS data requests for Departments which reduces department staff time, avoids interruptions and ensures the requests are completed within the necessary public response time limits. The public pays for the time to prepare the data on a CD. The GIS Data Request cost is for the maintenance of the GeoData Express web site (data ordering), coordination of the request, answering questions from the public and maintaining records. The cost is \$75 per request.</p>	<p>Public GIS data requests are coordinated by the GIS Division because requests include data from multiple departments. This charge represents the time of responding to requests and the time to maintain the infrastructure.</p>
Data Maintenance	<p>The Data Administration cost is for the maintenance, operation, storage and publication of the Department's GIS data sets as well as the GIS data sets that GIS maintains for use by all Departments. GIS produces the symbolization, annotation and metadata for each dataset and publishes updates of the data as frequently as the department requests. GIS manages data schema changes, migration of the dataset to SQL Server and publication in CVWeb and CVPro. GIS has developed software to assist in the management of data administration and this work requires 2 FTE.</p>	<p>The data maintenance cost is based on the amount of data created and maintained in the GIS. The cost to put the data in production, maintain metadata and migrate data to new structures is included in the fees.</p> <p>The GIS production data storage (without orthos) is approximately 20 TB which is equivalent to the printed collection of the US Library of Congress. The amount of data changed per day in the GIS database is equivalent to 19 pick-up trucks filled with paper (19 GB).</p>
Ortho and Lidar Data	<p>The Orthophoto and Lidar System cost is for the development, maintenance and operation of the orthophoto software tools and lidar data processing. GIS maintains image products from 1998 and developed software to allow access to the data and comparison of the data over multiple years via OrthoViewer. The lidar data is a 3D representation of the bare earth and was created using USGS lidar. This is an improvement and great cost savings over previous methods to build terrain information. The data is used by county engineers to assess flooding, design roads, assess wetlands, and evaluate steep slopes. The lidar data system is represented and stored as point, GRID, TIN and contour terrain models. The ortho image data and terrain models are large data sets that require additional administration, quality control and specialty software. The fee for this service is \$125 per year for each CountyView Web or Pro user.</p>	<p>This cost does not include the construction of ortho or lidar dataset. This fee is for all the infrastructure, data storage, data processing and file management for these large datasets.</p>

D. Implementation

1. What phases did you go through in developing the system?

The GIS Budget System went through two phases of development: development of the cost allocation model and development of the web site.

The cost allocation model was finalized after several years of trial models. GIS staff listened to departmental concerns and incorporated cost metrics (Table 1) that users could understand and value. The ability to control cost increases and anticipate future costs is viewed as a significant benefit to departments.

The development of the web site incorporated the following goals:

- Provide an overview of the overall budget over time
- Show departments how external revenues lowered their costs
- Provide departments with details of each cost metric and distinguish costs in terms of staffing, hardware, software and fixed costs

Initially, GIS considered creating a relational database system and web application, but the cost/time needed for that type of development was too expensive. To keep costs down, GIS chose to read existing Microsoft Excel® spreadsheets that are used in the cost allocation model and convert them into web pages. Since existing open source technology was used to develop the interface, the time to implement the project only took two weeks.

2. Were there any modifications to the original system design? Why? What?

The project design was simple – to present the GIS cost allocation and budget information for each department via an intranet application. As the web site was developed, additional details such as budget history, list of users, datasets, projects, and metadata were added to enrich the user experience and provide departments with valuable information.

The software code is stored in an open source version control system called Subversion to account for future alterations and to keep track of modifications over time.

E. Organizational Impact

1. What user community does the system serve and how?

The GIS Budget System serves the Executive, Council, and all County departments. It provides a budget overview and detailed budget information, including:

- Overall budget revenues, expenditures, and annual changes
- Descriptions of staff, hardware, and software and monies allocated to each component
- Individual GIS projects and budget allocations
- Funding allocations by department, including user fees, service plans, supported projects, special fund contributions and data administration
- Summary of all department costs for GIS and associated charts and tables

The GIS Budget System has improved relationships between GIS and departments. Previously, larger departments believed they were paying for everyone and smaller departments believed

that they simply couldn't afford to use GIS services. By providing the budget online and showing details about cost allocation, the GIS model gained credibility and departmental acceptance. Departments could see that everyone contributed a modest amount to the enterprise system, and that additional service costs were calculated based on six cost components (see C.2). This model allows departments to optimize their use and costs of GIS technology, and it provides a measure of stability to the GIS division in tough economic times.

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

The County Executive and Council are able to quickly obtain summary reports about the GIS budget to understand services, results, and benefits provided by the division. However, the intent of this system is to provide County departments with the ability to review their GIS spending and modify their service, data, or user plans to meet their budget objectives.

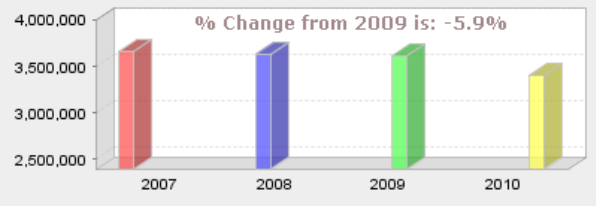
For most GIS departments or divisions, finding a method to distribute cost across the enterprise is essential to the continued operation and maintenance of the GIS system. The Pierce GIS Budget System includes multiple metrics to measure usage and distribute costs. Often, the heaviest users of GIS services are those that maintain data on the enterprise system. The goal of the new cost allocation model was not to penalize those users who provide value to the enterprise, but to encourage departments to expand the use of the system without directly increasing their cost. These cost ranges give departments flexibility in managing their use of GIS technology.

The GIS Budget System was designed and developed to be a flexible and reliable cost distribution method. The following screen shots display the elegance of the user interface and the richness of content. Detailed pages are provided for each department, including overall budget changes from year to year. By providing this information online, departments have seen that though the GIS budget has decreased, their service levels have been maintained. This information has shown that the GIS division continues to provide critical services to the County, while also incorporating efficiencies and innovation to reduce costs to all users.

GIS 2010 Budget

Finding simplicity in a world of complexity...Pierce County GIS [Home](#)

2010 GIS Budget is: **\$3,400,000.00**



Revenues

	In 2010	% of Budget	% Change from Previous
External Revenues List external revenues List external agencies	\$294,907.00	9% of budget	+23% from 2009
Project Revenues List project revenues	\$333,800.00	10% of budget	+26% from 2009
Fund Balance	\$700,000.00	21% of budget	+0% from 2009
Departments List departments	\$2,071,293.00	61% of budget	+0% from 2009

Expenditures

	In 2010	% of Budget	% Change from Previous
Staffing List staff	\$2,572,873.00	76% of budget	+2% from 2009
Hardware List hardware	\$417,690.00	12% of budget	+0% from 2009
Software List software	\$218,525.00	6% of budget	+0% from 2009
Fixed Costs	\$110,000.00	3% of budget	+5% from 2009
Other	\$80,912.00	2% of budget	+0% from 2009

What is the GIS Budget for My Department?

Select a Department:

[How Does GIS Lower Costs?](#)

[What Activities Does the GIS Fund Support?](#)

[Additional Questions? Please contact Linda Gerull, 4923](#)

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Figure 1. GIS Budget overview page.

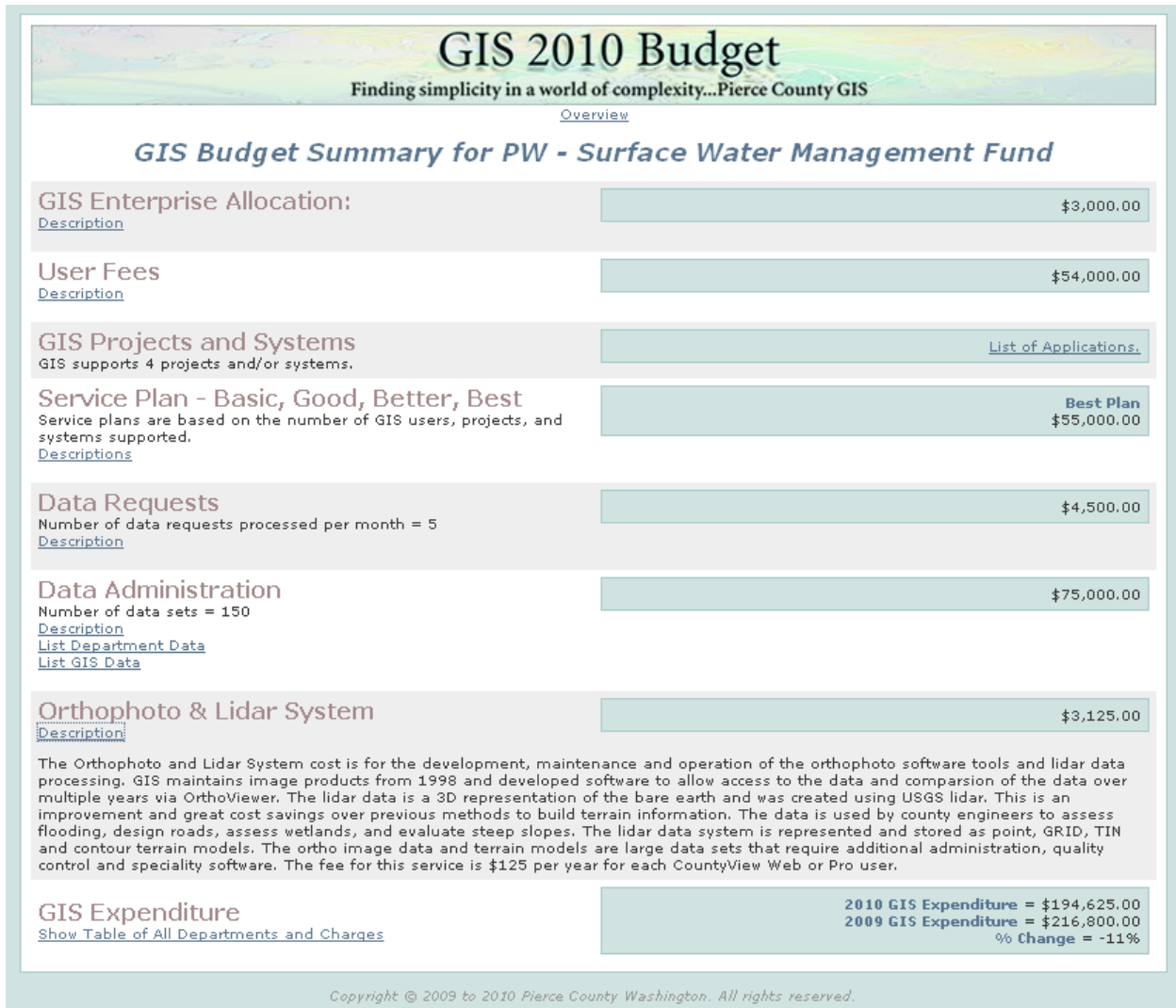


Figure 2. GIS budget summary for department.

3. What were the quantitative and qualitative impacts of the system?

The GIS Budget System has had several positive impacts. The web site provides detailed information that has simplified the annual accounting process and provided significant time savings to the 23 fiscal managers of the County. GIS service costs are provided early in the budgeting process, giving fiscal managers time to estimate expenditures and balance priorities and projects in their individual departments. Departments do not have to hunt down the GIS manager or search for physical budget documents, thereby saving time and money.

The online system provides easy access for all County entities to learn how their funds support GIS activities. Along with budget numbers, the site shows the projects, users, and work accomplished for each department. Department managers have a much clearer understanding of how integral GIS systems are to their daily operations.

4. What effect has the system had on productivity?

The online system has greatly improved the communication between GIS and other County departments. Departments can simply review the site online for budget information and no longer have to wait for the GIS division to prepare documentation and reports upon request. Because fewer requests are made, GIS staff has more time to work on projects, data, and services.

5. What, if any, other impacts has the systems had?

The success of the GIS cost allocation model and budget system has proved that enterprise technology is based on multiple metrics. Basing costs solely on usage has the potential to negatively affect use and reduce the benefits of the enterprise system. This new methodology and the transparency of the online system provided by the GIS division serves as a template for other technology systems at Pierce County. Other divisions of the Information Technology department are incorporating this method into their budget process to justify their business structures.

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 the new.

Prior to using the GIS Budget System, the GIS manager would submit a spreadsheet with costs allocated to departments based on the previous annual budget plus COLA increases. The costs were not related to the work performed. The new cost allocation model incorporates projects, number of users, data, and support into the budget.

Before the new allocation model, departments often had to wait until late in the budget process for information about GIS costs and had no control over costs for services. The online budget site allows departments to estimate expenditures early in the process, and control costs related to use of GIS technology and related projects.

F. System Resources

1. What are the system’s primary hardware components? Give a brief list or description of the hardware configuration supporting the system.

The GIS Budget system runs on a virtual machine that supports eight GIS applications.

- Operating System: Windows 2003 x64 Standard
- CPU: 1
- RAM: 2 GB
- Storage: 25 GB

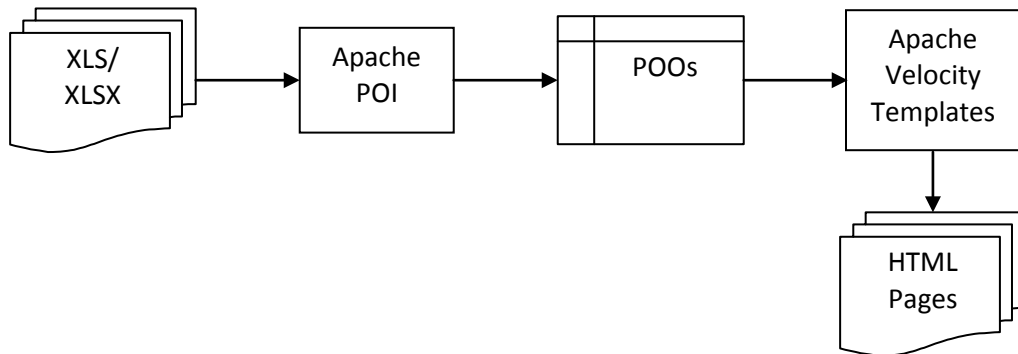
2. What are the system’s primary software components? Describe the primary software and, if a commercial package, any customizations required for the system.

Software components:

- Microsoft Excel® spreadsheets – Source data are stored in XLS or XLSX format <http://office.microsoft.com/>

- Apache POI – Java libraries that can read and write Microsoft Office formats, including Microsoft Excel® spreadsheets
<http://poi.apache.org/>
- Apache Velocity Templates – Java-based template engine to convert Plain Old Java Objects (POJOs) to HTML pages
<http://velocity.apache.org/>
- JFreeChart – Java library to display professional quality charts
<http://www.jfree.org/jfreechart/>
- jQuery – JavaScript library to handle user interface effects
<http://jquery.com/>

The software converts Microsoft Excel® spreadsheets to Java Plain Old Java Objects (POJOs) via Apache POI Java libraries. These data are then converted into HTML using Apache Velocity Templates. JFreeChart is used to generate charts from the underlying data (Figure 1), and jQuery is used to display description information based on user selection (Figure 2).



3. What data does the system work with? List and briefly describe the database(s).

Data containing GIS revenues, expenditures, departmental allocations, project information, and staff information are stored in Excel spreadsheets. Refer to F.2 for details on how these data are converted into HTML for use in the GIS Budget System.

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

The GIS Budget System was implemented in two weeks by a staff software engineer (1 FTE).

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

This project was completed in a short period of time by leveraging several open source libraries, including Apache POI, Apache Velocity, Java, and jQuery. Open source technology provided a low cost solution that met high quality Pierce County standards for its online applications.

One of the unique items about this system is that it has not altered the workflow process for managing the budget. The GIS manager simply updates the budget in the Microsoft Excel® workbook, which is then used to update the online GIS Budget System. The manager did not need to learn a new software package, and the online system provides a great communication tool for County departments.

ATTACHMENT A

Executive Administrator Letter



Pierce County

Office of the County Executive

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Deputy Executive
(253) 798-7477
kphelps@co.pierce.wa.us

May 3, 2010

Exemplary Systems in Government Team
URISA
701 Lee Street, Suite 680
Des Plaines, IL 60016

Dear ESIG Team:

In government, we have never before experienced the budget pressures that have occurred over the last two years and into a third year. Leveraging technology has helped us improve public information sharing, add value to internal business processes and cope with downsized staffing while maintaining service to citizens.

Pierce County, WA is pleased to submit an ESIG application for our GIS Online Budget System in the single process system category. County departments are closely scrutinizing their budgets and require justification for internal services or project spending. The GIS Online Budget has improved understanding and added transparency to the budgeting process. The web site has raised the level of confidence in technology spending and provided a measure of budget control for departments. This is an open system where departments can view one another's charges and this creates a sense of equity and fairness in the process.

Thank you for your consideration of this nomination. Sharing Pierce County's accomplishment with URISA will ensure other agencies can learn from this best practice.

Sincerely,

A handwritten signature in blue ink that reads "Pat McCarthy".

Pat McCarthy
Pierce County Executive

ATTACHMENT B

User Testimonials



To: Art Seeley, Interim GIS Manager
From: Kristina Waldron, IT Fiscal Services Manager
Date: April 20, 2010
Re: User Testimonial for Pierce County GIS Online Budget System

Comments:

As the budget manager for the IT department I found the GIS Budget website to contain all the information I needed to build the IT budget for the GIS related costs. The information is concise, informative, extremely user friendly, easy to access and easy to understand. I applaud the GIS division staff on the creation of this website.

A handwritten signature in blue ink that reads "Kristina Waldron".

System Title: Pierce County GIS Online Budget System
User: Toby Rickman, Public Works and Utilities Deputy Director

May 04, 2010
RE: GIS Budget Site

From a department that is supported by the Geographic Information Services, understanding the services we need and what those services cost is critical. The GIS Budget site made it easy to understand and find those services and costs. The site is easy to navigate and find the information we needed to do our budget work.

Toby Rickman
trickma@co.pierce.wa.us



To: Linda Gerull, Information Technology Director
From: Mary Schmidtke, Fiscal Services Manager – Auditor's Office
Date: 4-26-2010
Re: User Testimonial for Pierce County GIS Online Budget System

The GIS Budget site is fabulous. I found it to be interesting, informative, well put together and thorough. It was invaluable during the budget process in understanding the GIS services and related costs.

I have returned to the site at least a half dozen times since the budget was passed. The detail provided is sufficient to enable our department management to assess our utilization in an effort to maximize our investment in GIS.

It is a model site, both in presentation and data. Thank you for continuing to bring excellence to County processes!

A handwritten signature in black ink, appearing to read "Mary Schmidtke".

Mary Schmidtke
Fiscal Services Manager
Pierce County Auditor's Office
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Tacoma, WA 98409-7483
(253) 798-2583
(253) 798-3180 (fax)
mschmid@co.pierce.wa.us



Pierce County

Information Technology Department

LINDA J. GERULL
Director

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May 10, 2010

Exemplary Systems in Government Team

URISA

701 Lee Street, Suite 680

Des Plaines, IL 60016

Dear ESIG Committee,

Pierce County's Information Technology Department serves the technology and IT system needs for the County which includes 24 department and 30 subscribing agencies. Our clients expect and enjoy dependable, secure, efficient and economical technology solutions yet when budgets are created each year there is consternation and frustration with IT costs. The GIS Division of the IT Department took the bold step to establish a cost methodology for the enterprise GIS budget and created a creative communication tool to distribute budget information. The result has been accolades from department directors and budget managers who appreciate the proactive approach and fairness in the method.

Technology is expensive and it is difficult to devise cost allocation that rewards use while accounting for usage. During difficult budget times it can be tempting to cut technology expenditures and revert back to manual methods in an attempt to lower IT costs. Given these budget pressures, the GIS Division found it was much easier to justify technology maintenance and expansion when there are clear and consistent metrics for allocating the IT/GIS costs. The GIS Budget System is based on a flexible and balanced strategy for measuring use and distributing costs. Pierce County is anxious to share this good news of how to adopt a positive budget posture that benefits in the organization and avoid the angst of budgeting.

Sincerely,

A handwritten signature in black ink, appearing to read "L. Gerull".

Linda Gerull
Pierce County Information Technology Director