Market Research Report

BUDGETING
TECHNOLOGY SOLUTIONS

Contributors:
Shayne Kavanagh
John Ruggini
Monica Na
Anne Kinney
Steve Kreklow
Joanna Greiner
Amy Stewart

Government Finance Officers Association

About the publisher

Established in 1906, the Government Finance Officers Association (GFOA) is North America's premier association dedicated to enhancing and promoting the professional management of governments for the public benefit. Along with the GFOA staff, over 16,000 members from local and state/provincial governments in the United States and Canada are committed to the idea of identifying, developing, and advancing leading fiscal strategies and practices. As the premier adviser on the organization and administration of finance functions in the public sector, the GFOA produces publications, administers national training programs, and provides consulting services to governments on an array of financial management practices.

A division of the GFOA, the Research and Consulting Center (RCC) focuses on providing high quality research and advisory services by pairing the lessons learned from a broad membership network with the expertise of a highly educated professional staff that has practical experience working in local government. With a major focus on management and technology consulting, the RCC is a leading provider of consulting assistance for local governments procuring financial and ERP systems. The GFOA's RCC also provides assistance for members and clients on topics as varied as financial practice audits, long-term financial planning, and performance management. Publications both support and stem from the work completed in the field, ranging from white papers on new technology applications to books on budgeting and fiscal policy.

For more information on this report, contact:
Shayne Kavanagh at skavanagh@gfoa.org

Contents

Executive Summary

This report analyzes the market for software solutions to assist local governments with formulation and analysis of operating and capital budgets as well as with administration of performance measurement programs. The primary audience for this report is mid-size, general-purpose governments (e.g., cities and counties). For the purposes of this analysis, a mid-size government is considered to have a population between 100,000 and 500,000 and an operating budget between $200 million and $600 million. Much of the information presented, however, will still be relevant to larger and smaller governments. Key findings include the following:

➡ **Three Basic Types of Solutions.** There are three basic types of solutions available in the marketplace:

→ Excel Adds-Ons leverage the power and ubiquity of Microsoft Excel to provide an organization-wide budgeting solution.

→ Corporate Performance Management (CPM) solutions are functionally rich and flexible budgeting and planning solutions that have enjoyed widespread success in the private sector and are now beginning to penetrate the public sector marketplace.

→ Relational Systems couple familiar relational database technology and application design concepts with public sector application development expertise.

➡ **Available Products Meet Major Requirements.** The Government Finance Officers Association (GFOA) identified a number of major requirements that modern budget systems should be able to satisfy and, based on the GFOA's observations, many modern products appear able to meet these requirements, though there is variability in the quality with which requirements are met between vendors. Major findings include the following:

→ The GFOA observed that many systems in the current market could meet the functional requirements used by the GFOA to represent a local government's budget process difficulties. Technology vendors' approach to these requirements is based on their architecture as CPM or Relational Systems and has resulting advantages and disadvantages.

→ There are important differentiators in terms of how well systems meet major requirements, especially between the three major types of solutions identified in this report.

→ Budget publishing remains an under-developed public sector budgeting component, although the GFOA anticipates that increased competition among budgeting systems will result in improved functionality.

→ CPM systems and Relational Systems utilizing third-party reporting products demonstrated powerful forecasting and analytical capabilities that are likely to meet and exceed local government requirements. However, these

capabilities are dependent upon the proper development and maintenance of underlying data stores.

→ Increased emphasis on performance measurement in the private sector and in the federal government, where many systems have their largest market share, has resulted in robust functionality that should meet governments' needs. However, there are important performance variations between products.

➡ **No Silver Bullet Available.** While the products examined for this report hold promise, there is no particular product that commands an overwhelming share of the stand-alone budget system market—in fact, no vendor profiled has more than twenty public sector budgeting system clients using the system in a stand-alone capacity.

➡ **Government Experience Varies.** The GFOA conducted a survey of mid-size local governments. The survey found that that their experiences with budgeting technology varied, especially between operating budget, capital budget, and performance measurement functionality. More specifically:

→ A majority of respondents used modular and commercial off-the-shelf (COTS) systems for operating budget development (e.g., a module of a financial management system purchased from an outside vendor). These systems enjoyed higher satisfaction ratings relative to capital budgeting and performance measurement. Most of the respondents using spreadsheet-based and custom in-house systems for operating budgets wished to replace these systems.

→ A majority of respondents used spreadsheet-based and custom in-house systems for capital budget development. These systems had mixed satisfaction ratings and a significant number of respondents planned to replace them.

→ An overwhelming majority of respondents used spreadsheet-based and custom in-house systems for performance management. Satisfaction levels were inconclusive, as a majority of those were neutral towards their systems; correspondingly, most were undecided about whether or not to replace them.

➡ **Several Vendors Profiled.** The GFOA profiled a number of vendors for this report. This sample should be representative of the vendors who are capable of providing a stand-alone budgeting solution. The vendors profiled represent the vast majority of those who are active in the public sector budgeting technology market.

➡ **Cost Range.** Cost can vary significantly depending on the type of solution chosen. The report describes potential cost ranges, considerations that impact cost, and variables that can be used to modulate the cost according to available resources and desired results.

Section 1 - Introduction

This report provides a thorough assessment of the market for budgeting technology and the systems' abilities in the current market to meet the requirements for budget formulation, analysis of operating and capital budgets, as well as performance measurement functionality. This report is divided into the following sections:

➡ **Section 1—Introduction.**

➡ **Section 2—Research Method.** This section describes the process the GFOA used to conduct the market research.

➡ **Section 3—Product Typology.** This section covers a general typology of the market solutions available.

➡ **Section 4—Government Experiences.** The GFOA surveyed mid-size local governments on their experiences with budgeting technology and the results are analyzed in this section.

➡ **Section 5—Major Capabilities.** This section describes the essential functionalities available through commercial products for meeting public sector budget requirements.

➡ **Section 6—Fit to Typical Requirements.** The GFOA analyzed how currently available technology might be able to meet requirements typical of a mid-size general-purpose local government.

➡ **Section 7—Overview of Vendors.** This section provides a brief profile on the vendors who are active in the market for stand-alone public sector budgeting solutions.

➡ **Section 8—Cost.** This section discusses the potential cost for a budgeting solution.

➡ **Section 9—Conclusions.** This section suggests how governments can best use the information contained in this report.

Audience for this Report

The primary audience for this report is mid-size, general-purpose governments (e.g., cities and counties). Much of the information in this report will also be relevant to larger and smaller governments, with the following exceptions:

➡ **Vendor Target Markets.** Some of the vendors described in Section 7 may not be oriented towards serving smaller or larger governments.

➡ **Complexity.** Some of the technologies described in this report may be complex enough that they are not cost-effective solutions for smaller governments.

➡ **Scalability.** Very large governments may require the ability for thousands of users to access the budget system during budget formulation season and/or their budget processes may involve extremely large data sets that are not easily handled by the technologies profiled in this report. These issues are not pressing for most mid-size governments so the GFOA did not emphasize scalability in its research. Larger governments exploring a budget solution should be especially diligent in examining scalability issues involved with potential solutions.

Section 2 - Research Method

The GFOA contacted vendors known to be active in the public sector budget/planning software market and requested that they participate in our research related to this project. The GFOA selected these vendors based on its knowledge of which vendors are actively interested in providing a stand-alone budgeting solution to local government.[1] The vendors who agreed to participate are profiled in Section 7 of this report. Nearly all of the firms that are capable of providing a stand-alone budget system to mid-size local governments are included in this report.

The GFOA gave each vendor a standard questionnaire and conducted a follow-up interview. The GFOA also independently conducted a literature review related to the market for this type of solution.[2] Finally, the GFOA had the opportunity to observe the solutions in action through a combination of private and public demonstrations, and compared these demonstrations to a set of typical budgeting system functional requirements.

In this report, the term "budgeting" refers to budget formulation and budget analysis. The third major budget process, budget execution, is the domain of enterprise financial systems and is beyond the scope of this report.

---

1. Vendors were selected based on several factors including: 1) previous contact with GFOA to publicize their offering of a stand-alone solution; 2) past participation in procurements for stand-alone systems; and 3) presence of existing installation(s) in stand-alone environment for a mid-size government.
2. These solutions are known by a variety of names including "enterprise performance management" (EPM), "corporate performance management" (CPM), and "business performance management" (BPM).

Section 3 - Product Typology

This section describes a typology of solutions that are available in the public sector budgeting system market. A typology of solutions is useful for providing a conceptual foundation for eventually evaluating specific products. This report divides the market into three basic types of budgeting solutions: Excel Add-Ons; Corporate Performance Management (CPM) systems; and Relational Systems.

Excel Add-On

Excel is easily the most popular budgeting technology on the market today. Excel also has a number of limitations as a budget tool that has caused organizations to seek more robust solutions. One strategy has been to create products that leverage the existing popularity of Excel for budgeting by extending the functionality of Excel through "bolting-on" additional technology features, such as collaboration mechanisms and improved security features. Excel Add-Ons have several advantages:

➡ Users are likely already familiar with Excel, so training and change management requirements are less.

➡ Technical administration responsibilities are less as the technology is generally less sophisticated.

➡ The total cost of ownership of such systems is lower than the other types of systems featured in this report: CPM and Relational Systems. This is due to the less sophisticated technology and lower training requirements of Excel Add-Ons.

➡ Excel is a flexible tool, so is fairly adaptable to many calculation and data entry requirements.

Excel Add-Ons also have a number of disadvantages:

➡ Excel Add-Ons are generally less scalable (i.e., they are less able to accommodate a larger number of users). Excel was designed to be an individual productivity tool, not an enterprise budgeting system. While add-ons can mitigate this limitation, they may not be able to eliminate it completely.

➡ While Excel does have flexibility to use many types of formulas and calculations, it is not backed by a specialized mathematical/forecasting engine, so it cannot meet more advanced calculation/forecasting requirements.

➡ Excel's inherent reporting capabilities are limited. For example, users cannot drill down on a

Drill-down allows users to instantly determine the composition of a given piece of data in the system and to shift their focus to the most relevant level of detail for a particular query.

chart of accounts to access underlying data values and text integration is difficult.

➡ Excel has limited security/rule enforcement capability. As an individual productivity tool, Excel has very few features for governing collaboration between users. Again, while add-ons can mitigate this to some extent, this is still an underlying limitation of the Excel platform.

➡ Excel Add-Ons require greater levels of user manipulation to achieve the desired result. Calculations or processes will not be as automated.

➡ The "add-on" portion of the Excel Add-On may create a reliance on proprietary desktop software, resulting in desktop support complications. For example, technical staff would have to re-install such software every time a new PC is issued and may need to perform upgrade work directly on PCs during upgrades to the budgeting system.

> **Improving Collaboration**
>
> While a lack of collaborative capabilities has been a traditional disadvantage of the use of spreadsheet tools for budgeting, Microsoft has stated its intention to improve collaborative capabilities of its line of office productivity products. These developments could, perhaps, mitigate this weakness.

Corporate Performance Management (CPM) Systems

A class of products called Corporate Performance Management or CPM has gained in popularity in the private sector due to the desire to merge the data available through enterprise resource planning[3] (ERP) systems with state-of-the-art reporting and performance planning capabilities in order to provide improved visibility on organizational performance. The IT analysis firm Gartner Group estimates that the total market for these products will grow by almost 75 percent between 2003 and 2009. In the GFOA's experience, a number of CPM vendors expect part of this growth to come from the public sector and are seeking to make inroads into the local government market.

CPM products are distinguished by a few key functionalities:

➡ **Budgeting, Planning, and Forecasting**. CPM supports development of annual budgets and longer-term plans, including workflow technology to manage formulation of budgets, and the ability to model scenario and "what-if" analysis. The planning component of CPM supports linking financial plans

> **Workflow** is the defined series of tasks within an organization to produce a final outcome. Worfkflow technology routes work between the persons responsible for each task. Workflow automates the hand-offs between these persons that often cause delays in a manual process.

3.   ERP systems are integrated financial and human resource administration applications.

to operational plans. These capabilities demand a strong ability to integrate with existing systems outside of the CPM solution.

➡ **Financial and Performance Analysis.** CPM products support techniques such as activity-based costing and activity-based management, including the ability to model the impacts of different resource allocation strategies on performance.

➡ **Performance Measurement.** CPM products include tools such as dashboards, cockpits, and scorecards designed to quickly and easily communicate key performance data to users. Further, CPM products have tools for modeling the relationships between performance criteria in order to arrive at an organizational performance model.

> **Dashboards, cockpits, and scorecards**
>
> "Heads up display" of the most important indicators of the government's performance.

➡ **Reporting.** CPM products provide the ability to query and report on data in a wide variety of formats and using a very wide variety of criteria.

One of the underlying technologies that is largely responsible for distinguishing CPM from the other two types of solutions described in this report is OLAP (online analytical processing). "OLAP" has become industry shorthand for analytical software using what are commonly referred to as "multi-dimensional" or "cube" data structures. Multi-dimensional data structures differ from the relational data structures commonly associated with online transaction processing (OLTP) systems (e.g., an accounting or payroll system) in that multi-dimensional data structures are designed to maximize the user's accessibility to data. That accessibility to data is provided along several different dimensions. For example, a multi-dimensional cube may be built to allow the user to examine expenditure data by date, service area, and geographic area, simultaneously, or, more germane to budgeting, by fund, program, or

> **CPM Key Terms**
>
> Several specialized terms are associated with CPM.
>
> • **Business Intelligence (BI)—**Systems that allow an organization to gather, store, access, and analyze data to aid in decision making. Advanced reporting and querying capabilities characterize BI.
>
> • **Executive Information Systems (EIS)—** Systems used to deliver critical strategic or tactical data to executives in a highly accessible format. EIS are associated with computerized "dashboards" and "scorecards."
>
> • **Extract Transform Load (ETL) tools—** Tools used to share data with other systems, which enable the CPM system to pull in data for planning and reporting or push out data for use in other processes.

> **Visualizing OLAP**
>
> To someone who has never seen OLAP in action, an MS Excel pivot table provides a useful reference point. Like pivot tables, OLAP allows users to consider and manipulate data from multiple perspectives, though with much more power and flexibility.

department. In contrast, relational data structures are designed to maximize the speed at which records can be edited, added, inserted, and deleted. Thus, relational data structures typically emphasize transaction processing efficiency over data access and analytical capability.

A result of this type of architecture is that CPM products are highly configurable so by design they are able to adapt to many different uses in multiple fields ranging from retail to government. However, their strength is budgeting, planning, and forecasting as they are designed to handle different categorizations of data simultaneously and perform complex mathematical calculations; not process heavy transaction loads. Thus, they would not be well suited for processing purchase orders, for example, but are very well suited for performing complex budgeting what-if scenarios.

Multi-dimensional data structures are quite useful for budgeting. The public sector budgeting process deals with many different categorizations of data that need to be managed simultaneously. For example, a budgeting process may be concerned with budgeting at the fund, program, and organizational level all at once. Further, different stakeholders typically desire to consider the budget process from different vantage points, such as an organizational view versus an accounting structures view.

Also, a public sector budgeting system must be able to display data (especially dollar amounts) at any level of summarization through all chart-of-account dimensions (e.g., show the user department requests summarized by fund, show the user all departments summarized by strategic program, etc.). This allows needed reporting and analysis to be undertaken at any point during the budgeting process.

Maintaining a CPM System

There are two important processes required to maintain a CPM system. First, the data cube with the proper dimensions must be developed and maintained. Secondly, the proper models and reports that facilitate the budget process and allow access to the data cube must be developed and maintained. In both cases, vendors provide sophisticated tool sets so that the system administrator does not require programming language skills, even to change the data cube.

In the GFOA's experience, developing and maintaining the data cubes and business models in a large organization (with greater than 10,000 employees) would require two full-time employees during implementation and two full-time employees following "go-live" to maintain the system—ideally one data base administrator and one business analyst. For a mid-size organization, dedicated FTEs are typically not required following implementation. A business analyst will be required for several weeks over the course of a year to modify the models as the budget process evolves. A technical data base administrator will be necessary for integration and data synchronization at several predefined points in the budget process. More time consuming would be maintaining report definitions. This would require approximately .5 FTEs that would ideally be filled by several people to ensure availability.

Multi-dimensional capabilities are also important for performance measurement. Performance measurement can benefit from the ability to consider performance data from multiple dimensions. Further, multi-dimensional capabilities can make it easier to "drill-through" (i.e., directly access underlying or closely related data at the click of a button) performance data, enabling the user to further investigate the data underlying the displayed performance information.

Of course, multi-dimensionality is only a means of organizing data. A CPM solution uses multi-dimensionality as one tool, albeit an important one, to provide a complete application. As described earlier, in addition to a multi-dimensional data structure, CPM systems include various security, workflow, and collaboration features designed to enable an enterprise-wide deployment of a complete budgeting and planning solution. In many ways, a CPM system is a toolset that allows the customer the power/flexibility to build a data model that best matches its budgeting process and then the supporting features (e.g., end-user interface, security, collaboration, workflow, reporting) to use the model as a budgeting application.

Given this flexibility, detailed public sector templates that can be used for model building are very helpful for successful implementations of these products. The GFOA has noted that, currently, CPM vendors either do not have comprehensive templates themselves or they rely on implementation partners to supplement their resources. While the latter is not necessarily a weakness, it requires that a government carefully evaluate the qualifications of the third-party implementer, and in particular their public sector experience and product-specific model building templates and tools.

In summary, the key advantages of a CPM solution are:

➡ CPM systems are feature/function rich. Sophisticated functionality is available, especially in the areas of analytics and modeling.

➡ CPM solutions were designed with enterprise-wide deployment in mind (i.e., they are scalable[4]).

➡ CPM solutions are intended to be a complete solution for enterprise-level planning, budgeting, and forecasting and therefore include a number of important features for budgeting and performance measurement at the enterprise level, such as workflow, role-enforcement, drill-down/drill-through, and ad-hoc querying.

➡ CPM solutions emphasize data accessibility, so are likely to have better technical performance for querying, reporting, and accessing data compared to other types of solutions.

➡ CPM systems are designed to be flexible enough to accommodate a very wide range of data management requirements.

---

4. Please remember that this report focuses on mid-size governments and that, as stated earlier, in this report the GFOA did not focus on scalability as it applies to very large governments.

Key disadvantages are:

➡ CPM systems are "best-of-breed" solutions that must interface with existing source systems to load in important data sets (e.g., payroll information). Interfaces are a significant point of potential failure in any systems implementation project because they often require customized technical development work and thorough analysis and reconciliation of data definitions between legacy systems and the new system. Fortunately, the industry has advanced tremendously and CPM vendors have focused on honing their abilities so that interfaces are less of a concern now, though governments should still be mindful of implementation challenges.

➡ CPM solutions can be more expensive to implement as the flexibility of the solution means that more configuration effort is needed to mould the solution to the desired customer business processes.

➡ CPM systems can be more difficult to maintain. Maintaining an OLAP environment can be complex and many customer organizations do not have significant experience in this area. For example, a budgeting environment might require set-up and maintenance of several OLAP cubes—such as a payroll cube, capital budget cube, revenue and expense cube—which customer staff would have to maintain. Also, interfaces with source systems require on-going maintenance. In the GFOA's experience, however, CPM vendors have made great strides in providing application tools that an average business person can use to perform maintenance tasks. This can ease the overall burden of support.

➡ While not an inherent disadvantage to CPM solutions, the reality is that many CPM vendors have grown their offering through purchasing other vendors and integrating the acquired solution(s) with their own. Integration concerns within the product may result if the vendor did not complete the necessary steps to fully integrate the new solution. A resulting complication is that CPM products may have elaborate licensing structures and require the customer to purchase multiple modules to fully benefit from the product's capability.

➡ CPM products were not built as applications specifically intended for the public sector—rather, they provide a flexible tool set that allows the user to configure the system to meet particular requirements. While this flexibility was cited as an advantage earlier, it is also a potential disadvantage—implementing a CPM solution requires that the government be up to the challenge of designing and configuring a data model that meets its requirements. This stands in contrast to the OLTP or Relational System application model, which is more familiar to most governments. Under the Relational System approach, the government simply purchases the data model inherent in an off-the-shelf product and adapts business processes to those found in the software—or customizes the software to the detriment of on-going maintainability. To mitigate this disadvantage, CPM vendors often offer implementation templates and accelerators to facilitate the development of data models so that the client does not have to develop the models from scratch.

➡ OLAP technology was originally designed to facilitate the analysis of limited sets of data. However, budgeting (especially in larger organizations) can require the manipulation of very large data sets in a manner that is more akin to transaction processing than analysis. Hence, if the CPM system is over-reliant on OLAP then system response time might be unacceptably slow and/or management and administration of the data model might be significantly more complicated.

➡ CPM vendors do not have nearly the research and development resources as top-tier ERP vendors, so some technical features, such as workflow, may not be as advanced as in ERP products.

Relational Systems

Relational Systems are strongly associated with the concept of online transaction processing. As mentioned earlier, OLTP systems use relational technology to maximize the efficiency of transaction processing. Common examples of OLTP systems are accounting and payroll systems. Many vendors of OLTP systems, notably ERP vendors, have used their expertise in relational technology and application design to create a Relational System budgeting solution. In these instances, the data model is designed to accommodate the data entry and access requirements found in a budget process and the application uses the familiar data forms and fields founds in other types of OLTP systems in order to interface with the user.

Advantages of Relational System budgeting solutions are:

➡ Commercially available Relational System budgeting solutions are offered through vendors that also offer accounting and, often, payroll systems. If the government has implemented these modules it can realize important integration advantages with the budgeting system. Also, cost may be lower if it is able to leverage special customer discounts.

➡ If the Relational System is part of an ERP suite, system-wide features are stronger when implemented in a full ERP suite environment. In other words, the budgeting system can leverage system-wide functionality within the ERP system, such as document management and workflow. For example, it may be easier to design and implement workflows that cross the boundary between the budget system and other modules.

➡ If the users are accustomed to the look and feel of OLTP systems (e.g., data forms, field entry, etc.) then it may be easier for them to adopt a Relational System. If implemented within an ERP suite environment, the Relational System could enjoy a particularly consistent look and feel for end users, thereby simplifying training requirements.

➡ If implemented in an ERP suite environment, technical support may also be easier as the customer can realize better economies of scale in support resources.

➡ In theory, technical support should be easier than with CPM, as the Relational System relies on conventional relational database technology. However, in the GFOA's experience, the difficulty of support is heavily influenced by the tools provided by the vendor to intermediate between the support personnel and inner workings of the system. If the support tools are of low quality or do not provide features to automate more technical tasks, the support requirements may actually be equal to or greater than for CPM solutions.

➡ In theory, a Relational System could provide a perfect fit between technology and the customer's business processes because the Relational System vendor is selling a purpose-built solution for public sector budgeting rather than a more generally applicable toolset, as with CPM. This means that if the solution designed by the vendor has a close enough fit to the requirements of the customer (or can be configured appropriately), then the customer can adopt the solution without the need to design its own data model, as it would need to with a CPM solution. Adopting the model inherent in a Relational System may be less risky than building a data model with CPM tools. This is because the Relational System's model has presumably been proven at other customer sites, rather than being built from the ground up for a particular customer.

Disadvantages of Relational System budgeting solutions are:

➡ Many of the above advantages rely on the Relational System as part of a complete ERP suite and would not apply in a stand-alone environment.

➡ Relational Systems are not built for reporting and analytics. Often third-party tools are necessary to provide supplemental abilities in these areas.

➡ Technical performance may not be as good for those functions of the budgeting process that emphasize data accessibility, as accessibility is not a strength of Relational Systems.

➡ Relational Systems revolve around data entry forms containing a number of fields. This lacks the drag-and-drop functionality and the ability to manipulate many cells at once found in the more spreadsheet-like interfaces associated with Excel and CPM.

➡ Relational Systems are often tightly coupled to the organization's accounting structure and

Customization vs. Configuration

These terms are often used interchangeably, but for the purposes of this report, customization refers to modification of a delivered application object, including tables, windows and processes, through either a traditional programming language such as COBOL, or SQR, *or* through the programming toolset on which the application was built. Configuration is a method of tailoring the processing of an application package through table-driven manipulation or otherwise modulating built-in parameters of application functionality. This includes correctly defining foundation tables and selecting numerous options from the potentially thousands of configuration choices available. Customization is to be avoided as it can compromise the upgrade path of the application.

chart of accounts. This complicates budgeting by goal, program, or other mechanisms that are not part of the chart of accounts string.

➡ A budgeting system will likely require interfaces with a number of other customer systems. Integration with systems outside the ERP suite has generally not been a strength of ERP vendors, so it is questionable how effective a Relational System from an ERP vendor could be on this count. However, the same advances in data interchange technology that CPM vendors have enjoyed are also available to Relational System vendors, so this is also less of a concern than it may have been in the past.

➡ Because budgeting and performance measurement processes vary among governments, it is unlikely that a commercial Relational System's out-of-the-box processes will perfectly match the customer's. Therefore, the system must be configurable enough to accommodate this variation without customization. Such configurability is not an inherent feature of Relational Systems and must be designed-in by the vendor. Thus, the customer must carefully determine if configuration options are flexible enough to meet its requirements.

➡ Relational Systems are generally difficult to reconfigure after initial implementation. However, budget processes are typically more prone to changes from year-to-year than other administrative processes. As such, the Relational System would need to provide the tools that enable the user to make such changes independent of consultant support. Traditionally, this sort of flexibility has not been a strong feature of Relational Systems.

➡ Highly configurable Relational Systems will have comparable implementation costs to CPM products.

Concluding Analysis

This analysis reveals that the market for a true public sector budgeting solution is not fully developed and there remains no "silver bullet" solution. Excel Add-Ons retain many of the limitations of stand-alone Excel and don't effectively address larger process orchestration needs (e.g., workflow technology). Relational Systems have not proven totally satisfactory either (for example, they are not in wide use for capital budgeting or performance measurement, as Section 4 will describe in more detail). Finally, CPM solutions have been primarily focused on serving private sector firms and have yet to convincingly demonstrate that they have a solid government-specific offering. That being said, there is clear progress being made in this market. Vendors recognize the need and are placing increasing emphasis on meeting the demand as the private sector market becomes saturated. Also, the tool sets offered though CPM products are becoming more sophisticated, increasing the likelihood that they could be used to configure a solution that meets a government's requirements.

Thus, if a government were to move forward with a budgeting system project it should realize that it would be a public sector early adopter, which entails rela-

tively greater risk than would purchasing and implementing a more established type of solution. For example, because of the limited number of governments that have implemented modern budgeting systems in a stand-alone environment, there are fewer lessons learned to draw upon. In addition, it will be more of a challenge to identify a budgeting system vendor partner with deep public sector experience. The implication is that careful planning and analysis are necessary to recognize and mitigate potential project pitfalls, since that government will be able to rely less on the experience of predecessors or the expertise of the vendor community for such information.

Also, while the foregoing categorizations capture the essence of the market, governments should realize that the lines between these categories are often blurred. For example, a Relational System may feature an OLAP-based bolt-on to mitigate the reporting/analytical weaknesses inherent to an OLTP environment. A CPM vendor may include data entry forms that mimic the data entry efficiency of a Relational System, or may even use relational data structures to organize data that doesn't require multi-dimensional capability. An Excel Add-On product may interface with an OLAP engine or make use of workflow or entry forms to gain some of the advantages of the other two types of budgeting solutions. Consequently, this typology should not be used to attempt to place vendors into rigid categories. However, it can help to remember the disadvantages and advantages of different types of solutions, and consider how vendors emphasize these strengths and compensate for weaknesses.

Section 4 - Government Experiences

This section describes the results of a survey of mid-size local governments on their experiences with budgeting technology. The survey itself is briefly described, and this is followed by an analysis of responses across three major areas of budgeting system functionality: operating budget, capital budget, and performance measurement. The section ends with a concluding analysis.

About the Survey

This survey was used to determine the technologies in most common usage in budgeting and performance measurement processes. The GFOA sent out the survey to local governments that had received the association's Distinguished Budget Presentation Award and that have an operating budget between $250 million and $500 million; out of 86 targeted governments, 64 responded, closing out the survey with a high response rate of 74 percent.

This brief summary of system usage and corresponding qualitative assessments will help guide governments' decision making on their budgeting and performance measurement technology solutions based on market comparisons.

The results have been organized in the same structure as the survey itself, with subsections on operating budget systems, capital budget systems, and performance management systems.

Each subsection of the survey questionnaire first asked the respondent to indicate what kind of system they had. The survey provided for the following possibilities:

➡ A stand-alone product purchased from an outside vendor (i.e., a product that is generally commercially available);

➡ One module of a more comprehensive financial management system that was purchased from an outside vendor (i.e., a product that is generally commercially available);

➡ A custom system developed specifically for the respondent by an outside vendor;

➡ A custom system developed by in-house staff;

➡ A system that centers on the use of spreadsheets (e.g., Microsoft Excel); and

➡ Other.

If a commercial product was used, the respondent was asked to provide the name of the product. The survey then sought to ascertain how satisfied the respondents were by asking directly about satisfaction and also how likely they were to replace the system in the next two years.

Generally, the GFOA found that the use of vendor-bought or commercial off-the-shelf (COTS) systems were most prevalent in operating budgeting processes, were less prevalent in capital budgeting processes, and least prevalent in performance measurement. Conversely, the use of in-house, spreadsheet-based systems was most prevalent in performance measurement processes and least prevalent in operating budgeting processes. This suggests, rather broadly, that the market is not meeting all the functional needs of budgeting in terms of capital planning and performance management. Other indicators, such as results to questions posed on satisfaction and the likelihood of system replacement, also supported these findings.

Operating Budget Development

The first issue the survey addressed was to define the type of primary technology system in use for the operating budget. The majority of respondents—about 61 percent—reported using a system purchased by an outside vendor (COTS); of those, 78 percent were using a module of a more comprehensive financial management system. Thirty-nine percent were using customized solutions, the majority of which were developed in house, and 22 percent of respondents reported using a more manual spreadsheet-based process. Exhibit 4.1 illustrates the itemized results.
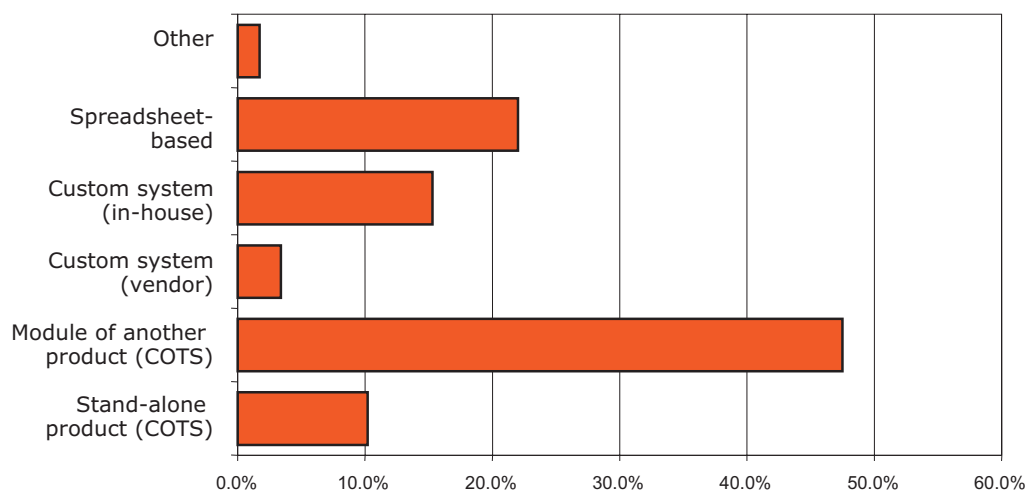
Exhibit 4.1 Primary Operating Budget System

Exhibit 4.2 identifies the systems used for operating budget development by survey respondents, presented by the number of respondents that used each system. Please note that this exhibit is not intended as a GFOA endorsement of any particular system.

Exhibit 4.2 Vendor Names of Systems Used: Operating Budgets

A. Stand-alone product (COTS)	# Citations
Brass, CGI-AMS	3
GovMax, Sarasota County, FL	2
B. Module of another product (COTS)	
Performance Series, Tier	6
JD Edwards	5
Sungard/HTE	5
Pentamation	3
Eden	2
Oracle	2
ACS	1
FAMIS	1
Mitchell Humphrey	1
MUNIS	1
New World	1
Sungard Bitech	1
C. Custom system (vendor)	
Component Publisher, Aleuron Systems	1
POD	1

As shown in Exhibit 4.3, satisfaction was relatively high (compared to the other two functional areas to be examined later) for the operating budget systems: 64 percent of respondents were satisfied or very satisfied with their systems; none reported being very unsatisfied with their current systems. A majority of respondents used modular systems and stand-alone systems, and moreover, 68 percent of those were satisfied or above with their systems, the highest level of satisfaction by system usage. Half of the 20 percent of respondents using spreadsheet-based systems were satisfied or above with their system; surprisingly, this rating was higher than that given by their counterparts in capital budgets, suggesting that although the system was not the system of choice (reflected by lower market demand), it was adequate to perform the main functions of operating budget development.

Those with stand-alone products and vendor-bought, custom systems both praised their systems for their flexibility, reporting, and publishing functionality. There were mixed opinions on their ability to interface with other systems. Other weaknesses included their ability to handle more complex requirements. In-house custom systems were also praised for their flexibility, reporting, ability

Exhibit 4.3 Operating Budget System Satisfaction
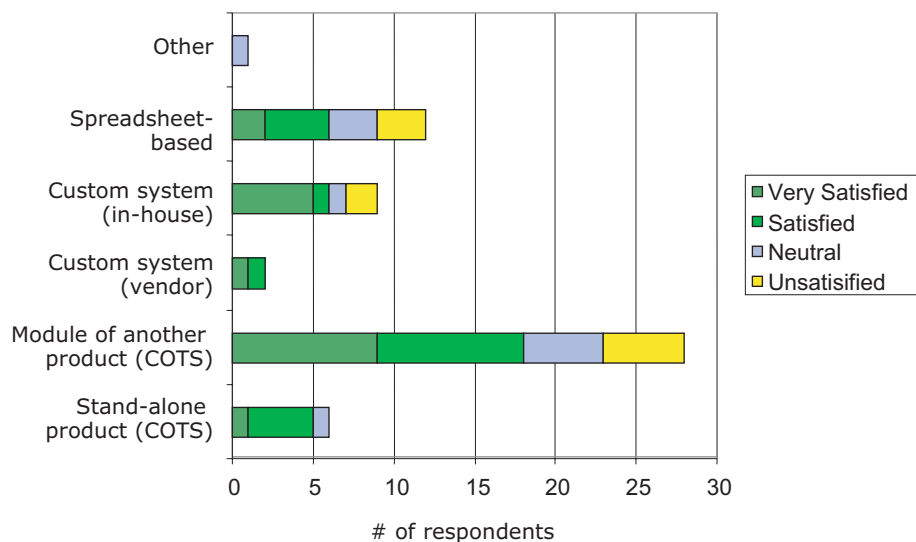
to customize to the exact specifications of the government as needs changed, and the ability to maintain them using in-house staff. Weaknesses of these systems included limited documentation, need for IT staff (not budgeting staff) to make changes, lack of ability to export into Excel, and the difficulty of interfacing with other systems. Those using modules of a more comprehensive financial management system extolled them for integration back to the financial system, ease of use, efficiency, ability to distribute the application to multiple users simultaneously, and flexibility. However, they found limitations in their forecasting capabilities, ability to support performance budgeting, report presentations, and inflexible structure (something that appears to contradict previous findings). Respondents using a spreadsheet-based system reported system strengths as flexibility, ability to distribute access to users, user familiarity with the tool, and low cost; weaknesses included their systems' stability, security, and reporting, in addition to the general labor-intensity of the process.

This is clearer when looking at the results of the likelihood of system replacement by system in Exhibit 4.4: only one of the respondents using COTS systems was thinking of replacing the systems (interestingly, COTS users were more likely to simply skip this question entirely), whereas 37 percent of those on spreadsheet-based systems wished to replace their systems.

Exhibit 4.4 Likelihood of System Replacement: Operating Budgets

How likely are you to seriously investigate finding a replacement to this system within the next two years?

Type of System	Very Likely	Somewhat Likely	Undecided/ Don't Know	Unlikely	Very Unlikely	Total	Percent of Total
Stand-alone	-	1	-	2	1	4	8
Modular	-	-	-	-	3	3	6
Custom (vendor)	-	-	-	1	-	1	2
Custom (in-house)	2	2	1	2	1	8	15
Spreadsheet-based	7	3	3	6	8	27	52
Other	1	2		5	1	9	17
Total	10	8	4	16	14	52	100

Capital Budget Development

Contrary to trends exhibiting in operating budget systems, the vast majority of respondents—75 percent—utilized a customized system developed in-house or a more manual system utilizing a desktop application such as Excel, suggesting that COTS products are not capable of meeting their needs. Twenty-five percent of respondents used a system purchased by an outside vendor; of those, 80 percent

Exhibit 4.5 Primary Capital Budget System
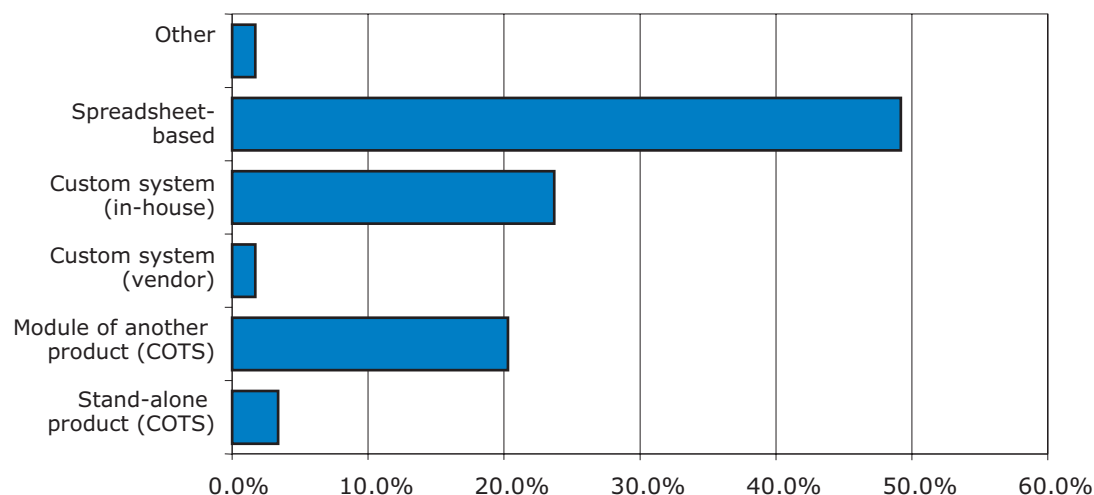
were using a module of a more comprehensive financial management system from many of the same vendors from the section on operating budget systems (see Exhibit 4.5).

Exhibit 4.6 Vendor Names of Systems Used: Capital Budgets

A. Stand-alone product (COTS)	# Citations
GovMax, Sarasota County, FL	2
B. Module of another product (COTS)	
JD Edwards	3
Performance Series, Tier	2
Sungard/HTE	2
Eden	1
FAMIS	1
Mitchell Humphrey	1
Oracle	1
C. Custom system (vendor)	
Component Publisher, Aleuron Systems	1

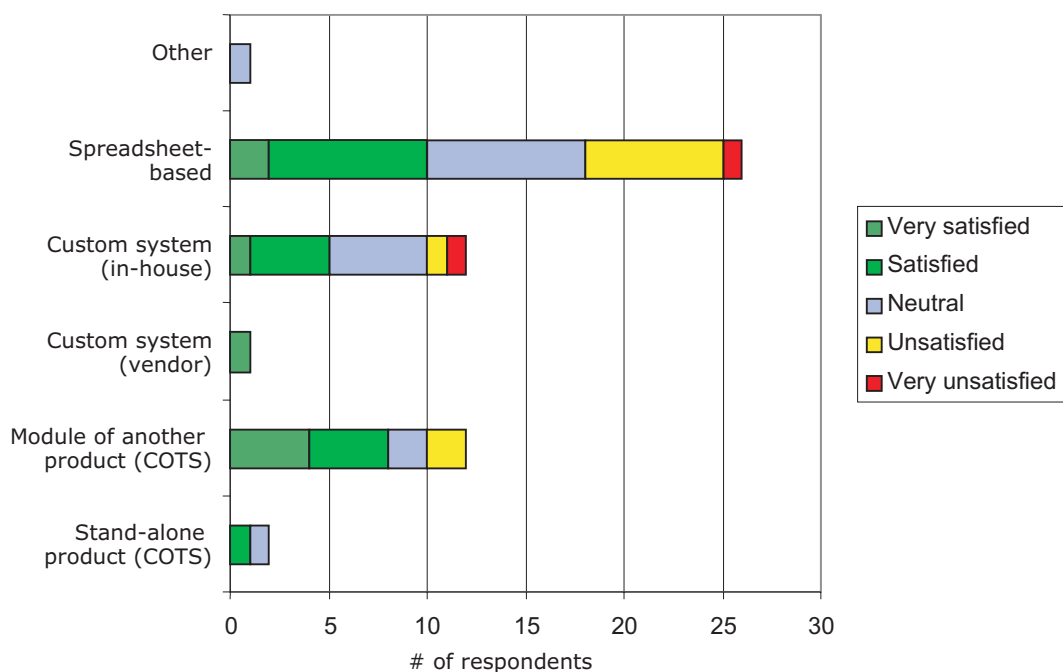**Exhibit 4.7 Capital Budget System Satisfaction**

Exhibit 4.6 illustrates the breakdown of systems used for capital budget development. Because the number of system users is so small, the number of citations provides more of a reference than a guide to market share or preference.

As shown in Exhibit 4.7, satisfaction levels for capital budget development systems were generally lower; including the appearance of "very unsatisfied" responses. Satisfaction levels for those on spreadsheet-based and/or in-house custom systems were splintered into satisfied, neutral, and unsatisfied camps, with tail ends at very satisfied and very unsatisfied, though the 39 percent of those who were satisfied or above is rather weighty, as this group forms a clear majority. However, it is interesting to note that the minority that use modular systems enjoyed higher satisfaction overall, with 8 out of the 12 reporting that they were satisfied or above.

The major trends in the strengths of in-house customized or spreadsheet-based systems included the following: ease of use and user familiarity with the tool, flexibility, and low costs. Basic weaknesses were deemed to be difficulties in compilation of a final budget, standardization of budget format and processes, interfacing with other systems and tracking of data between systems, and labor intensity of the process. For those with off-the-shelf systems, including multi-modular financial systems, advantages included improved customer service delivery to service populations, integration with other modules, coordination, and ease of printing reports. Disadvantages included problems with forecasting and creating new or multiple projects—inarguably a fundamental part of capital budgeting.

Exhibit 4.8 Likelihood of System Replacement: Capital Budgets

How likely are you to seriously investigate finding a replacement to this system within the next two years?

Type of System	Very Likely	Somewhat Likely	Undecided/ Don't Know	Unlikely	Very Unlikely	Total	Percent of Total
Stand-alone	-	-	1	1	-	2	3
Modular	1		1	5	5	12	21
Custom (vendor)	-	-	-	1	-	1	2
Custom (in-house)	5	4	1	4	-	14	24
Spreadsheet-based	4	9	5	7	3	28	48
Other	-	1	-	-	-	1	2
Total	10	14	8	18	8	58	100

As shown in Exhibit 4.8, overall more than 41 percent of respondents stated that they were likely to replace their systems within the next two years, and 52 percent of those using spreadsheet-based or in-house custom systems were likely to re-

consider their systems. This reflects the split trends in satisfaction described above; although some are unsatisfied or worse with their spreadsheet-based systems, similar numbers are satisfied, and the market has yet to supply a product compelling enough to buy.

Performance Management Development

As with capital budgeting, the majority of respondents —85 percent— were using an in-house customized or spreadsheet-based system, or a combination thereof. Of the remaining, roughly half were using a stand-alone product and half were using a module of another product (see Exhibit 4.9). While these results echoed those of the capital budget development section, there were some notable differences: the tendency to use an in-house customized or spreadsheet-based system further increased and there was also some usage of a few specialized performance management systems as stand-alone products.

Exhibit 4.9 Primary Performance Measurement Tracking and Management System
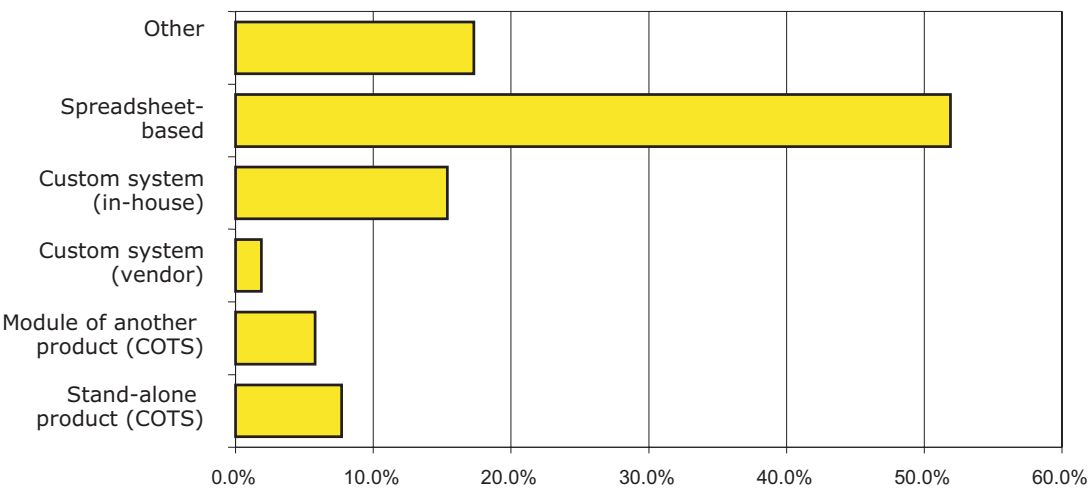
Exhibit 4.10 illustrates the breakdown of systems used for performance measurement tracking and management. Each system was cited only once.

User satisfaction was the lowest with performance measurement systems: only 24 percent were either satisfied with, or very satisfied with their current system. About 34 percent were unsatisfied, or worse, with their system and most were "neutral" towards their systems (see Exhibit 4.11). The largest group of system users, those on spreadsheet-based systems, had nearly equal numbers of unsatisfied (or very unsatisfied) users and neutral users; a minority were satisfied or above. Two out of the three using modular systems were satisfied, but one was

Exhibit 4.10 Vendor Names of Systems Used: Capital Budgets

A. Stand-alone product (COTS)
GovMax, Sarasota County, FL
QPR
ActiveStrategy
B. Module of another product (COTS)
JD Edwards
Oracle
Performance Series, Tier
C. Custom system (vendor)
Component Publisher, Aleuron Systems

Exhibit 4.11 Performance Management System Satisfaction
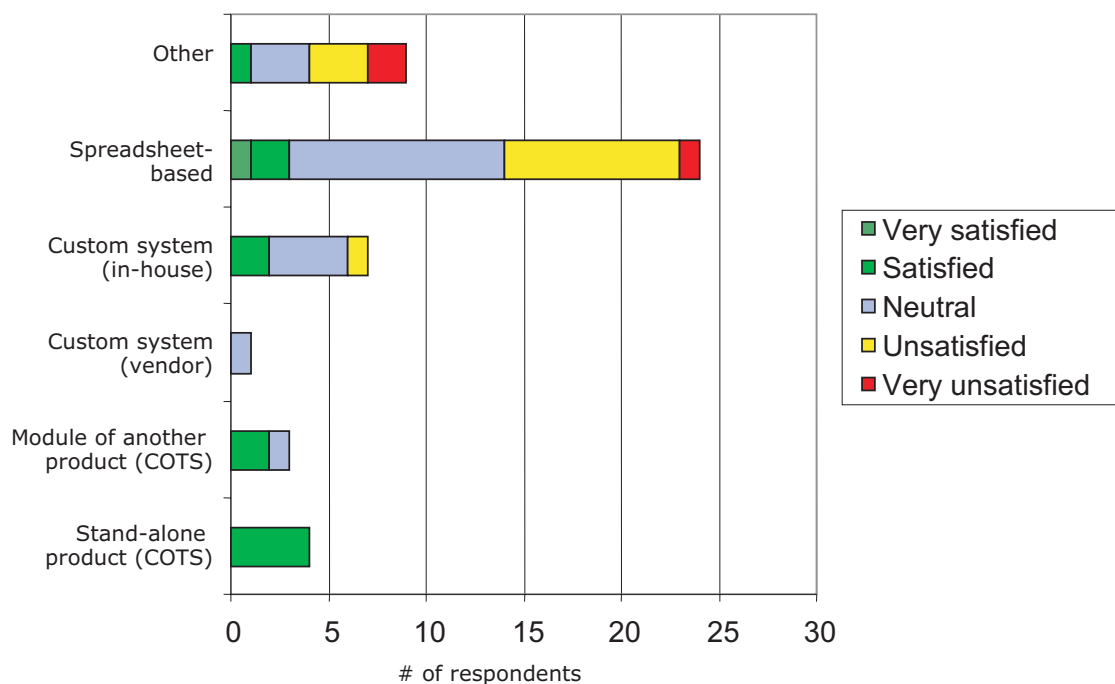
# of respondents

unsatisfied, leaving any meaningful interpretation of satisfaction of those using modular systems somewhat questionable.

As the number of respondents tracking and measuring performance was fewer, and most were using a spreadsheet-based system, the strengths listed were largely

Exhibit 4.12 Likelihood of System Replacement:
Performance Management Systems

How likely are you to seriously investigate finding a replacement to this system within the next two years?

Type of System	Very Likely	Somewhat Likely	Undecided/ Don't Know	Unlikely	Very Unlikely	Total	Percent of Total
Stand-alone				2	4	4	8
Modular			1		2	3	6
Custom (vendor)			1			1	2
Custom (in-house)	1	1	4	2		8	16
Spreadsheet-based	7	6	7	3	2	25	50
Other	2	4	4	1		9	18
Total	10	11	15	8	6	50	100

flexibility, ease, and customization. Trends in reported weaknesses of in-house customized and/or spreadsheet-based systems were over-reliance on manual calculations, lack of trend analysis, lack of uniformity, and weak analytical capabilities.

As the practice of performance management is still relatively nascent, the high percentage of respondents (42 percent)—all from respondents using custom in-house and spreadsheet-based systems—who expressed the likelihood to find a system replacement is to be expected. The greatest plurality of responses for finding a system replacement was under the "undecided" category, further reflecting the inexperience and indecision surrounding performance management. Detailed results appear in Exhibit 4.12.

Concluding Analysis

A diverse range of systems is being used for operating budgets. The majority of users, however, rely on a module from a more comprehensive financial system. Operating budget systems were the area of highest satisfaction and least propensity for system replacement, suggesting that the vendor community and government agencies have made the most progress in addressing public sector needs in this area, relative to capital budgeting and performance measurement. When considering capital budget development to performance management processes, there is a greater incidence of spreadsheet-based systems, suggesting that survey respon-

dents' primary budgeting systems have limited functionality in these two areas. This is reinforced by the fact that a greater number of respondents were interested in procuring new capital and performance management systems, although results here are inconclusive, as other factions were managing to cobble together a working system with which they could be reasonably satisfied.

The survey suggests that there is significant demand for better budgeting solutions among local governments. Even with regards to operating budgeting systems, the highest overall area of satisfaction, almost one third of respondents indicated a possibility of replacing their system within the next two years. Given the propensity of governments to maintain technology systems for long-term periods (i.e., ten years or more), one third is a significant portion. Also, this research indicated that the type of dedicated planning and budgeting software systems (CPM) that are in common use in the private sector are not in wide use in the public sector. The GFOA's research indicates that the providers of these technologies are quite interested in making inroads into the public sector marketplace. As these robust systems become accessible to governments, it may very well drive demand for new systems beyond what the survey documents.

Section 5 - Major Capabilities

This section describes major capabilities and indispensable features of modern budgeting systems. In the GFOA's experience, the budgeting systems currently available in the market can, in general, provide these features, though the quality of the approach can vary considerably. Hence, the information contained in this section can help governments better understand the opportunities available to them from a modern budgeting system. Should they elect to move forward with a procurement, this information can help them more effectively prepare detailed RFP requirements that reflect "must-have" functionality, and better evaluate proposals and consider implementation plans.

Budgeting System Features

End-User Input

➡ **Efficient Input.** Budget formulation requires the end user to enter a significant amount of data across a number of accounts. The budget system should provide tools to facilitate this entry, such as:

→ *Spreadsheet-like interface.* Interfaces that provide the sort of flexibility found in MS Excel for data entry and manipulation can accelerate budget input. For example, the interface should provide the ability to manipulate many fields simultaneously (e.g., apply a given percentage increase across a given set of accounts). Such an interface may be provided through the system's main interface or through a capability for tight integration with MS Excel.

→ *Notation of entries.* The interface should provide the ability to associate supporting documentation with an entry. For example, the user may wish to provide justification for budget requests using either free-form text or document attachments. Further, the user should be able to provide the justification at varying levels of the entry (e.g., a justification for a single account vs. an entire submittal or group of accounts). This information is often key to decision making during the budget approval process.

➡ **Collaboration.** A system must provide collaborative workspace to build budget requests. In other words, the solution must support intranet-based data sharing, provide requisite security to limit users to the appropriate portion of the request, supply a means to prevent collaborators from accidentally overwriting each other's work, and have the ability to hide certain portions of the request, as needed. The system should also provide workflow capabilities to move requests between collaborators.

Budget Formulation—Building Requests

➡ **Budget Requests.** The system should have the ability to develop budget requests and manage the associated approval processes (prioritizing and ranking, routing and workflow). There are a number of important sub-requirements here:

→ Ability to budget at the same level of detail at which performance is delivered and measured. In other words, a budgeting solution cannot simply budget at the level of accounting control favored by the organization as this may or may not match its budgeting level requirements.

→ Ability for top-down decisions to impact lower level units (e.g., set a top-down budget number and distribute it among subunits).

→ Ability to keep an audit trail of changes made to the budget requests, including values changed, when changes were made, and who made them.

→ Ability to combine additional supporting materials to budget requests such as documentation, text, or other types of unstructured content.

➡ **Decision Packages.** Many governments approach their budget process in two separate decision-making phases. First, they develop a baseline of the current services budget that determines the level of funding required to support the same level of services as in the prior years. Second are service improvements where the organization determines what new programs or improved services will be delivered to constituents, what level of funding is required, and what performance metrics the new services will be tied to. The budget needs to be developed and analyzed along these two separate processes, which requires departments to submit "decision packages" or various combinations of cost and services between which decision makers can choose. The budget system must support this requirement by allowing users to group/relate different accounts in order to construct a decision package.

➡ **Benefit and Salary Forecasting.** Given the importance of personnel costs to a government budget, the ability to forecast salaries and benefits is critical. A budgeting solution must be flexible enough to meet complex needs in this area, especially in unionized environments. This includes the ability to set up models/tables with imbedded formulas that can accommodate the often complex rules that sometimes govern pay and benefit provisions. For example, a separate rate or step-and-grade table may be necessary to interact with detailed position information (which must be pulled from an HR administrative system and stored in the budget system) in order to arrive at detailed salary expenditure projections. These tables and interactions allow the system to be able to calculate the impact, at any level of the organization (by fund, department, employee group etc.), of a change in one rate that may impact the changes to other pay types of a select group of employees. This type of functionality requires system flexibility and the ability to perform complex calculations.

➡ **Revenue Forecasting.** The system must provide support for revenue forecasting processes, not just expenditure planning. For example, revenue fore-

casting can be greatly assisted through the use of statistical techniques such as historical trend analysis and regression. The mathematical capability of the budget system should provide capabilities for these and other statistical techniques.

➡ **Budgeting Scenarios.** The system must allow several budgeting scenarios, enabling users to construct several budgets utilizing what-if scenarios and ultimately adopting or submitting one of them.

Budget Formulation—Process Management

➡ **Budget Process Monitoring Capabilities.** The system must provide the central office with the ability to monitor what stage the budget process is in (e.g., are requests started? incomplete? under consideration by an approver?). The system should also help decentralized participants navigate the budget process via a budget calendar or similar mechanism.

➡ **Point-of-Entry Alerts.** The budget formulation process may be subject to certain business rules. For example, perhaps the organization wishes to disallow formulators from requesting increases in personnel costs greater than 3 percent. In such cases, the budget system should provide the ability to prevent formulators from making such requests (through an online edit check or error message) before requests are submitted.

➡ **Budget Aggregation.** The system must provide for automated consolidation of various departmentally generated templates into a consolidated budget, with necessary validation such as balancing requirements. Advanced budget aggregation capabilities are also important, such as the ability to include or not include submitted data in the aggregated budget depending on the level of approval it has received. This also includes the ability to aggregate the budget in real time, for the benefit of the end user.

➡ **Version Control.** The system must have the flexibility to ensure proper versioning of the budget and its component parts so that draft, proposed, approved, adopted, and appropriated statuses can be tracked with auditable changes and so that supplementals, transfers, and/or adjustments can be easily traced back to the original budgetary items.

➡ **Multi-Dimensional Hierarchical Structures.** The system can support various alternate roll-ups of the chart of accounts, as may be required by the organization.

➡ **Budget Worksheet Preparation.** Beginning budget preparation worksheets can be easily built and distributed. Budget analysts can easily identify recurring and non-recurring events for beginning budgets.

➡ **Budget Publishing.** The system must allow incorporation of associated budgetary documents, and preferably allow printout of the entire budget, incorporating text and object documents where appropriate.

Budget Analysis

➡ **Guided Analysis.** Budget systems should provide proven methods and templates for analyzing financial and non-financial performance in order to help the organization make the best use of the software. This is especially important for helping end users without formal analytical training or expertise to realize the most management benefit from the system.

➡ **Statistical Analysis.** The system should have the ability to track statistics (i.e., variables) that impact financial resources and use those statistics to analyze budgets. For example, if the cost of maintaining the lawns of public buildings is partially based on the price of gasoline, the system should provide the ability to designate the price of gasoline as a key budget variable. Not only could projected gasoline prices be used to help model an initial budget, but also likely actual costs could be analyzed throughout the year as gasoline prices fluctuate.

➡ **Seamless Excel Upload and Download.** Budget analysis often entails ad hoc analysis of questions of short-term interest. In these cases, it may be much easier for the user to perform the analysis outside of the budgeting system in Excel and then upload the results.

➡ **Flexible Reporting and Analytics.** The system should provide the ability for flexible reporting and analytics to allow queries into any dimension of budgeting data required.

➡ **Alerts.** The system should provide alerts that notify users (and possibly the central office) if certain thresholds are exceeded or if budgets are out of balance.

Implementation and Flexibility

➡ **Integration.** Integration with source systems (i.e., financial, HR, other systems that have statistical data that needs to be interfaced with) is a requirement. This a matter of inherent integration capabilities for Relational Systems that are part of an ERP system, and is a function of ETL (extract, transform, load) tools and/or APIs (application program interfaces) for stand-alone systems. The budgeting solution must be able to push and pull data to and from other systems as needed.

➡ **Implementation Flexibility.** A budget system must be flexible enough to adapt to the process of the organization, rather than forcing the organization to adopt a system-imposed template. This may even include ability to adapt to different budgeting process requirements between different departments in the same organization. More specifically, the system must allow the budget department to prepare budget preparation templates, including instructions and a data entry mechanism with online data validation.

➡ **Ongoing Flexibility.** Not only must the system have the flexibility to adapt to the processes of the customer when initially implemented, it must also be able

to adapt to future changes in the financial and organizational structure of the customer.

➡ **Usefulness as a Year-Round Management Tool.** The budget system should have the capability of helping the organization to monitor financial status throughout the year. For example, if revenue or expenditure forecasts change during the year, the system should help identify these variances and make budgetary adjustments appropriately.

Performance Measurement System Features

User Interface

➡ **Personalized User Interface.** The solution should be able to present measurement results to the end user in the format most appropriate to that user's role/preferences. For example, the CFO would be primarily interested in financial performance information while the CAO would be more interested in broader-based performance information. Specific features include:

→ *User dashboard and scorecards.* Displays of relevant performance information in a highly visual format such as tables or graphs. This should include visual warnings of under-performance (i.e., highlighting unfavorable values, trends, etc.).

→ *Alerts.* The system should notify the user of unfavorable values or trends through means such as email or pop-up screen alerts.

→ *Imbedded queries.* Particular query structures can be saved and the results refreshed as needed.

→ *Flexibility.* The user interface should allow the user to easily change what appears on his or her dashboard as his or her information consumption needs change. For example, the user should be able to easily switch between a program and department-based view of expenditure indicators.

➡ **Drill-Through.** Users should be able to drill on displayed values (in either text or graphical formats) in order to see underlying values.

Data Administration

➡ **Centralized Repository.** The system should provide a centralized repository for performance data.

➡ **Data Capture.** The budgeting solution must be able to capture performance data originating from outside this system. This includes manual data entry mechanisms and automated interface tools. This may also require linkage to work order management and operations systems where cost information is collected at the activity level.

➡ **Data Quality.** The system should help identify stale values and push out notifications to owners of source data.

Metric Administration

➡ **Measurement Management.** This includes the ability to define measures in whatever way the organization requires, as well as the ability to establish relationships between measures (e.g., cause-and-effect), establish relations between measures and various accounting mechanisms (i.e., tying measures to dollars), categorize measures according to user-defined definitions, and categorize by performance. In addition, the system should have the ability to capture data and associate it with an effective date to support analysis and reporting of performance over time.

➡ **Aggregation.** Performance measures must roll-up into indices or other summary values to provide an overview of organizational performance to mangers.

Performance Management

➡ **Flexible Performance Management Model.** The budgeting solution should provide the flexibility to build customized performance models (rather than relying on a "canned" approach). For example, if the organization were using a balanced scorecard approach it should be able to model the scorecard to its exact specifications. The system should also be able to adapt to departmental variations on the organizations performance model, or even completely different models.

➡ **Strategy Mapping Capabilities.** The system must be able to help the customer map out its strategic intent in order to truly facilitate performance management. Simply monitoring individual performance measures with no link to an overall strategy will not be sufficient for this task. Ideally, the system can provide a graphical tool to visually show how measures relate to each other. The system should also provide the ability to define the relationship between different elements of performance (e.g., a strong relationship vs. a weaker relationship)

➡ **Business Planning.** Measures and strategy mapping must be accompanied by a long-range business plan and shorter-term tactics that explain how the organization plans to achieve the measures/strategies it has set forth.

➡ **Accountability.** The system should help the customer track accountability for results of measures, not just track the measures themselves.

➡ **Flexible Reporting.** The budgeting solution should be able to provide a variety of reporting capabilities, including trend reporting, reporting against target values, or reporting against historical values. The reporting tool must be useable by end users.

Capital Budget System Features

Capital Budget Formulation

➡ **Support Key Differences From Operating Budgets.** While there are many basic similarities between operating and capital budgets, there are also important differences that must be supported such as:

→ *Length of planning horizon.* A capital plan could cover up to twenty years.

→ *Milestone-based.* A capital plan may use project milestones as a major element of planning (e.g., plan, design, build, etc.)

→ *Track different dimensions.* Large project planning may require tracking of totally different dimensions/categories of data.

→ *Automate different workflows.* Workflow processes will likely be different, so the budgeting solution engine must have the flexibility to maintain separate workflows.

➡ **Knowledge Management.** Capital budgeting processes can be more complicated than operating budget procedures, so it is especially important that there be an online library for policies and procedures.

➡ **Consolidation.** The organization should have the ability to develop a complete capital plan in one location, even if departments are maintaining separate capital planning processes.

Project Perspective

➡ **Funding Requirements.** The system should provide for the ability to identify and track funding requirements for capital projects over the course of multiple fiscal years and budgeting periods.

➡ **Scenario Planning.** The budgeting solution should provide a subsystem for modeling potential project delays, cost over-runs, fluctuating interest rates, etc.

➡ **Account for Future Operating Impacts.** Capital projects often have significant impacts on future operating costs (additional personnel, maintenance, etc.). The system must provide a means to capture anticipated increases in operating costs and a way to roll them in the operating budget as appropriate.

➡ **Project Tracking and Ranking.** The system should provide for the ability to maintain a list of projects and rank them as required by the planning process, and also track projects as funded or unfunded and change the designation as needed.

➡ **Project Management System Integration.** It should provide two-way integration with accounting and project management systems to enable mid-plan analysis and re-estimation. Project management is very important to detailed capital planning, so the capital budgeting system needs to be tightly integrated

with project management. The system may even help provide project management metrics such as planned vs. actual expenditures.

Technology Features

Architecture Features

➡ **Common Architecture.** The various pieces of the application must form a coherent whole in order to enable data integration and improve system performance. Some particularly important points here include:

→ *Single store of metadata.* Metadata is simply the descriptor of data found within the system (e.g., metadata might define what a "fund" is). Metadata is important for maintaining a common understanding among users of what data means, which is critical for maintaining consistent reporting and analysis across users (i.e., maintaining a "single version of the truth"). Budget systems should maintain a single location for all system metadata to avoid conflicting definitions.

→ *Consistent user tools.* The tools provided by the system should be consistent across the application. For example, the reporting tools and technical support tools should be consistent. If they are very different, training will be more difficult.

➡ **Central Data Store.** A critical weakness of a spreadsheet-driven budget process is that budget data is dispersed amongst various users. Hence, a budgeting solution must provide a central location for all budgeting data.

➡ **Technology Platform.** There are several important features a budget system's technology platform should accommodate:

→ *Open database.* An open database (like MS SQL Server or Oracle) enables the use of standard integration (ETL) tools to move data in from source systems and back out to the same or other systems (like data warehouses).

→ *Open application architecture.* An open application architecture allows for easy integration with productivity tools like Excel, PowerPoint and e-mail systems. Published APIs can facilitate integration to commonly used systems such as SAP.

→ *Web access.* The technology platform should also provide for Web-based access. This is the most efficient means for providing access to decentralized users and reduces maintenance requirements at the desktop PC level.

➡ **Integration Ability.** As the foregoing implied, a budgeting solution's technical features must support integration with various source and destination systems. Particularly important is the ability to interface with the customer's financial and/or human resource systems for tasks such as synchronizing master data (e.g., chart of accounts), pushing and pulling budget information to the general ledger, and pulling actuals from the general ledger.

System-wide Features

➡ **Model Design Functionality (business rules and layout for forms/reports).** It is critical to a budget model that the required business rules (such as a payroll tax or a benefit calculation) can easily be incorporated in the budget templates/forms to avoid work-arounds or the need to access many screens to generate the required budget figures. This can also facilitate reporting by allowing all needed data to be accessed at one point, as opposed to having to use multiple tools to locate different data. This feature implies strong capability to managed data multi-dimensionally.

➡ **Security.** No organization wants to share information, such as salaries, to users across the organization. Also, no budget manager wants to risk that somebody deletes an approved budget, or changes formulas in budget templates and reports.

➡ **Workflow.** Workflow is important for three major budget process orchestration functions:

→ *Communication*—telling users what is needed;

→ *Collection*—obtaining the required data; and

→ *Consolidation*—putting the final budget together, including controlling multiple versions.

➡ **Content Management.** Unstructured data like free-form text is an integral part of the budget process and must be managed on par with structured data.

➡ **Collaborative/Central Workspace.** The system should provide a single location for a user to access the modules of the budgeting solution and share information between users.

Section 6 - Fit to Typical Requirements

The minimum qualification for any new software system is its ability to meet the basic functional requirements of the jurisdiction's current and anticipated business processes. The GFOA derived such basic functional requirements from general, assumed needs of midsize local governments, which served as the scripts for vendor demonstrations. Based on these demonstrations, this section presents an overview of systems' abilities to meet budgeting and performance measurement needs.

Overview

The most important finding of the GFOA's research is that the capabilities of most systems in the current marketplace appear able to meet functional requirements. While in the past these requirements would have been an endpoint for most systems - a stretch of their capabilities to meet the requirements at all - these requirements now represent a starting point for the marketplace as many systems have powerful analytical and forecasting capabilities.

Weaknesses do exist, of course. As described in Section 3, the two main categories of systems in the marketplace, CPM and Relational Systems, each have advantages and disadvantages based on their architecture. Also, publishing capabilities, especially in relation to the budget book, remain underdeveloped. However, the GFOA can confidently say that the market has made great strides recently in meeting public sector budgeting requirements. While this is encouraging, it presents its own challenges. For instance, jurisdictions that procure the more advanced systems in the market risk vastly underutilizing the systems' capabilities if they use them only to replicate current practices. This report will highlight these advanced capabilities but jurisdictions should also take the time necessary to thoroughly envision improvements to their budgeting process before implementation and also establish a plan to continually optimize their system and practices.

Given the systems' ability to meet nearly all of the basic functional requirements outlined by the GFOA, this section will focus on key differentiators in the market and areas where a government ought to focus its evaluation. The rest of this section is organized by budgeting system module, which is also how the GFOA organized its functional requirements:

➡ Base budget development, departmental requests, and consolidation
➡ Forecasting and analytical capabilities
➡ Reporting
➡ Publishing
➡ Performance measurement.

Base Budget Development, Requests, and Consolidation

The requirements in this section were used to determine whether the systems in the current market could meet the basic budgeting process needs—from building a base budget to consolidating department requests into a single organization-wide budget. It was clear from the demonstrations that nearly any budgeting process could be accommodated by the current systems. However, there were two distinct approaches with their own advantages and disadvantages.

Input Methods

The Relational System budgeting solutions utilize a form-based approach to the budget process with fields similar to those used in a financial accounting system. This results in a linear process (complete form A, complete form B, etc.) but one that is broken up into many pieces. As described in Section 3, the Relational System vendors provide a purpose-built solution. As a result, once the forms and process are created during implementation, it is difficult to change the budget process, although some systems enable users to add and delete fields using toolsets or commonly understood computer languages. While this allows small changes around the edges of the process, more significant changes to the process are more difficult.

Systems may also utilize an MS Excel-like data entry interface that not only mimics Excel in appearance but also provides Excel-like functionality. In some cases the vendor is actually using MS Excel as an interface that is built on top of its multi-dimensional data model engine; in others, the browser looks and acts like Excel and some vendors offer users both interfaces to choose from. The advantage to this approach is end-user familiarity with the interface and an overall better fit to budget development needs. CPM systems are particularly strong in providing an Excel-like interface. However, Relational Systems may also provide an Excel user interface. In these cases, the Relational System often requires uploading of an Excel sheet into the application. In such cases, the seamlessness of the upload process should be evaluated in terms of whether the typical end user can accomplish it or if it is a more technical task.

Regardless of their architecture, a differentiator between products is how they simplify the budget development process for users who access the system just once a year. The market's standard approach is to make the system as logical and Excel-like as possible. However, several vendors have also added features, such as a user checklist, that help walk users through the process.

Extract Transfer Load (ETL) Tools

ETL tools are commonly used to interface the budget system with other source systems such as the general ledger and payroll systems. Because of their best-

of-breed nature, CPM tools rely exclusively on ETL tools for data sharing with outside systems. Relational Systems, if used as part of an ERP package, have tighter integration and no need for an interface to standard administrative systems such as general ledger or human resources (as long as the administrative systems are part of the ERP system). ETL tools may be necessary for Relational Systems if the system is being used in a stand-alone environment or if the budget system must interact with systems outside of the ERP suite.

> **Extract Transform Load (ETL)** tools are used to share data with other systems, which enable the budget system to pull in data for planning and reporting or push out data for use in other processes.

Business Rule Development

A differentiator was the user-friendliness of the business-rules engine that is used to develop the base budget and accommodate the jurisdiction-specific processes that must take place to transform the prior year's budget or actuals into the base that is distributed to departments. The business-rules engine varied from a wizard tool with a click-and-drag interface that allowed business users to easily set-up processes that automatically manipulated prior year data to a form-based approach that relied on pre-set functions. In other words, some systems made it much more feasible for the business user to manipulate the business rules, while in other systems it was a more technical process.

Collaborative Workspace

All systems that the GFOA examined provided a collaborative workspace for departments to develop their requests and allow for multiple budget versions (although the system administrator must determine how many versions to make available to end users).

Workflow

The systems use security-enabled workflow to facilitate budget approval and consolidation with an appropriate audit trail, though power of workflow tools was variable between systems. For example, some systems can provide for automated workflow for a variety of budget tasks, while others are only useful for version control. In terms of a procurement, a government should consider which processes it might need automated workflow for, specifically, and then test systems' ability to automate those particular processes.

Audit Trails

The audit trails were also provided, though the exhaustiveness of the data captured by the audit trail varied. For example, products that had to conform to private sec-

tor requirements for Sarbanes-Oxley reporting tended to have very exhaustive audit trail reporting.

Appending Text and Documents

Different approaches were utilized for appending free-form text to the application (e.g., justification of budget requests). In some systems, end users are either able to add a comment (similar to Excel's cell notations) to any cell, column, or entire budgeting model. In others, a field was required to be created by the system administrator in which text could be entered. The former method is preferred as it allows the user greater flexibility. Different approaches were used to facilitate document inclusion in budget requests. Systems either allowed users to attach the URL location of a document or attach the document (as one might attache a document to an e-mail) that was then recorded in the approval screen that a supervisor previewed when a budget was submitted. In addition to considering how text is appended, governments should also consider how these appendices are reported. For example, is it easy to tie the appendices to the transaction they represent?

Security

In the current marketplace, users have read or write privileges based on their security roles. The security roles can be maintained by business users and must be hierarchical. For example, the Public Works director will have access to the budgets of all the divisions under her/him and those budgets, when submitted, are submitted to the director. The division chiefs only have access to their budgets and any sub-divisions under them. Budgets can be sub-divided, based on security, so that one analyst can work on the capital portion of their division's budget while another analyst can work on the operating portion.

Edit-Checking Entries

Another differentiator is the ability to check user entries against certain logic defined by business rules. Systems either utilized business rules to prevent users from entering values that exceed a certain threshold at the point of entry or utilized the reporting tool to identify and alert users who entered a value greater than the threshold, after the entry had been made and saved. While both approaches accomplish the goal of the requirement, for enabling the central office to create and enforce budgeting conditions as well as minimize mistakes, the first approach requires less manual work and is more proactive. Systems tend to compliment either approach with the ability to force users to add a comment if a value exceeds a certain threshold or displays a message to the user.

Summary points related to base budget development, departmental requests, and budget consolidation include:

☑ Systems in the current market can accommodate general budget-building processes from building the base budget to consolidating departmental budgets.

☑ The budget entry interface differs based on system architecture between form-based and cell-based. Mechanisms to assist users who access the system once a year vary.

☑ ETL tools are a common mechanism for accessing source-system data.

☑ The user-friendliness and flexibility of the business rules engine is a differentiator in the market.

☑ Security is role-based and hierarchical. The budget approval process is enabled by security.

☑ Different approaches are utilized to attach documents to budget requests.

☑ Currently there are different approaches to enforcing business rule logic within individual entry cells although the GFOA's market research indicates that this difference in functionality will diminish over the next year.

Forecasting and Analytical Capabilities

Forecasting and analytics refers to the budgeting system's ability to perform more complex calculations typically required by budget department staff (rather than the average end user), such as impact of a rate change for cost of living adjustments, salaries or benefits, or other more complex forecasting and scenario analysis, as well as data querying/manipulation capabilities more generally.

Data Querying and Manipulation

A term associated with analytical systems is "slicing-and-dicing" of data. This refers to the ability to view data from different dimensions (or slices). In this area CPM systems demonstrate their full potential as the multi-dimensional data structure allows the extensive slicing-and-dicing of information. Users are able to pivot columns and rows; switch views between dimensions; and even combine dimensions to achieve entirely new views of data (e.g., show expenditures per month and per quarter together for each department). As described in Section 3, Relational Systems are not built for this type of analysis and often use business intelligence reporting tools to supplement their capabilities. While this provides similar functionality, it adds a level of integration that may or may not be problematic.

Forecasting

Statistical formulas are a cornerstone of many forecasting methods. Hence, the ability of a system to provide true mathematical engines that can handle the most complex forecasting scenarios including regression and other statistical functions

is an important consideration. CPM systems typically feature a powerful mathematic engine, including the ability to utilize most any statistical function that would typically be required by a government budgeting process. However, a differentiator among the CPM products was the ability to document these forecasting scenarios. For example, one CPM product demonstrated a mapping function that allows users to document from which model a forecast pulls, pushes, or manipulates data. While Relational Systems can also perform mathematical forecasts, their functionality tends to be more limited and cannot be described as a true mathematical engine.

Real-time calculations are standard in the market today so that, for example, a change in a cost of living adjustment rate or assumption will automatically be updated throughout the system, impacting all figures that were based on that rate or assumption. Likewise, the ability to perform these calculations by employee group is also standard. However, the means by which this is accomplished varies. In the CPM system, this is done through a drag-and-drop function or a drop-down list while the Relational Systems rely on pre-developed forms or the use of a third-party reporting tool.

Scenario Analysis

Scenario analyses, or more complex what-if analysis, such as union contract scenarios, are handled differently in CPM and Relational systems. In CPM systems, a business user with administrator privileges would develop a model for the scenario and provide end users with several columns that they could use as a work space to perform the what-if analysis. Relational Systems demonstrated the same capability utilizing forms; however, a key differentiator was that some Relational System vendors advise their customers to copy the production database to a test file in order to produce the analysis without impacting production data. This calls into question the scenario forecasting potential of these systems and the ease with which the results of what-if scenarios could be migrated into the budget.

Informal Analytics

Users often face the need to analyze ad-hoc questions of short-term interest. In these cases, it is more efficient to use MS Excel and then upload results as needed to the budget system, rather than building in the capability to perform the analysis in the system itself. Hence, uploading and downloading to Excel is recognized in the current market as essential; this ability, however, is a critical differentiator between CPM and Relational systems. For CPM systems that the GFOA observed, this is a relatively simple import/export function available to end users. However, in some Relational Systems, a more technical ETL tool was required, which would be beyond the capabilities of most end users. For simpler imports, standard cut-and-paste features were sometimes available. Some Relational Systems, though, did have Excel import/export utilities comparable to CPM systems.

This section has noted the powerful forecasting capabilities of the CPM systems. It is important to realize that they are a function of multi-dimensional data structures. A great deal of planning and skill is required to develop these structures with the proper dimensions so that this type of analysis can be completed.

Summary points related to forecasting and analysis include:

☑ CPM products have powerful slicing-and-dicing capabilities.

☑ CPM products utilize powerful mathematical engines while Relational Systems have more limited forecasting capabilities unless they are supplemented by third-party products (often CPM reporting tools).

☑ A differentiator among CPM products are the documentation tools available to map complex forecasts.

☑ Real-time data calculations are standard in the market.

☑ What-if analysis can be accommodated by both CPM and Relational systems, however, complex scenarios are more easily created and pushed-out to users in CPM systems.

☑ CPM systems utilize an import/export function for downloading and uploading information to Excel while Relational Systems, in some cases, required an ETL tool or cutting-and-pasting.

☑ CPM forecasting and analytical capabilities are dependent on properly designing the multi-dimensional data structures they are based upon.

Reporting

Reporting capabilities include out-of-the box reports, report writers, and ad-hoc reporting tools. Due to their flexibility and ease of report creation, the CPM systems tend to rely on report writers and ad-hoc reporting tools as opposed to pre-formatted reports. Relational systems rely more on pre-formatted reports created during implementation and, as described above, tend to supplement their report writing capabilities with a third-party business intelligence or report-writing product.

Ad Hoc Reporting

The ad-hoc report writer provides end users with the data querying and manipulation capabilities discussed in the previous section. In CPM systems, users can use this range of querying and manipulation capabilities to create their own reports, which can be saved to a personal online folder. The reports can be saved as live (data will be refreshed when opened) or static as a point-in-time snapshot. Relational Systems often have a more basic query tool that has more limited querying and manipulation capabilities. However, Relational Systems typically supplement their ability with a powerful third-party business intelligence tool (perhaps even the identical tools used by the CPM vendors!).

Mass Reporting

Business users with administrative privileges can create standard reports for end users to run. These reports can be created for the entire organization and, when sent out to end users, only display data for which they have security to view. Reports can access any data in the system—budgetary data including historical actuals, current year, proposed budget, encumbrances, and available balance data at any level of the classification account structure, performance data, or even information from the audit trail. All of the systems previewed had report scheduling functionality.

Drill Down

Drill-down capability is another standard feature of both CPM and Relational systems. Users are able to drill down and across data in the system's primary data entry interface as well as reports, charts, and through the dashboard, as will be discussed below. Drill down, and especially drill across, capabilities are more extensive in CPM systems due to their basis in multi-dimensional data models and they can be combined with ad-hoc query functionality. Drill-down capabilities in Relational Systems are more limited and often tied to the available account hierarchy (e.g. users can drill down from fund to object accounts).

While there are clear differences in this area between CPM and Relational systems, the GFOA noted fewer differentiators between the CPM systems. The differences become that much narrower when Relational Systems supplement their capabilities with a third-party business intelligence application.

Summary points for reporting functionality include:

☑ CPM systems meet reporting requirements through the use of ad hoc report tools and report writers. Relational systems tend to rely on pre-formatted reports and third-party reporting tools although they do also have more basic ad hoc reporting tools.

☑ Ad hoc report writers provide end users with the ability to conduct analysis on the fly and create and save their own reports.

☑ Business users can write organization-wide reports with read-restrictions based on security that access any data in the system.

☑ Drill-down and drill-across capabilities are industry standard, although they are more extensive in CPM systems than in Relational Systems.

☑ The GFOA noted few differentiators between CPM vendors in this area.

Publishing

This critical functionality of a budgeting system—being able to produce the final product—remains the most under-developed component of budgeting systems in the marketplace. All the systems the GFOA previewed were able to produce a final published product; however, there is no standard approach and the GFOA did not consider any of them ideal.

The approach that produces the highest quality result utilizes a best-of-breed third-party publishing product. A professional-grade publishing tool comes very close to providing the one-click publishing solution considered ideal by most budget offices. Although such applications can produce a wide variety of publications, these products are also complex and may require skill sets not often found in local government. They require a significant amount of set-up and configuration, and several user local governments contacted by the GFOA indicated that while the applications work well, they are reluctant to make significant formatting changes due to the complexity factor. As with all third-party products, the level of integration with the budgeting system can vary.

The second approach utilizes the budget system's own publishing tools. These tools tend to be extensions of their report writers and seem to be capable of producing "what-you-see-is-what-you-get" documents, where the printed page duplicates exactly the on-screen previewed document. It is relatively easy to incorporate data from within the system including charts and graphs, which all automatically update in user-created page templates when information is altered within the system. The disadvantage to this approach is that these publishing tools have limited word processing capabilities. For example, this type of tool may not have spell or grammar checking abilities and text manipulation may be limited. Vendors taking this approach recommend composing text portions in Microsoft Word or another word processing application and cutting-and-pasting the text into the document or importing it from Excel.

The final approach utilizes a Microsoft Word interface with application extensions allowing the user to incorporate data from the budgeting system that will refresh at the click of a button. While this approach provides effective text manipulation capabilities, Microsoft Word is inherently not a professional publishing application and tends to become instable with larger-size documents.

Each approach allows for pdf documents to be produced so that publications can be posted to the Internet.

As budgeting system vendors increasingly compete for public sector clients, and given the limited number of critical differentiators between budgeting products, the GFOA expects the market to place increased emphasis on publishing capabilities. Currently; however, this remains a market weakness.

Summary points for the publishing requirements include:

☑ Publishing functionality remains under-developed in the market.

☑ Three approaches are utilized, each with advantages and disadvantages:

→ While a third-party application produces a professional grade publication, the complexity tends to require unique skill sets.

→ Built-in publishing tools produce what-you-see-is-what-you-get documents with limited text manipulation capabilities.

→ Microsoft Word interfaces allow for maximum text manipulation and include refresh extensions to budget system data but tend to be unstable for larger documents.

☑ Each approach is capable of producing pdf files for publishing to the Internet.

Performance Measurement

Reflecting the emphasis of performance measurement in the private sector and the federal government, where many budgeting system vendors have their largest market shares, these systems tend to include advanced functionality appropriate for only the most experienced performance measurement users in local government (although Relational Systems rely on third-party business intelligence reporting tools to achieve this functionality). However, given the growing interest and experience in local government with performance measurement, this functionality will likely prove valuable. Although these systems do have weaknesses, overall they were able to meet requirements and demonstrate potential for advanced functionality.

Performance Data

Maintaining performance data in a central repository is industry standard in the current marketplace. In fact, all of the vendors examined by the GFOA maintained performance data in the same database as budgetary data, allowing for easy integration of the two. Vendors used different approaches for entering performance data into the system. All provided ETL tools that could be used to regularly extract measures from source systems (e.g., a 911 system), although the GFOA did not have the opportunity to test this functionality. Vendors either utilized their budget request tools or separate forms to facilitate performance measurement data entry and most offered users the choice between the two. For the most part, this was a question of style, although the GFOA researchers noted the advantage of the form-based approach in this instance, as it seemed to better accommodate the greater narrative demands of performance measurement. Given the ease of importing information from Excel into modern budget systems (and CPM systems in particular), measures could also be entered into Excel and uploaded. Another possibility recommended by one vendor would be to create a separate Web entry form so that users could enter performance measurement data without requiring an application license. This approach is likely to be available for all CPM systems, although others did not specifically mention it. Regardless of data entry method, performance measurement data was easily viewed and reported upon, although

Relational Systems tend to utilize a third-party business intelligence reporting tool to supplement both reporting and publishing capabilities.

Management of Metrics

A current differentiator in the market is the ability for the central budget office to control the creation, editing, and deletion of performance measures. While all the systems provided functionality to enable this, they did so to varying degrees of effectiveness. For example, a number of the solutions reviewed by the GFOA did not have true object-oriented workflow engines but instead rely on security roles to affect a form of status reporting. Hence, users would then need to take manual action within the system based on the results of the status report, rather than the appropriate action being executed automatically by the system based on workflow-driven business rules.

Key questions when evaluating these systems are whether or not changes to the performance measures (as opposed to the data) are captured in the audit trail and whether workflow is enabled in both the form and budget-entry templates. It would be advisable to have defined very specific requirements for which business processes will require workflow automation prior to evaluation in order to best determine the capabilities of products to meet a government's needs.

Executive Information Systems—Dashboards and Scorecards

Allowing end users to create personalized dashboards where they can display their key performance indicators as well as have easy access to regular reports is also industry standard in the current marketplace. The Relational Systems relied on third-party business intelligence tools to accomplish this.

Performance Modeling

The GFOA also previewed the systems' capabilities to roll-up measures to organizational-wide goals and also assign discrete costs to measures (e.g., to determine the cost associated with impacting a crime rate measure). Performance modeling displayed some of the widest variance in capabilities. For example, one vendor demonstrated predictive analysis capabilities—the ability to alert users when measures were falling and pinpoint possible explanations—that were particularly impressive while two other vendors included strategy mapping tools allowing users to pictorially demonstrate the impact of measures on one another and overall goals. Several vendors offered out-of-the-box performance measurement frameworks such as the Balanced Scorecard and Baldridge criteria.

While beyond the scope of functional requirements, it is important to note that during implementation vendors provide varying degrees of performance measurement consulting services. Most expect to just take current measures and implement them in the new system, possibly with some validation. However, it is the

GFOA's experience that jurisdictions tend to have underdeveloped performance measurement systems. Before implementation, the GFOA recommends jurisdictions thoroughly review their performance measures to ensure they have a manageable number of measures, are measuring the most important dimensions, and have validated the data sources.

Summary points for performance measurement requirements include:

☑ Most systems contain advanced performance measurement functionality including predictive analytics, roll-up measures, program costing capabilities, and strategy mapping, although Relational Systems may use a third-party OLAP reporting tool to enable these capabilities.

☑ Maintaining performance data in the same, single database with budgetary data is industry standard. ETL tools are used to access data in other source systems and vendors offer data input through their budget request interfaces or a more form-based approach.

☑ Performance data can be reported upon and published in the same way as budgetary data; however, Relational Systems rely on third-party products.

☑ The effectiveness of enabling central control of adding, deleting, and editing performance measures varied. This functionality along with the inclusion of such information in the audit trail should be verified when evaluating systems.

☑ Personalized dashboards are an industry standard allowing for quick access to performance measures and reports. Again, Relational Systems rely on third-party products for this functionality.

☑ Jurisdictions should consider a thorough review of their performance measurement systems prior to implementation.

☑ The budgeting system must be able to align measures to government-wide priorities/strategies.

☑ The budgeting system must be able to handle the large amounts of data that are often associated with performance measurement.

☑ Current budgeting system technology reports quantitative performance measures most effectively so governments should consider how their performance measurement requirements would adapt to such an environment.

Concluding Analysis

The key finding from this market research in regards to functional requirements is the ability of most current budgeting systems to meet typical budgeting and performance measurement needs. An important distinction is the way in which CPM systems approach these requirements, as opposed to Relational Systems, which is a function of their architecture as described in Section 3. In discussing each budgeting system component, the GFOA has attempted to point out differentiators

both between CPM and Relational systems as well as between vendors within each category.

As noted in the introduction, the CPM products in particular have powerful forecasting and analytical tools that will be dependent not just on the skill of the jurisdiction in developing the proper data dimensions, but also in the skill of the key system administrator (a business, not IT, user) in developing effective and efficient models. Jurisdictions that procure these types of systems should give serious thought to how they intend to reorganize their budget offices to accommodate the needs and potential of these new systems. While the GFOA was impressed with the CPM capabilities, Relational Systems are not without their advantages. In cases where they have been developed specifically for public sector budgeting, the system, once configured, tends to support most budgeting requirements. When coupled with a business intelligence tool, they are also able to achieve very similar levels of functionality in querying and reporting to CPM solutions.

However, it is important to note that in general, none of the stand-alone systems profiled in this report enjoy a large presence in the market as a stand-alone budgeting solution. In fact, none of the solutions profiled has more than twenty installed sites, as will be discussed later. The next section provides an overview of the vendors, but it is important to emphasize that regardless of functional capabilities, given the limited install bases, any organization implementing such a solution will be an "earlier adopter" with all of the associated risks.

Section 7 - Overview of Vendors

This section provides overviews of the vendors who participated in this research. The primary purpose of this section is to provide some real-world illustrations of the types of companies who offer the kinds of solutions described in this report. These profiles should also help governments who might undertake a budgeting technology procurement to better understand vendors it might interact with. The profiles provided here include several vendors that fall under the Relational System and CPM system typologies described in Section 3 of this report. This section does not profile any vendors that fall firmly under the "Excel Add-On" type because the GFOA is not aware of any vendors that have a significant presence or potential for such a presence in the public sector market and/or that would be a particularly strong candidate for a solution. The accompanying sidebar lists some vendors of Excel Add-On solutions should the reader simply like to have a real-world example of such a solution.

Finally, please note that the vendor profiles are presented here in alphabetical order. The appearance (or absence) of a particular vendor from this report should not be construed as an endorsement by the GFOA or an implicit assessment of the quality of the vendor's solution. Also, it should be noted that this report does not offer a comprehensive cataloging of all of the vendors active in the public sector budgeting market.

Examples of Excel Add-On Solutions

- PerpetualBudget from Spicer-Baer (www.spicer-baer.com)
- A3 Modeling 2005 from A3 Solutions (www.a3solutions.com)
- Budget Tool Business from Bizpep (www.bizpeponline.com)

Business Objects

Background. Business Objects (www.businessobjects.com) is a vendor specializing in business intelligence and reporting tools. For example, Business Objects owns the well-known Crystal Reports product and Business Objects has been recognized by Forester Group as one of the top two providers of business intelligence products (i.e., reporting, dashboards, etc.).[5] Business Objects recently purchased SRC, which had concentrated on budgeting and planning tools. Business Objects, thus, has positioned itself to offer a complete CPM solution to the market and, in fact, the industry analyst firm Gartner Group places Business Objects in its top 8 (out of 18) CPM vendors.[6] As is described later, Business Objects has not made

---

5.   Forrester is an IT industry analyst firm. See "The Forrester Wave™: BI Reporting and Analysis Platforms, Q1 2006."
6.   See "Magic Quadrant for CPM Suites, 2005" by the Gartner Group. Note that this statement involved GFOA interpretation of the Gartner report – Garnter does not provide explicit numerical rankings.

any significant penetration of the public sector market for a complete CPM budgeting solution as of yet, but given Business Objects' resources, expertise in business intelligence, penetration of the public sector market with its other products, and recent acquisition of SRC it is likely they will become a serious player in the market.

Company Size. For 2005, Business Objects' revenues were $1.077 billion, up 16 percent year-over-year. Business Objects has 4,500 total employees. 1,500 of those are developers, 600 are involved in support and training, and 700 provide implementation services.

Install Base. Business Objects has approximately 35,000 customers worldwide, including 2,000 government customers. However, it should be noted that this figure is for Business Objects products in total, not just the Business Objects CPM suite. In other words, many of these customers may be users of Business Objects' business intelligence tools, which do not constitute a complete budgeting solution. Given that Business Objects' acquisition of SRC and, therefore, its ability to offer a complete CPM suite is a relatively recent event, it is likely that its install base of government customers using the complete portfolio of Business Objects CPM products is small. In fact, GFOA is not aware of any local governments in the United States that are currently using Business Objects' full CPM suite for a budgeting solution (although some are using particular products for budgeting applications).

It should be noted that since SRC was well established company prior to its acquisition by Business Objects, SRC has a sizable installation base of it planning and budgeting tools – over 2,000 customers in banking, retail, healthcare, government, and other industries.

Technical Architecture. The Business Objects suite of products (consisting of its planning and budgeting, business intelligence, and integration tools) uses as combination of web-based and client-server architecture, depending on the application. All elements of the Business Objects platform access the Planning and Budgeting application database through a "Universe." A Universe is how Business Objects provides a collection of data from different applications to particular set of users for a particular purpose, such as budgeting. Universes are a data warehousing technology created by Business Objects. The use of Universes makes planning and budgeting data is available in real time to all Business Objects applications.

Business Objects' stated direction is to develop its product to a 100% services-oriented architecture, which would give it great flexibility to work with a variety of infrastructure platforms and to more easily interoperate with other applications. Currently Business Objects works with all major database platforms and server operating systems.

Implementation/Services Strategy. Business Objects is capable of providing implementation services through its own services staff and also has integration partners for larger projects. These partners include Accenture, IBM, EDS, CGI, and Bull Services.

While specific information on the implement effort for the Business Objects product was not available, GFOA believes is reasonable to assume that it is similar to the effort required other CPM vendors. Typically, a CPM implementation project requires one to two full-time customer staff plus occasional participation by subject matter experts and technical support personnel. There are also typically one to two full-time consulting resources plus some additional part-time involvement from other consultants for specialized requirements.

CGI

Background. CGI (www.cgi.com) is a global, full-service business and IT consulting firm to the federal government, state and local government agencies, financial services, and communications industries. CGI has significant experience and expertise in both the business and technology sides of the public sector industry. CGI specializes in providing solutions in a number of areas, including enterprise resource planning, digital government, service, tax, revenue, and collections, and technology outsourcing services.

In the area of enterprise resource planning for the state and local public sector market, CGI offers a full ERP solution called AMS Advantage®. AMS Advantage, originally created over thirty years ago, was, and continues to be, designed exclusively for state and local public sector clients.

CGI purchased BTI in 1999 to fully incorporate and integrate the industry-leading budgeting solution into AMS Advantage ERP, and introduced its Budget Reporting and Analysis Support System (AMS Advantage BRASS) to the market. In 2003, CGI released CGI-AMS Performance Budgeting, which migrated AMS Advantage BRASS solution to a Web-enabled technical platform. CGI, CGI-AMS Performance Budgeting can be either a stand-alone solution or an integrated solution for users of AMS Advantage 3, CGI's Web-based version of its ERP suite.

Company Size. In 2005, CGI had annual revenues of approximately $3 billion. However, the performance budgeting software product is only one small piece of the entire company, so this revenue figure is not reflective of the actual market presence of CGI-AMS Performance Budgeting. Specific revenue figures for CGI-AMS Performance Budgeting were not available; however, the number of personnel in the AMS Advantage program (which includes CGI-AMS Performance Budgeting) was made available. This provides a better indication of the resources behind CGI-AMS Performance Budgeting (though only a portion of these are devoted specifically to CGI-AMS Performance Budgeting).

Personnel	#
Admin	3
Sales	30
Developers	300
Support	38
Services	450
Other (R&D)	50
Total	871

Install Base. CGI reports that over 80 clients have licensed AMS Advantage BRASS or CGI-AMS Performance Budgeting. Specific figures were not made available for the number of clients using CGI-AMS Performance Budgeting. The GFOA's experience suggests that because CGI-AMS Performance Budgeting is relatively new and many AMS Advantage BRASS clients have been on the product for a number of years, a relatively small portion of the 80 clients use CGI-AMS Performance Budgeting Management. The GFOA's experience also suggests that an even smaller subset of these use CGI-AMS Performance Budgeting as a stand-alone product. The GFOA estimates that the number of organizations using CGI-AMS Performance Budgeting as a stand-alone solution is not greater than ten and is probably fewer.

Technical Architecture. CGI-AMS Performance Budgeting is built using relational database technology. CGI-AMS Performance Budgeting is programmed in Java 2 Enterprise Edition and is completely Web-based. It works with Oracle, DB2, and SQL databases and with a variety of network operating systems including Sun Solaris, AIX, and Windows. CGI partners with other vendors to extend the functionality of its ERP solution. With the CGI-AMS Performance Budgeting product, CGI partners with Business Objects to extend the reporting and querying functionality and with Finite Matters to publish budget documents.

Implementation/Services Strategy. CGI provides both software and implementation consulting services to its customers. CGI promotes this hybrid-approach strategy as providing a single point of accountability for the success of both the ERP solution and services. This single point of accountability extends to other third-party solution providers with whom CGI partners to expand the functionality of CGI-AMS Performance Budgeting.

A typical implementation requires at least one full-time resource from the client, with part-time support from other functional and technical resources. CGI would provide roughly equivalent consulting staff to institute a standard implementation approach that has a 50 percent level of effort for the client and a 50 percent level of effort for CGI. An implementation typically lasts four to eight months.

Cognos

Background. Cognos (www.cognos.com) is a large provider of business intelligence and CPM solutions. For many years, Cognos was most well known for its reporting tools, and is still well regarded in this area as evidenced by Forester's evaluation of their products, who put Cognos in its top two vendors for analytical reporting.[7] About five years ago Cognos acquired Adaytum, a best-of-breed planning application and has integrated it with its existing solution such that it now can offer a complete CPM product. Gartner Group considers Cognos to be one of the top two CPM vendors in the industry.[8] Cognos has exhibited consistent interest

---

7. Forrester is an IT industry analyst firm. See "The Forrester Wave™: BI Reporting
8. See "Magic Quadrant for CPM Suites, 2005" by the Gartner Group.

in the public sector market as is evidenced by the high number of government customers for its products and the existence of a dedicated public sector sales and support staff.

Company Size. Cognos's revenues in FY05 were $825 million. It has 3,400 employees. Over 800 of these are developers, while about 600 provide implementation services.

Install Base. Cognos has about 23,000 customers worldwide, of which about 4,500 are government organizations. However, many of these customers are likely to be users of only certain Cognos products, rather than the entire CPM suite (e.g., many of these customers may be using only Cognos's reporting tools). In the GFOA's experience, there are a very small number of users of the entire Cognos CPM product for budgeting.

Technical Architecture. Cognos's architecture is built on XML, J2EE, SOAP, and other standards designed for enable a Web-based application. Hence, the vast majority of the application is Web-based. However, Cognos "analyst" users have a client-server interface. Analysts tend to be a relatively small portion of the overall user base (e.g., limited to key staff in the budget department)—most users are considered "contributors" to the Cognos CPM product and use product's Web interface. Cognos runs on Windows, UNIX (HP, AIX, Sun and Linux). From a database perspective, Cognos supports Oracle, Microsoft, and IBM. These databases are used to store certain portions of the Cognos data (i.e., metadata). In addition, Cognos uses proprietary OLAP technology to store certain portions of data in OLAP cubes.

Implementation/Services Strategy. Cognos has its own implementation consulting services capability to assist customers with implementation and also works with third-party integration firms to provide services where there are more extensive implementation requirements, such as change management or a large number of users.

Typically, an implementation project requires one to two full-time customer staff plus occasional participation by subject matter experts and technical support personnel. There are also typically one to two full-time consulting resources plus some additional part-time involvement from other consultants for specialized requirements. An implementation typically lasts between two and six months depending on the functionality to be implemented and the level of customer commitment (e.g., if the customer cannot commit staff on a full-time basis, the implementation can be extended).

GovMax

Background. GovMax (CMPP.net) is unique among the solutions profiled in this report in that in is not offered by a commercial software vendor. Rather, it is an application that was developed by Sarasota County, Florida, and that is now offered by Sarasota to other governments through an application service provider

(ASP[9]) approach. Several years ago, Sarasota County had found the market's available budgeting solutions to be unsatisfactory, so it developed a homegrown Relational System solution to meet its extensive requirements for performance budgeting, capital budgeting, and strategic planning/performance management. The county has a history of progressive use of technology and intergovernmental cooperation, so then began to share its solution with other governments.

GovMax is offered at a price point significantly lower than many commercial products. GovMax customers pay an annual fee based on the population level of their jurisdiction, with the lowest price point set at a $25,000 annual fee for the GovMax ASP service and nominal additional fees (a few thousand dollars) for start-up assistance from Sarasota County personnel.[10]

Company Size. Sarasota County is a mid-size county with an annual budget of just over $1 billion. More descriptive of the resources behind GovMax is the fact that there are approximately six full-time resources devoted to support and development of the GovMax program (Sarasota County uses a combination of in-house and contracted personnel to support and develop GoxMax).

Install Base. Thirteen governments currently use GovMax. Most of these are located in the State of Florida, though two are in Virginia and one is in Washington.

Technical Architecture. GovMax is programmed using Cold Fusion, runs on an MS SQL database, and leverages Crystal Reports for a reporting tool. Sarasota County is developing a new version, GovMax 5.0, that will be built using the Microsoft .Net framework (projected to be available in 2007). Since GovMax is offered as an ASP, the customer does not have to concern itself with the technical infrastructure required to support GovMax—it only needs to maintain a connection to the Internet. Sarasota follows practices in its datacenter designed to safeguard each customer's instance of the GovMax program.

Services Strategy. GovMax is also distinguished from the other solutions profiled here in that its implementation methodology is much more streamlined. The main elements are data conversion and training. Sarasota County provides a template that assists the customer to map its data elements to the GovMax data model and the data is then converted remotely. Sarasota County personnel provide the training, typically following a train-the-trainer approach. A GovMax implementation can usually be completed in a matter of weeks.

It should be noted that because GovMax was built specifically for Sarasota County and was not originally designed for commercial implementation, there are few system configuration options available in GovMax, meaning that customers must adopt the processes imbedded into GovMax. This lack of flexibility is what enables GovMax to have such a streamlined implementation, but at the same time limits the ability of customers to adapt GovMax to their own specific require-

9. An ASP is an arrangement wherein the application is hosted in a remote data center and accessed by the customer over the Internet.
10. Price is accurate at the time of publication.

ments. For example, GovMax assumes a certain chart-of-accounts structure and does not have flexibility to accommodate structures with significant differences. Sarasota County is building configuration options into its new GovMax 5.0, but is mindful of maintaining its low implementation costs.

Hyperion

Background. Hyperion (www.hyperion.com) is a leading provider of CPM products worldwide and is considered by Gartner Group to be the "leading" CPM product in the industry.[11] Hyperion has a long history in planning applications, particularly for financials, and is also well known for its ESSBASE product, which was one of the first widely used multi-dimensional data stores. Up to this point, Hyperion has focused the bulk of its attention in the public sector on federal agencies, though has stated to the GFOA that is intends to pursue the state and local market more aggressively.

Company Size. Hyperion's total revenues were just over $700 million in 2005. Hyperion staff exceeds 2,500 persons.

Install Base. Hyperion's products are in use by over 11,000 organizations worldwide, though as with the other CPM vendors profiled in this report it is questionable that all or even most of them are using the vendor's entire CPM suite. While the vast majority of its customers are in the private sector, Hyperion has some experience operating in the public sector. Several federal agencies, higher education institutions, and local governments use its software in some fashion.

Technical Architecture. Hyperion is a Web-based, n-tier application built around J2EE. Hyperion supports Microsoft, Oracle, and IBM databases, as well as IBM, BEA, and Apache J2EE servers. Hyperion requires use of its ESSBASE product for its planning and budgeting application (though not for business intelligence).

Implementation/Services Strategy. Hyperion has its own consulting services capabilities to assist customers with implementation and also has a partner network of more than 400 organizations in order to provide implementation service through a third party. In the GFOA's experience, a Hyperion implementation appears to have very similar resource requirements to other CPM products—one or two full-time customer staff for a two- to six-month period, plus occasional use of subject matter experts and technical support. These customer staff would be supported by one or two consultant staff members, and potentially a few additional resources for specialized needs.

---

11. See "Magic Quadrant for CPM Suites, 2005" by the Gartner Group.

Lawson

Background. Lawson (www.lawson.com) provides business administration applications (ERP) to a variety of industries across the world. Lawson recently acquired Sweden-based Intentia AB, and the two are now operating as a single company.

Lawson is currently re-designing its existing Budgeting & Planning solution to meet the needs of many industries including the public sector and to take advantage of new technologies. Lawson intends the solution to be very flexible and also well integrated (but loosely coupled) with its ERP solutions. Lawson reports that the product will serve centralized and de-centralized budgeting authorities with appropriate security and approval policies and will include many public-sector specific features such as position-based budgeting, budget versioning, revenue/expenditure modeling, supplemental budgets/budgetary adjustments, split-funding, outcomes-based budgeting, etc. Lawson intends to target the solution primarily towards its existing ERP customers (or new ERP customers), though Lawson reports that the solution could be used in a stand-alone environment. The re-designed version is currently targeted for release during the second half of 2006. A follow-on version is scheduled for release within twelve months after that and is targeted to include more public-sector specific features such as program-based budgeting, target-based budgeting, discretionary vs. non-discretionary budget planning, etc.

Company Size. After the merger with Intentia, Lawson is now a $750 million company with 45 percent of its revenue coming from North America. Lawson has about 3,500 employees; about 1,500 of these are professional services consultants.

Install Base. Lawson has over 4,000 customers in 40 countries. In the U.S. public sector, Lawson has about 150 customers including federal agencies, state-wide/state agency implementations, city/county government, public utilities, a few colleges, many not-for-profits, and a number of K-12 school districts. These numbers reflect the install base of Lawson's ERP product and do not reflect the install base of its new budgeting product, which is still under re-development.

Technical Architecture. Lawson states its budget solution will be Web-based and use open, standard J2EE technologies, which is consistent with the direction Lawson has taken with its ERP product line. Lawson intends to move towards a services-oriented architecture for both its ERP product and budgeting solution.

The budgeting solution's data structure designs will make use of standard OLAP and RDBMS capabilities where needed. Many functions will not require capabilities beyond standard RDBMS and transactional/inquiry. Higher-order functions will take advantage of standard OLAP data structures.

Services Strategy. Lawson's own Professional Services will be the primary delivery mechanism for its budgeting solution. Lawson partners with third parties to offer specialized implementation services, such as process benchmarking services via the Hackett Group.

Microsoft

Background. Microsoft (www.microsoft.com) is one of the world's largest technology companies and one of the 100 largest publicly held companies in the world, overall. Microsoft specializes in business applications, platform applications (e.g., PC and server operating systems), and entertainment and mobile technology. Microsoft is perhaps most recognized for its Windows operating systems and Office personal productivity solutions. Microsoft also is the provider of the well-known Great Plains ERP product, now branded Dynamics GP.

Microsoft's current strategy for budgeting, planning, and forecasting technology is built around its Microsoft Enterprise Reporting solution. In summer 2007, Microsoft plans to supplement this offering with a business intelligence suite called PerformancePoint Server. Microsoft anticipates that this will provide additional reporting, forecasting, and scorecarding capabilities to its solution offering. While Microsoft is coordinating the development its budgeting/forecasting solution with its ERP solution, it sees the two as separate solutions, with the budgeting component completely capable of operating as a stand-alone solution.

Of course, Microsoft is the vendor of the Excel spreadsheet tool, probably the most widely used budgeting tool on the planet. Microsoft plans to leverage this by making Excel part of the core user interface of the forthcoming PerformancePoint Server product. Microsoft anticipates that incorporating Excel into Performance Point Server will mitigate one of Excel's traditional weaknesses for budgeting—lack of collaborative capabilities—by providing scalable use up to thousands of users, budget approval workflow, and user security.

Company Size. Microsoft's FY05 revenue was $39.7 billion and it has approximately 65,000 employees worldwide. Of those numbers Microsoft's U.S. Public Sector represents approximately $2.0 billion and 600 employees (Products & Services).

Install Base. The Microsoft Enterprise Reporting solution has an installed base around 2,500 customers worldwide (both public and private sector). The solution is built for mid-size to large organizations with about ten to hundreds of budget users (the largest customer has close to 2,000 budget users). Almost all the larger customers use the thin Web-client for full budgeting and reporting capabilities from their Web browser (remote access and/or on the local network). Microsoft intends to target its Enterprise Reporting and PerformancePoint Server to mid-size and larger customers going forward (Microsoft defines a mid-size user as having at least ten budgeting users, ten cost centers, and fifty funds or programs).

Technical Architecture. Microsoft's current Enterprise Reporting solution uses the MS SQL database for budgeting and reporting and MS Analytical Services for analysis. The Enterprise Reporting Web portal is written in .Net, while the Windows client is written in Visual C++.

The PerformancePoint Server will also use both MS SQL (relational) and MS SQL Analytical Services (OLAP). Microsoft believes that use of both relational

and OLAP technology will enable fast retrieval of data as well as efficient write back for updating data. PerformancePoint Server will be programmed using .Net 2.0. PerformancePoint will not be a traditional client-server tool, however, it will require that users have Excel installed and that a small add-in be installed to Excel in order to login to PerformancePoint and share Excel sheets through the product. The application also enables work in an offline mode. This means that only the data the user has access to is downloaded to the PC so that the user can work offline and upload updates later.

Services Strategy. Microsoft has traditionally deployed its business solutions, including the Enterprise Reporting solution, through a network of Microsoft-certified partners. In addition to possessing a defined skill set in the appropriate Microsoft products, these partners also often have a particular specialization in serving public sector customers. Microsoft plans to continue this approach with the PerformancePoint Server. Additionally, Microsoft is developing the capacity to work with those customers that would prefer a more direct relationship with Microsoft (as either a prime or sub-contractor) rather than working with a Microsoft-certified partner.

Oracle

Background. Oracle (www.oracle.com) is a leading worldwide provider of business application, database, middleware and business intelligence solutions. Oracle's application product offering includes recent acquisitions such as Peoplesoft Enterprise, JD Edwards EnterpriseOne, and World and Siebel CRM. Oracle has taken an approach wherein all of these product offerings are sold through a single Public Sector sales organization. Oracle has publicly stated its intention to continue to develop and support all of these product lines, in addition to developing the next generation of products called Fusion Applications.

Oracle provides budgeting solutions to support multiple product lines. For the Oracle E-Business Suite, both Enterprise Planning and Budgeting and Public Sector Budgeting are offered to state and local customers seeking budgeting solutions. Enterprise Planning and Budgeting can work as both a standalone solution as well as an integrated solution within the Oracle E-Business Suite. This solution leverages the multi-dimensional capabilities within the Oracle database. Public Sector Budgeting is a more traditional relational solution that is integrated with the Oracle human resource and financial systems. Planning and Budgeting is the solution offered to customers using the Oracle Peoplesoft Enterprise product line. This is an integrated budgeting solution that also provides multi-dimensional analysis.

Oracle has identified the public sector as one of its top three industries of focus. As such, there has been a continuous process to develop and enhance budgeting solutions targeted at the public sector. Its first public sector budget solution was released in 1998. Since that time, through the course of development and acquisition, Oracle has extended and deepened its solution offerings. Oracle has stated

that budgeting is considered a key focus area within its public sector solution set. Its intention is to continue to provide solutions that can be used by existing Oracle application customers as well as organizations that are specifically looking for a stand-alone solution. Oracle has traditionally focused on selling its business applications as a full suite of products. With its new product offerings, Oracle has indicated that it is committed to selling and supporting its budgeting applications as both separate products capable of matching those products offered by "best-of-breed" vendors and as complementary products within its full suite of business applications.

Company Size. In 2005 Oracle had approximately $11.8 billion in global revenues. As of May 31, 2005, Oracle had 49,872 full-time employees. Of these 11,445 were in sales and marketing, 4,937 in license update and product support, 14,125 in services, 13,114 in R&D, and 6,251 in general/Admin. Of these, 21,544 were located in the United States.

Install Base. Oracle has 30,000 customers across all its business application product lines. Although only a portion of these customers is in the public sector, it does mean that Oracle still has a number of government customers. Of these customers, it is unknown how many utilize Oracle's budgeting applications. In the GFOA's experience, it is probable that only a portion of Oracle's government customers is actively using its budgeting applications.

Technical Architecture. All of Oracle's products are Web-based. The specifics of the technical architectures differ between products. As mentioned earlier, the Public Sector Budgeting module is a relational product, enterprise planning and budgeting is a CPM-type product, while PeopleSoft Planning and Budgeting has characteristics of both a CPM and Relational system.

Services Strategy. Oracle has traditionally leveraged a partner network to deliver implementation services to its customers while also using its own implementation services capabilities in some cases. This strategy will remain the same for public sector budgeting applications.

OutlookSoft

Background. OutlookSoft (www.outlooksoft.com) is a CPM software vendor that is firmly rooted in Microsoft technology (and is a Gold Certified Microsoft partner). OutlookSoft is a newer company than the other firms profiled in this report, having been founded in 1999. Regardless, OutlookSoft is generally regarded in the industry as a strong CPM package. The industry analyst firm Gartner Group places OutlookSoft in its "Visionaries" category, not too far from its "Leaders" category.[12] The U.S. state and local market is a new entry for OutlookSoft, which recently formed a dedicated sales and support staff specifically for the public sector market.

---

12. See "Magic Quadrant for CPM Suites, 2005" by the Gartner Group.

Company Size. OutlookSoft is a privately held company and declined to provide revenue figures. However, OutlookSoft did provide a comprehensive employee headcount.[13]

Personnel	#
Admin	28
Sales	42
Developers	64
Support	11
Services	39
Other (R&D)	NA
Total	270

Install Base. OutlookSoft has 220 fully live customers and reports to have a number of other customers in various phases of implementation, with the total customer base exceeding 400. Currently, OutlookSoft has two live public sector customers in the United States and thirteen government agencies in Europe. When the definition of public sector is broadened to include organizations such as higher education and healthcare, OutlookSoft has 33 live customers. The GFOA is aware that at least of few of these customers are using OutlookSoft for a budgeting solution.

Technical Architecture. OutlookSoft CPM is Web-based. The only client requirements at the desktop include Excel (an Excel Add-On is also installed as part of the software) and a browser. For the creation of its product, OutlookSoft uses standard Microsoft development tools such as VB, ASP, Active X, HTML, NET, XML and C++. OutlookSoft uses Microsoft SQL Server and is developed exclusively around the Microsoft Business Intelligence Platform architecture including Microsoft SQL Server, Analysis Services (an OLAP engine), and enterprise-scale Excel (WebExcel). OutlookSoft is unique among the CPM vendors profiled in this report in that it has not grown its product through acquisition—all components of OutlookSoft CPM were originally created by OutlookSoft.

Implementation/Services Strategy. OutlookSoft has its own implementation resources and also works with third-party integration firms. In the public sector, OutlookSoft typically takes a partnered approach to implementation, wherein OutlookSoft consultants are included on a third-party implementer's project team in order to provide technical and product expertise. In the state and local government market OutlookSoft partners with a number of different integration firms with public sector experience.

An OutlookSoft implementation requires one FTE at a minimum. More resources would be advisable in order to have the best project results in terms of model quality and customer knowledge transfer. Additionally, occasional involvement from IT is required—about a 10 percent involvement during the implementation—mostly during the initial stages of implementation to configure the environment. In the GFOA's experience, a similar effort from implementation consultants is required. A project involving one component of a full CPM suite (e.g., just operating budgeting) typically ranges from 60-90 days in duration. A full suite may take up to six months.

---

13. Note that the total number of employees is a worldwide count while the detail is for the United States only, so the detail counts do not sum to the total.

SAP

Background. SAP (www.sap.com) is a world-leading provider of ERP software. SAP began selling its product in the private sector, but has also had significant success in the public sector. Due to its significant size and R&D resources, SAP has been able to develop its own CPM-like capabilities, above and beyond the OLTP financial and human resources applications it is best known for. In fact, SAP was ranked by Gartner as a "Challenger" in the CPM market (following leaders), due to the resources of the company and the large install-base its products enjoy. SAP had initially developed analytical capabilities to complement its core transaction-processing products, but appears to be further developing its products such that it might even be viable as a stand-alone product.

More specifically, SAP is releasing a toolset called "BI Integrated Planning" that is integrated into SAP's Business Warehouse (BW) product (all of these products are part of the larger Netweaver 2004s Platform). SAP's vision is that this product will represent a significant step forward by enabling its customers much greater flexibility to design and access data models, such as data models designed for budgeting. Previously, the SAP budgeting tools interface followed a very form-centric approach that relied on standard Relational System-like features such as fields, drop-down menus, and radio-buttons. Modifying the form to suit particular roles was not something that was typically within the power of an average end user to accomplish. The new product is supposed to deliver the ability to create much more variety in user interface including tools that enable the end user to more easily vary the interface to particular needs and to utilize MS Excel more fully as the user interface. Besides improving the user interface, BI Integrated Planning is intended to improve reporting and query abilities generally.

In addition to releasing the new BI Integrated Planning toolset, SAP also intends to release "business content," which are templates designed to help customers configure the models to suit particular application needs. For example, SAP would provide business content to help create a public sector budgeting application. This is a similar concept to how some CPM vendors have developed templates to help customers develop models for public sector budgeting more quickly, rather than requiring models to be developed from scratch. SAP intends that public sector business content will be available around the same time as the BI Integrated Planning toolset.

Hence, SAP is not releasing a public sector budgeting module, per se, but more like CPM vendors is planning to provide a toolset that can be used to create an application that satisfies public sector budgeting requirements.

Although SAP envisions the new product as capable of standing alone, it is important to note that stand-alone CPM or budgeting products have not been a traditional sales focus for SAP—rather it has seen such tools as a complement to its core transaction processing applications. Hence, it remains to be seen if SAP is fully committed, as a company, to delivering world-class budgeting functionality to its customers or if the product will serve to deliver more basic features. It also re-

mains to be seen if SAP is committed to the stand-alone budget system market or if SAP's offering will only be of serious interest to users of its ERP products.

Company Size. SAP is the world's largest inter-enterprise software company and the third-largest software supplier overall. There are 12 million users and 100,600 installations of SAP's software, worldwide. The company is headquartered in Walldorf, Germany and employs more than 32,000 people in more than 50 countries.

Install Base. As mentioned earlier, SAP has a very large install base for its products. The vast majority of these installations are not within the public sector (though given the large install base, SAP still has a number of government customers). SAP has a few government clients using its older budgeting technology and there are a few higher education customers who are serving as "ramp-up" customers of SAP's newer budgeting technology before it enters general release.

Technical Architecture. As the new budgeting technology is really a toolset within SAP BW it retains all the technical architecture characteristics of other SAP products (client server or Web-based access options, support for various database systems, and network infrastructures). BW is a fairly conventional data warehouse design wherein data is stored in relational data structures within the warehouse and this data is then fed into OLAP cubes in order to be accessed and manipulated by the end user (i.e., users do not directly access relational structures).

Services Strategy. SAP has traditionally leveraged a large partner network to deliver implementation services to its customers, while occasionally using its own implementation services capabilities. This strategy will remain the same for public sector budgeting applications.

However, since this is a new product for SAP there will be a process by which SAP's partner network must be trained in the new product. As a result, over the short term there may not be a large number of partners with expertise in the new product and public sector budgeting expertise.

SunGard

Background. SunGard (www.sungard.com) is a global provider of software and information processing solutions for financial services, higher education, and the public sector. The SunGard Public Sector segment provides administrative systems, including ERP, to local and state governments through business units of Sungard such as SunGard BiTech, SunGard HTE, and SunGard Pentamation. These systems include solutions for finance and human resources, community development, utilities, K-12 school districts and public safety administration.

Each of the three business units offers Relational System budgeting solutions that are closely tied to their respective ERP offerings. The products available from each business unit are based on different technologies, which SunGard believes is important for providing choices to their customers. For example, HTE NaviLine® is

based on an IBM® System i5™ technology, while the Pentamation PLUS Series® is a Microsoft® Windows®-based solution.

Company Size. SunGard has annual revenues of over $4 billion and serves more than 25,000 customers in more than 50 countries. Total 2005 revenue for SunGard's Higher Education/Public Sector Solutions sector was $788 million.

Install Base. More than 900 cities and counties and 700 public safety agencies use SunGard Public Sector systems and services. Additionally, more than 600 K-12 organizations use SunGard solutions. These numbers reflect users of all SunGard Public Sector segment solutions, not budgeting solutions in particular.

Technical Architecture. The technical architecture of SunGard's solutions vary by product line. The HTE solution is designed for IBM technology while Pentamation and BiTech's IFAS solutions are designed for both Windows and UNIX environments.

Services Strategy. The SunGard Public Sector segment has traditionally used internal consulting, training, and installation resources associated with each division to help customers implement its products and this approach also applies to budgeting solutions.

Tyler Technologies, Inc.

Background. Tyler Technologies (www.tylerworks.com) focuses exclusively on providing technology solutions to local governments in the areas of financial management, courts and justice, property appraisal and tax, and document management. Tyler has made acquisitions in a number of areas and is, thus, able to provide solutions across these varied disciplines. In particular, Tyler has two ERP products that are germane to the mid-market: MUNIS and Eden. Each of these products offers a Relational System budgeting module; however, Tyler has recently developed a stand-alone Performance Based Budget product that can interface with most other general ledger software products. Tyler has partnered with SAS (a leading provider of business intelligence software) to provide additional capabilities in areas such as revenue forecasting and multi-year analysis.

Although Tyler envisions the new product as capable of standing alone, it is important to note that stand-alone budgeting products have not been a traditional sales focus for Tyler—rather it has traditionally offered a budget "module" as a complement to its core financial management applications. Hence, it remains to be seen if Tyler is fully committed, as a company, to delivering world-class budgeting functionality to its customers or if the product will merely serve to deliver more basic features. It also remains to be seen if Tyler is committed to the stand-alone budget system market or if Tyler's offering will only be of serious interest to users of its ERP products.

Company Size. Tyler had revenues of $170 million in 2005. Its customer base is comprised of approximately 6,000 cities, towns, counties, and K-12 schools. It employs 1,450 people. As of April 26, 2006, Tyler's market capitalization was $425

million. This may make Tyler the largest software company that is focused solely on local government.

Install Base. As mentioned above, 6,000 local government entities of all sizes currently use products from Tyler Technologies. Nearly 3,000 customers use its ERP applications. This spans from very small towns and cities to large organizations with budgets exceeding $1 billion. Since the Performance Based Budget product is new, there are few customers currently using the Performance Based Budget / SAS product.

Technical Architecture. Tyler's budgeting product was written using the same standardized development tools as other MUNIS applications. Hence, all MUNIS products support Oracle, Microsoft SQL Server, and IBM/Informix databases and various versions of LINUX, UNIX, and Microsoft operating systems

The budgeting system stores data in a series of relational tables. These tables normally reside within the MUNIS ERP product, but would also be included with the budgeting solution, were it to be implemented in stand-alone mode. The Tyler budgeting product is provided with standard interfaces to Crystal Reports and SAS in order to provide advanced reporting and analytical capabilities.

Services Strategy. Tyler has traditionally used internal consulting resources to help customers implement its products and intends to follow a similar approach for the Performance Based Budget product. An implementation of the budgeting product could range from two to four months.

Section 8 - Cost

Cost is, of course, an essential consideration when evaluating technology solutions. This section discusses potential costs based on the GFOA's knowledge of the market. This section also discusses factors that can result in cost variability.

Potential Costs

Potential cost depends on the type of solution under consideration. First, this section will consider a stand-alone CPM or Relational System solution purchased from a major vendor, such as those profiled in this report. For a mid-size, general purpose government, such a solution could cost anywhere in between $400,000 and $750,000 to implement. This does not include ongoing maintenance and support fees paid to the vendor, internal staff effort, or internal ongoing maintenance. Vendor maintenance fees typically amount to 15 to 20 percent of the license cost annually. It is reasonable to assume that internal effort for most budgeting system implementations would require one or two full-time staff for a four- to six-month period. Finally, it can be assumed that the system would consume the efforts of one FTE employee to administer on an ongoing basis. The GFOA has taken a conservative approach with these estimates so that estimated costs appearing in this report might tend to be higher than what actual bids and experience might produce.

Costs could be less when considering other types of solutions. For example, GovMax customers pay an annual fee for the GovMax service that starts at $25,000 and scales upwards based on population and a nominal amount of additional fees for start-up (a few thousand dollars). However, lower costs come at a price—in the case of GovMax, the solution is going to be less flexible than that offered by most private sector firms.

Costs could also be different when not purchasing a budget solution in a stand-alone environment. If a budgeting solution is selected as part of a larger ERP procurement, the costs could be less than for a stand-alone solution. The vendor may provide deeper discounts on software if more modules are being purchased and there may be economies of scale available across the implementation project (such as in project administration overhead). The caveat in this case is that a full-suite procurement like this may eliminate best-of-breed budgeting system vendors from contention, thus depriving government the chance to consider CPM packages.

Cost Variability

There are several factors that could cause the price of a budget system project to increase or decrease. Many of these are a matter of scale; the project can be modified to accommodate resources available and results desired. These factors are:

➡ **Functional Scope.** The cost estimate described above assumed that operating budgeting, capital budgeting, and performance measurement would all be within the scope of the project. For example, taking out either capital budgeting or performance measurement should result in project cost reductions of between 15 percent and 25 percent. Taking out both would result in greater savings, but probably *not* up to 50 percent in savings as economies of scale in implementation begin to be lost. Removing operating budgeting could result in savings of about 40 to50 percent.

➡ **Process Redesign.** The cost estimate assumed a moderate level of implementation complexity, which implies some process redesign and change management effort. It is possible to undertake a very streamlined implementation that focuses solely on re-implementing current processes using a new technology. While there may be more risk inherent in this approach and less potential yield of benefits, it could reduce implementation costs. The cost estimate assumed that implementation costs would always be at least as high as software costs and could be as much as 2.5 times higher than software cost. Using a streamlined approach, implementation costs could be held to no more than the price of the software and possibly even less (e.g., 70 to 80 percent of the software cost). Conversely, a government could also request additional assistance from consultants that would drive up costs. Examples of such assistance might include a consultant-led training approach, an extensive change management or process redesign program, or assistance with designing a performance measurement system (as opposed to simply implementing pre-existing measures).

➡ **Reduce Licenses.** In a CPM environment there are a number of means for reducing the level of licensing costs while still meeting essential business functions, although in a less automated fashion than would be possible in a fully licensed environment. For example, one city the GFOA conducted research with did not buy licenses for contributors to the budget process outside of the budget department. Instead, it provides MS Excel templates to these contributors and then uses the powerful MS Excel upload capabilities of the CPM system to upload the completed templates into the budget system. While this does involve more manual steps for the budget analyst, it has reduced software costs. In some cases, not licensing contributors could save up to $150,000. Another example of this tactic would be to not license end users for the ability to access the system for reports and instead rely on analysts to produce reports and distribute them in pdf or another universally accessible format.

➡ **Other Tactics.** There is a range of other tactics possible to reduce costs such as foregoing consulting assistance during implementation (i.e., implement using only in-house staff), hard-nosed cost negotiations with vendors, or even more

dramatic scope reduction. However, the GFOA has not provided any potential reduction figures for these types of options as they may lead to unacceptable increased implementation risk or may not be reliable enough (in the case of negotiations) to build estimates around.

Section 9 - Conclusions

Government organizations are increasingly demanding stronger budgeting technology solutions. Budgeting is the cornerstone of the governmental resource allocation and performance management cycle, so a strong technology foundation is necessary for peak performance. Traditionally, the market for budgeting systems has not been strong. However, recent developments present a great deal of promise as well as risk. On one hand, newer technologies such as CPM have demonstrated potential in the private sector and may hold similar promise for public sector organizations. On the other hand, new technologies bring with them risk. This risk is not so much technical in nature as it is organizational. The government organization must effectively integrate newer technology into its operations, which may be particularly challenging for processes with important political components such as budgeting and related decision support.

A next step for readers of this report could be to move forward with a procurement of a new budget system. Should this be the direction chosen, the GFOA recommends the following steps.

➡ **Consider Requirements for Both Operating and Capital Budgeting.** Section 4 of this report described how the governments surveyed made significantly less use of Relational Systems for capital budgeting compared to operating budgeting. This suggests that at least some Relational Systems have not been designed to meet capital budget requirements as successfully as operating budgeting requirements. While CPM systems appear to have the flexibility to meet capital requirements, it may be more difficult to justify the investment in CPM technology just for capital budgeting. Hence, governments should consider their capital budgeting technology strategy in conjunction with their operating budgeting technology strategy, even if they aren't going to procure both technologies at the same time. This should help ensure that a single technology platform is procured that will ultimately work for both areas, even if both won't be implemented simultaneously.

Ideally, performance measurement requirements would also be considered simultaneously, but this is less important because performance measurement technology relies more on business intelligence / reporting tools rather than on the transactional / planning technologies that underpin budgeting. Hence, it would be more feasible to select a separate product for performance measurement than it would for capital and operating budgeting (though there still could be significant losses in economies of scale from selecting different products).

➡ **Consider Need for Flexibility Versus Automation.** Budgeting for governments is as much a political process as it is a business process. This is why public entities are having troubles finding complete budget system solutions. The right budgeting tool must be flexible enough to adjust to the political changes in government. However, the need for flexible processes is often the enemy of

technology-enabled process automation. Therefore, governments should have a clear understanding of the level of political flexibility required for their budgeting process and temper their expectations for process automation accordingly.

➡ **Business Case.** Create a business case that describes the critical business issues (such as the budget process difficulties described in this report) to be solved by the project and the executive vision to be realized through the system (e.g., a vision for organizational performance measurement). An explicit business case that describes *why* the organization is undertaking the project creates a basis for action and helps build support. A business case should also help mobilize the project by identifying key project team members and resources.

➡ **Plan Backwards from Budget Season.** Implementation of a new budget system will naturally consume a great deal of time from key budget staff. Hence, the timing of the implementation and procurement should be planned around budget staff's busiest time of year—budget formulation.

➡ **Detailed Requirements.** Build a set of detailed requirements to inform vendors about functionality and to guide the vendor evaluation process. Section 5 provides information that should be useful in this regard.

➡ **Use the Evaluation Process to Make the Most of a New System.** Given this market structure, the GFOA recommends that demonstrations during a procurement process not only focus on verifying that the system can meet the current business processes, but also provide time for the vendor to demonstrate advanced capabilities that may change how the jurisdiction currently budgets. Given the capabilities of many systems previewed, a vision for future processes is as important as an understanding of current ones.

➡ **User Counts.** Carefully consider user counts so that the RFP can include the most accurate usage metrics possible. This will result in more accurate bids.

➡ **Identify Key Implementation Cost Drivers.** There are a number of details that influence implementation cost and should be clearly specified in an RFP. Such factors include data conversion and interface requirements, change management assistance requirements, desired training approach, and the extent to which budgeting system requirements differ between departments.

➡ **Performance Measurement Strategy.** If a performance measurement strategy figures heavily into the executive vision for a new system, a government should have a clear vision of what its performance measurement strategy looks like prior to procurement—it may be too difficult to simultaneously conceptualize and implement enabling technology for a new performance measurement system.