

user interface was also modernized to include a web browser-based user experience.

The system resulting from this modernization project is running on a combination of Unix and Windows servers to support the programming technologies. All the programming and systems support is done in-house using a combination of newer development tools while still relying heavily on the legacy Cobol programming language. The system also employs “wrapper” technologies that allow much of the system to mimic the way the old technology worked.

While the resulting system is hosted on a modern platform, the underlying application structure and business rules are approximately 30 years old. The current system has been in production for over seven years and continues to be maintained by seven technical positions for the application, and contracted positions support the hardware platforms and database. The system complexity and 30-year-old design has proven to be a maintenance challenge and continues to limit departments’ ability to improve their business processes as well as limits the County’s ability to take advantage of new service-based technology. Operation of the system is heavily dependent upon the institutional knowledge of how the application works, including its idiosyncrasies and numerous workarounds. The system will need a major platform overhaul in the next few years to ensure its components remain supported by their manufacturers.

Understanding the limitations, short comings, and risks inherent in the current system, and it having been over 10 years since the last market review, County stakeholders (Assessor/Recorder, Auditor/Controller, and Treasurer/Tax Collector) determined a market survey of available system replacement options was needed. Over a nine-month period, the three available software packages were evaluated. The results from the evaluations determined that the Thomson Reuters (T-R) Aumentum package is the most complete system for Solano County’s needs.

Given the multi-year timeframe needed for data migration and implementation of a new system, the Department of Information Technology (DoIT) and the SCIPS stakeholders seek Board approval to initiate the project to replace the current system and authorize the creation of a designated reserve of \$10,000,000 to fund the project.

FINANCIAL IMPACT:

The total cost to replace the Solano County Integrated Property System is estimated at \$10 million. The department proposes this amount come from the general reserve and into a committed designation for Property Tax system replacement. This action can only take place during the budget hearings scheduled for June 2017. This action will authorize the Auditor Controller to establish the committed designation for the property tax system. As the replacement system progresses and an appropriation becomes necessary an appropriation adjustment request will be brought back to the Board of Supervisors for approval.

In addition, based on current legislation, only 48% of the total cost or an estimated \$4.8 million will be recovered from cities and other agencies through the property tax administrative fee. The balance of \$5.2 million will be a general fund cost.

DISCUSSION:

The Solano County Integrated Property System (SCIPS) is internally developed and maintained by the Land Information Systems Division of the Department of Information Technology (DoIT). Initially developed on an HP3000 platform, the system hosted the database, application, and provided for character-based terminal access. Initial development started in the early 1980’s and has been in a state of continuous improvement. Attempts to modernize the system fell short due to software and system vendors dropping support for the HP3000 platform. Finally, in 2003, HP discontinued the HP3000 platform leaving their customers with no migration or upgrade path.

In 2005 three options were considered:

1. Purchase a new system,
2. Rewrite a completely new system, and
3. Migrate the current application to a new technology platform

Surveying existing software vendors in the California marketplace revealed few options, and those options provided less capability than the current system. Rewriting the system was considered. A high-level cost estimate put a rewrite project in the range of \$30 to \$50million. This estimate was verified against rewrite projects initiated by other counties at the time, none of which were ever completed. Due to the high cost of rewriting the system, limited staffing, support risks of the current platform, and the learning curve for new development tools, the feasibility of successfully completing a rewrite in a reasonable timeframe seemed, remote. Additionally, a significant amount of the institutional knowledge of the business rules imbedded in the system was no longer available.

The final option of migrating to a new hardware platform and associated system software was determined to be the lowest risk solution. A "Lift and Shift" methodology was utilized to retain all the existing business rules and maintain the application structure.

On December 12, 2006, after considering all the available options, the Board approved a contract with Speedware, a Division of Activant Solutions Inc., for the re-engineering and modernization SCIPS. The original 14-month project was estimated at \$3,446,204 and was intended to maintain current business rules and program logic while modernizing the underlying operating system software, database, and hardware platform. Due to unforeseen challenges encountered in the legacy system, the project fell behind schedule and incurred additional costs. On May 13, 2008, the Board approved a contract change order for \$604,329. The project was successfully completed in February 2010 at a total cost of \$4,050,533.

The current system was put into production in 2010. It is a complex multi-tier architecture running on a combination of Windows-based systems providing the end-user experience and an IBM Unix system providing the back-end batch processing, application processing, and database management. While the architecture is an open system, the application is virtually still the legacy software running within an emulation software layer to allow the business rules and workflows to remain intact. This added complexity has proven to be the systems weakest point.

Since going into production in February 2010, the system has undergone upgrades to the Windows hardware and operating system, the IBM hardware and operating system, and the database. These upgrades have proved to be extremely time consuming; taking about 2 years to complete and requiring significant user testing. Currently the system is stable but is running on an unsupported Microsoft programming framework.

Challenges with continuing with the current system:

Continuing with the current system poses a number of risks. The Property Tax applications are developed in Cobol for the batch processing and VB.NET for the user interface. Both of these languages rely on custom middleware products to provide the HP3000-like functionality needed to maintain the existing business rules. These middleware products are highly dependent on the underlying operating systems and hardware platforms. In addition to the custom middleware, the user interface is tightly coupled to the Microsoft Internet Explorer (IE) Browser. Currently IE11 as well as the Windows Server operating system will be supported through January 2020. The Unix operating system is currently supported through December 2019. In addition to the difficulty experienced in upgrading the platforms, these middleware products are uniquely customized for Solano County. The Microsoft .NET framework 2.0 is out of support and is currently being upgraded to version 4.5. Over half of the property system relies on this framework. As it is tightly coupled to the underlying operating system and development tools, this upgrade poses the most risk and requires the most testing.

Another significant risk to continuing with the current system is the reliance on a small group of support staff as well as the subject matter experts in the operating departments. With every year that passes, the County is

exposed to the potential loss of institutional knowledge. As experienced operators depart, so does their knowledge of the unique operating behavior of the current system. Additionally, all of the current technical personnel supporting SCIPS are at or near retirement age. Considering instruction in some of the legacy technologies is no longer available in most colleges, the pool of available resources is very limited.

Options Investigated:

- 1) Redeveloping the existing software was evaluated and determined to be the least optimum approach. Based on discussions with other counties, this approach would probably take the better part of 10 years to complete and require 20 to 25 dedicated staff and/or consultants. Because of the age of the current system, programming language, and system design methodology, very little (if any) of the current code base can be re-used. The current system was designed to operate on an annual cycle and utilized destructive updates when modifying records. Modern systems utilize a transaction-based architecture where all transactions are effective dated, allowing for virtually unlimited history (limited only by hardware resources and performance requirements). Using a Constructive Cost Model developed by USC - Center for Systems and Software Engineering, the results are less than encouraging. Based on 1.2 million lines of code (existing legacy system prior to modernization) and \$10,000 per person-month, the model indicates about a five-year project, with an average of 85 personnel, at a cost of over \$50 Million. This estimate is consistent with other property tax system projects attempted in the state over the last ten years, none of which have reached full production.

- 2) Purchasing a Commercial Off-The Shelf system (COTS) would provide the benefit of implementing a commercially available system that has many years and tens of thousands of hours of development effort invested to deliver an end-product with standardized processes based on industry and state specific standards. As more Counties move to the commercial platform, the County could realize a benefit from the potential ability to tap the available pool of employees familiar with the commercial system. Currently there are two integrated property system packages available in California:

Thomson Reuters Aumentum product (Initial Demo July 19/20, 2016).
Megabyte Systems (Demo October 5, 2016).

- 3) Purchasing "best of breed" rather than an integrated system was another option evaluated. There was only one vendor offering a software product that seemed suitable in meeting Auditor/Controller and Treasurer/Tax Collector needs: The Grant Street Group TaxSYS (Demo July 27/28, 2016). This solution would require a separate acquisition for a system to suit the Assessor's needs and then customized interfaces to make the components work in an integrated manner.

Results from demonstrations:

Of the two integrated packages available on the market today, the Thomson Reuters Aumentum package looks the most promising. All three departments were positive on what was demonstrated. The main detractor is the amount of time it has taken with the implementation in Riverside County.

While the Megabyte Systems package could provide most of the functionality needed to perform core business operations, after departments had an opportunity to review and compare operations in detail with other counties, it was determined there were too many gaps between the product offering and the current SCIPS system functionality. Additionally, the gaps were usually filled by spreadsheets and manual processes. Additional staff resources would be needed to make up for the lost functionality and automation that exists in the current system. Given the gaps and additional staff resources that would be required, this system is not a preferred solution.

Thomson Reuters was invited back to provide more detailed department specific demonstrations (January 25/26, 2017 and March 8, 2017). All three departments continue to be positive about the functionality that was demonstrated.

Recommended option:

The recommended path forward is to enter into a contract with Thomson Reuters once all the County stakeholders have completed their independent reference checks with other counties currently in the process of implementing the Aumentum package.

Thomson Reuters is a \$12 billion company and their Aumentum property tax and revenue systems are used in 25 states as well as six foreign countries. Although the full Aumentum integrated product is not in production in California, T-R Aumentum is in production for the Tax version in three counties; their assessment product is in production in one county, and they have a significant customer base in the state. Attachment B lists Thomson Reuters' current California customer base. Included in the list are the counties that are live on one or more of the Aumentum software modules or in various stages of implementation under contract.

Through discussions with other counties, it is evident a number of them are taking a wait and see approach to their property tax system modernization initiatives. Once a couple of the counties currently in the implementation process successfully complete their projects, it is expected those counties currently waiting will quickly move to follow suit. Understanding there are limitations on the number of customers that can be in the implementation pipeline at the same time, and the first phase of project startup is contingent on the County completing "pre-startup (phase 0)" activities involving data migration, it is in the County's best interest to move forward with the pre-startup phase as early as possible. Delaying a decision to move forward will force the County into another platform upgrade cycle, which will be expensive, disruptive and will not improve the functionality of the system for the stakeholders.

In order to move ahead with the data migration phase, the County needs to contract with Thomson Reuters in order to gain their assistance with training, and access to their proprietary systems information and support.

The evaluation team believes the most efficient procurement method is to "piggy-back" on a current California county contract. Riverside County released a Request for Proposal for implementation of an integrated property tax management system. Thomson Reuters was awarded the work for their Aumentum product. The resulting contract specifically allows other counties or entities to piggyback on the Riverside County procurement process. By using this purchasing method, Solano County will purchase the same three modules, and will receive its services at the same rates per unit as Riverside County. Additionally, there are other contracts in place we can leverage; all of which have arrangements where the County can withdraw from the agreement if T-R is not successful implementing their product in California, or is not timely. It is the County's intent to negotiate escape clauses in the agreement with T-R to ensure liability will be limited. Attachment C contains the T-R proposal for the project.

Project phases and schedule:

The project will be completed in the following 13 phases and the overall project duration is estimated to be 34 months:

0. Pre-Project Startup-Database Cleanup, Validation, and Migration to staging environment - Estimated to be 12 months in duration.
 1. Project Start Up
 2. Base Configuration
 3. Initial Data Conversion - Estimated to be 8 months in duration.
 4. Business Process Analysis and Mapping - Estimated to be 4 months in duration.
 5. System/Client Configuration;
 6. Full Conversion mapping, extraction, and migration - Estimated to be 6 months in duration.
 7. User Acceptance Testing (UAT) Configuration;
 8. User Acceptance Testing Conversion - Estimated to be 1 month in duration.
 9. Implementation Services-Engineering/Programming (reports, interfaces, documentation);
 10. Final User Acceptance Testing - Estimated to be 3 months in duration.
 11. Client Training;

12. Go-Live

Augmented staffing requirement:

Over the course of the project it is anticipated there will be a need for dedicated project staff to focus on the implementation in each of the departments. At this stage of the process, it is difficult to determine the level of staffing required. Based on staffing augmentation levels from similar projects in other counties it is likely that two additional staff in the Assessor, and one each in the Auditor and Tax Collector departments will be needed for the configuration and implementation phases. These positions would be limited term. More staffing will be needed for the acceptance testing phases but the extent of that supplemental staffing cannot be determined at this time. Due to the difficulty of providing accurate estimates at this time, the budget may need to be revised as the project progresses and more becomes known of the experience of other counties implementing this software. Technical staff involvement in the project will be heaviest in "Phase 0" performing data migration and validation activities as well as for building an archive system for historical data. We estimate that IT staff will need to be augmented with one full time project manager and two analysts that would focus on testing. Current technical staff would be focused on data migration, building an historical archive, and rewriting system interfaces.

ALTERNATIVES:

The Board could choose to not authorize proceeding with the SCIPS replacement project; however, this is not recommended. The current system is expensive and difficult to maintain and will be faced with a major upgrade cycle in 2019. The Department believes it is in the County's best interest to avoid the cost and disruption of this upgrade cycle by replacing SCIPS with a commercial software package.

The Board could choose to not authorize the CAO to negotiate and contract with Thomson Reuters until there is a successful implementation in California. This alternative is not recommended as it could delay the project indefinitely as more counties commit to implementing the software ahead of Solano. Based on existing contracts with T-R, the Department believes flexibility can be negotiated into an agreement to limit the County's liability and provide a means to cancel the contract if Thomson Reuters is not successful.

OTHER AGENCY INVOLVEMENT:

The Department of Information Technology, in cooperation with the Assessor/Recorder, Auditor Controller, and Treasurer/Tax Collector have been involved in the search and assessment of available alternatives in the market place. All departments are in agreement with selecting the Thomson Reuters Aumentum package to replace the SCIPS system. The Department will continue to work with project stakeholders, the County Administrator, and County Counsel on all contract agreements for the project.

CAO RECOMMENDATION:

APPROVE DEPARTMENTAL RECOMMENDATION