
Evaluation of the Sustainability of the Colorado Financial Reporting System

**Governor's Office of Information Technology
and
Department of Personnel & Administration**

**Information Technology
June 2011**



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June 15, 2011

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This report contains the results of an evaluation of the sustainability of the Colorado Financial Reporting System (COFRS) at the Governor's Office of Information Technology and the Department of Personnel & Administration. The evaluation was conducted pursuant to Section 2-3-103, C.R.S., which authorizes the State Auditor to conduct audits and evaluations of all departments, institutions, and agencies of state government. The report presents our findings, conclusions, and recommendations, and the responses of the Governor's Office of Information Technology and the Department of Personnel & Administration.



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SUSTAINABILITY OF THE COLORADO FINANCIAL REPORTING SYSTEM (COFRS)

Information Technology Evaluation, June 2011 Report Highlights



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Governor's Office of Information Technology (OIT)
Department of Personnel & Administration

PURPOSE

Assess the short- and long-term sustainability of COFRS, evaluate whether COFRS supports the State's 21st century business needs, and identify lessons Colorado can learn from other governments that have undertaken financial management system modernization projects.

BACKGROUND

- COFRS provides overall accounting and financial management for the State and is the accounting system of final record.
- In Fiscal Year 2010, COFRS processed about \$36 billion in state expenditures and \$34 billion in state revenues. Each month, COFRS processed an average of 1.65 million General Ledger records and 300,000 financial documents.
- About 2,000 state employees use COFRS.
- COFRS was implemented in 1991 for a total cost of \$17 million–\$19 million.
- Annually, it costs the Department approximately \$1.8 million to maintain COFRS, which includes the Financial Data Warehouse and Document Direct decision support systems.

OUR RECOMMENDATIONS

OIT and the Department should:

- Establish a succession plan to ensure that the State employs adequate staff with sufficient technical knowledge to maintain COFRS.
- Limit the number of code changes made to COFRS.
- Work with state financial managers and the General Assembly to develop and execute a viable plan for modernizing COFRS.

The agencies agreed with these recommendations.

EVALUATION CONCERN

COFRS is at significant risk of partial or complete failure and can no longer be supported by outside vendors or maintained by existing resources within the State.

KEY FACTS AND FINDINGS

- The likelihood of a partial or complete failure of COFRS is increasing, and a failure of COFRS would have significant financial, operational, and political ramifications. State agencies' ability to perform various governmental activities would be limited or unavailable.
- The State has not entered into a maintenance contract with the original vendor for the past 12 years. As such, state staff are solely responsible for maintaining the COFRS source code, including resolving any errors or bugs.
- By 2014, the State's staff with knowledge to support COFRS will all be retired, exponentially increasing the risk of an unrecoverable system failure.
- COFRS is based on obsolete technology, including 1.7 million lines of complex programming code, the majority of which was written more than 20 years ago. Since implementation, this code has been highly customized to support the State's organizational structure, business processes, and interdependent subsidiary systems.
- COFRS does not support the State's 21st century business needs, such as the ability to gather and process adequate data to provide citizens with transparent information. The system also cannot produce real-time information for decision makers.
- COFRS has reached the last stage of the software development lifecycle and is increasingly becoming more expensive and difficult to sustain. Modernizing COFRS should be a strategic priority for state government.
- If the decision is made to modernize the State's financial management system, Colorado should consider lessons learned from modernization projects undertaken by other government entities.

Evaluation of the Sustainability of the Colorado Financial Reporting System

Purpose and Scope

The Colorado Financial Reporting System, better known as COFRS, provides overall accounting and financial management for the State and is the accounting system of final record. All state agencies except the Colorado Department of Transportation (CDOT) and higher education institutions use COFRS directly to perform their day-to-day accounting functions. CDOT and higher education institutions have implemented their own Enterprise Resource Planning systems that interface summarized accounting information to COFRS. Additionally, multiple auxiliary agency-developed systems interface with COFRS to upload or download data to COFRS.

COFRS is critical to the State's operations, serving as the administrative "backbone" of the State. In Fiscal Year 2010, COFRS processed \$36 billion in expenditures and recorded \$34 billion in revenues. The State relies on COFRS to pay vendors and state employees, distribute money to local governments and taxpayers, prepare the annual Comprehensive Annual Financial Report, prepare and implement the State's annual budget, track and record state assets, and provide accurate and up-to-date information to taxpayers. If COFRS were to experience either a partial or complete failure, State operations would be severely impacted.

The Office of the State Controller under the Department of Personnel & Administration (the Department) is the business owner of COFRS, and the Governor's Office of Information Technology (OIT) is the service provider that maintains and supports the system. According to the State Controller and OIT, COFRS is at significant risk of partial or complete failure and can no longer be supported by outside vendors or maintained by existing resources within the State. In one incident in 2009, problems related to COFRS threatened the State's year-end financial statement closing and were resolved due to the efforts of knowledgeable IT staff who have worked with COFRS for the past 20 years. We performed this evaluation to assess how the continued reliance on COFRS could expose the State to risks associated with a partial or complete failure of the system that would significantly affect state operations. Our evaluation sought to answer the following questions:

- Is COFRS sustainable in the short-term (fewer than 5 years)?
- What are the specific risks threatening the future sustainability of COFRS?
- Does COFRS support the State's 21st century business needs?
- What lessons can Colorado learn from the financial management system modernization projects undertaken by other states and the federal government?

During this evaluation, we interviewed and surveyed staff at the Department, OIT, other stakeholders around the state, and relevant vendors. In addition, we conducted a technical evaluation of the software and utilities supporting COFRS and reviewed best practices and evaluations of modernization projects undertaken by other states. We also surveyed the State's financial managers and COFRS users and conducted directed focus groups.

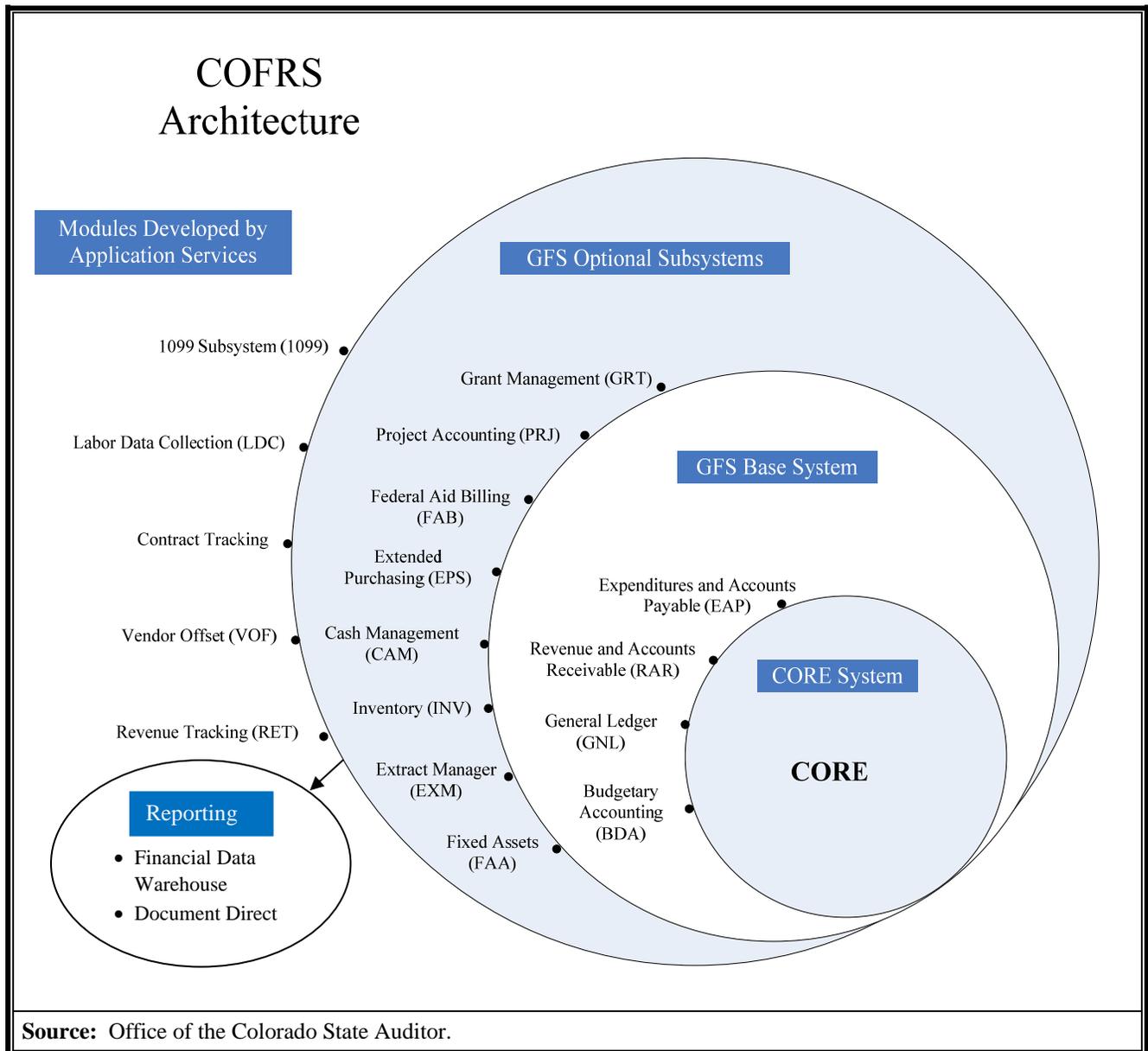
Background

COFRS has been the State's financial management system since the early 1990s. In the mid-1980s, state agencies began questioning the ability of the Central Accounting System, the statewide accounting system used at that time, to meet their business needs. A consultant was hired to determine the feasibility of purchasing and implementing a new accounting system for the State of Colorado. This study recommended that the State acquire a replacement for the Central Accounting System.

Through a competitive bidding process, the State acquired the Government Financial System (GFS) from American Management Systems. Initial system development and implementation efforts began in May 1988. Early in the implementation process, American Management Systems consultants and state staff worked together and identified additional software modifications required by the State. These modifications were incorporated into the GFS software, and the entire system became known as COFRS. The system was designed to act as a comprehensive book of financial records for the State and included functionality missing in the existing Central Accounting System, such as online processing of transactions.

COFRS's implementation was completed in 1991 for a total cost of \$17 million–\$19 million. The system was financed between 1993 and 1995 through a loan from the General Fund that was paid back from agency operating budgets. The State capitalized and depreciated approximately \$11 million of system costs and received approximately \$8 million paid from agency operating budgets for repayment of the loan.

As shown in the figure on page 4, the COFRS architecture, as implemented in 1991, included the CORE System, which controls all other system operations, the GFS Base System (which included the Expenditures and Accounts Payable, Revenue and Accounts Receivable, General Ledger, and Budgetary Accounting modules), and GFS Optional Subsystems (which included the Grant Management, Project Accounting, Federal Aid Billing, Extended Purchasing, Cash Management, Inventory, Extract Manager, and Fixed Assets modules). Over time, to meet state agency business needs and new legal and regulatory requirements, state agency staff also added the 1099 subsystem, Labor Data Collection, Contract Tracking, Vendor Offset, and Revenue Tracking modules. In addition, the Financial Data Warehouse and Document Direct systems are integral parts of COFRS and serve as reporting systems to provide useable information from COFRS to the State's financial managers. A complete description of each system and/or module is included in Appendix C.



COFRS has served the State exceptionally well for the last 20 years. In fact, in a survey our office conducted, 65 percent of state financial managers were overall satisfied with the performance of COFRS. However, technology has come a long way in the past 25 years, and these same survey respondents agreed that COFRS no longer supports the State's 21st century business needs and should be modernized. As an example, COFRS data field limitations and system design constraints make it extremely difficult for the State to meet public transparency requirements. In a recent analysis by the nonpartisan United States Public Interest Research Groups, Colorado's online transparency website (tops.state.co.us) was given the grade of "C." Additionally, COFRS was not designed to and does not integrate other critical administrative functions such as procurement, budget

formulation, human resources, and payroll. This lack of integration has led to inefficiency in state business processes and hampers the State's executives from making well-informed decisions.

As the business owner of COFRS, the Office of the State Controller is responsible for ensuring that COFRS's business rules comply with all state, federal, and accounting industry requirements; establishing the rules for protecting the confidentiality of COFRS data; and advocating for resources to keep COFRS operational. OIT is responsible for maintaining and supporting the system based on the guidance received from the State Controller. In Fiscal Year 2010, OIT was appropriated 4.5 full-time-equivalent (FTE) staff to maintain COFRS. This represents a 77 percent decrease in COFRS support staff since 2000 without any decrease in workload. In addition, the frequency and complexity involved with implementing new requirements, such as regulatory requirements, are on the rise. Annually, it costs the Department approximately \$1.8 million to maintain COFRS, which includes the Financial Data Warehouse and Document Direct decision support systems. The Financial Data Warehouse and Document Direct systems are an integral part of COFRS and are used to provide useable information to the State's financial managers.

COFRS Technology Stack

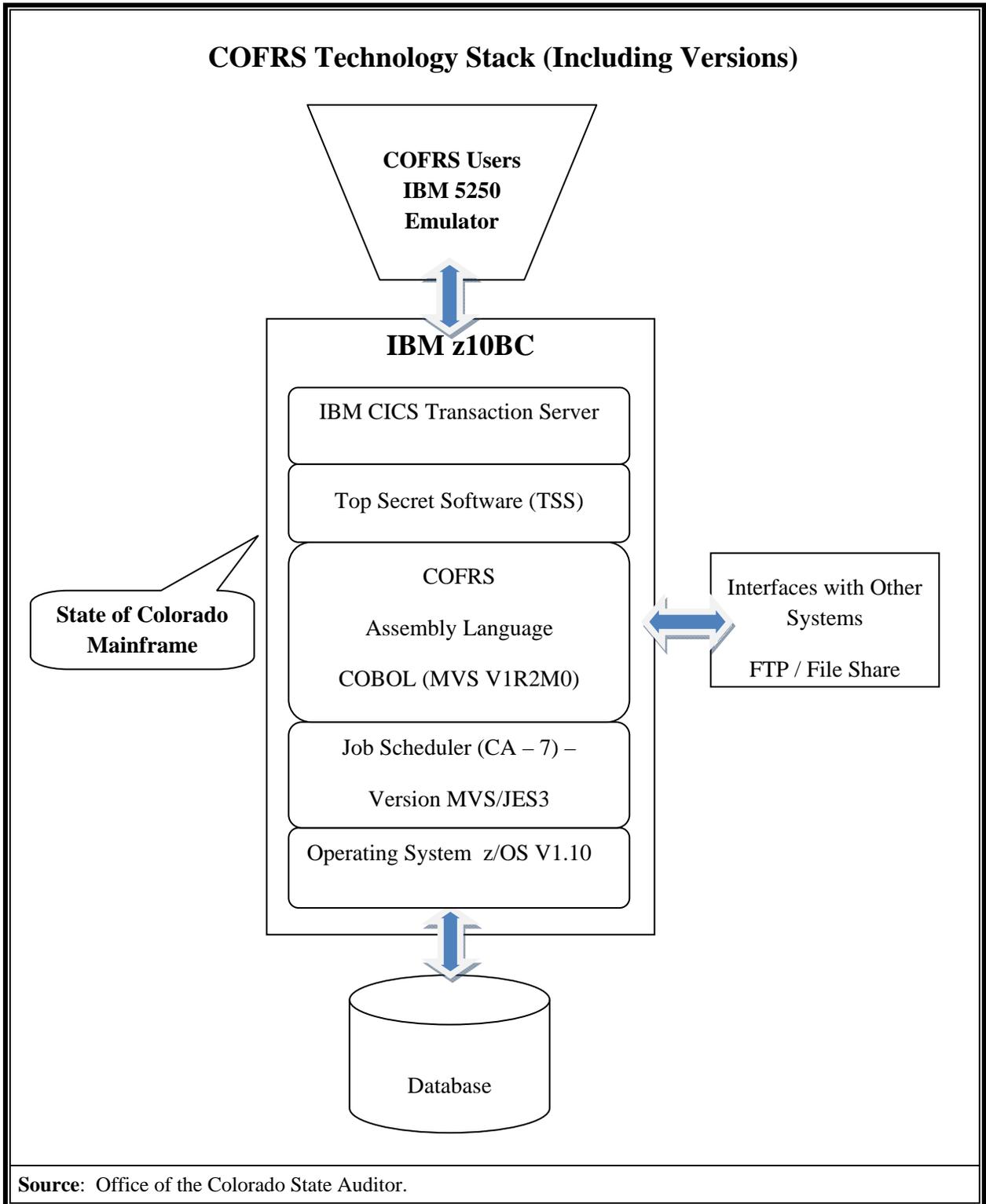
A technology stack is the layer of components such as hardware, operating systems, databases, and security tools that provide the infrastructure for a software application. In other words, the components of a technology stack facilitate the functioning of a software application. Problems with any one component of the technology stack could impact the proper functioning of COFRS. The major components of the COFRS technology stack include:

- **IBM Mainframe.** The IBM z10 BC Enterprise Server with Integrated Facility for Linux provides the platform on which all other components of the technology stack are based. The mainframe is capable of quickly and simultaneously processing thousands of transactions and is rated at 635 million instructions per second.
- **IBM CICS Transaction Server.** Customer Information Control System (CICS) is a transaction server that runs on the IBM mainframe under the z/OS operating system. CICS is a transaction manager designed for rapid, high-volume online processing.
- **IBM zOS Operating System.** z/OS is the operating system produced by IBM and used by OIT to manage the mainframe's operations. The operating system is responsible for managing computer hardware

resources and provides common services for the execution of various applications.

- **CA Top Secret Security Software.** Top Secret Software (TSS) is an application produced by CA Technologies that envelops the operating system and is responsible for controlling and managing access to all files, utilities, and applications contained on the mainframe.
- **CA-7 Job Scheduler.** CA-7 is an application produced by CA Technologies that is used to manage and control the execution of background jobs, commonly known as batch processing. The job scheduler acts as a single point of control for defining and monitoring background job executions in a distributed network of computers.
- **IBM FTP Server.** A piece of software contained in the mainframe's operating system that utilizes the File Transfer Protocol (FTP) to move data files to and from the mainframe. The mainframe's FTP server is used extensively by OIT to interface with other state financial systems.
- **Assembly Programming Language.** Assembly is a low-level programming language used extensively in the COFRS CORE system.
- **COBOL Programming Language.** COBOL, which stands for Common Business-Oriented Language, is one of the oldest existing programming languages and is the primary language used to develop and maintain COFRS. COBOL originated from the U.S. Navy in the early 1950s.
- **IBM MVS Compiler.** The compiler is a sophisticated piece of software that converts the COBOL source code into computer-readable byte code.
- **VSAM Database.** Virtual Storage Access Method (VSAM) is an IBM disk file, non-relational storage access method developed in the 1960s. VSAM serves as the database containing all information entered in and processed by COFRS.
- **IBM 5250 Terminal Emulator.** Client software installed on user computers that allows users to communicate with COFRS.

The diagram on page 7 depicts these components and their associated versions. We performed an assessment of each component of the technology stack as part of our evaluation and discuss our findings later in the report.



Importance of COFRS to State Government Operations

State agencies and institutions of higher education rely heavily on COFRS as the financial backbone that supports their ability to provide essential services and maintain business operations. COFRS supports key financial management functions, such as general ledger entries, accounts payable, accounts receivable, budget implementation, grants management, and inventory management. In addition, agencies use the system to pay and account for those services provided through state-administered federal programs, such as food stamps. If COFRS were to experience a system failure, there would be a significant risk that state operations would come to a standstill.

A significant volume of financial transactions is processed through COFRS on a regular basis. For example, in Fiscal Year 2010 COFRS processed an average of 1.65 million general ledger records per month. The following table shows the magnitude of other types of transactions that were processed through COFRS during Fiscal Year 2010.

Colorado Financial Reporting System System Usage and Transaction Processing Fiscal Year 2010	
State Expenditures Processed	\$36 billion
State Revenues Processed	\$34 billion
COFRS Users	2,000
Average Number of Financial Documents Processed Per Month	300,000
Average Number of General Ledger Records Processed Per Month	1.65 million
Average Number of State Warrants (Checks) Processed Per month	57,400
Source: Office of the State Auditor's analysis of Fiscal Year 2010 data from the Financial Data Warehouse, the Governor's Office of Information Technology, and the Office of the State Controller.	

State agency staff rely on COFRS to be available and functioning properly to conduct their daily business. For example, staff must use COFRS to process state warrants (checks) and initiate electronic funds transfers to pay state employees, local governments, vendors, and other entities. In the event of software malfunctions, state agencies would be unable to perform these and other important financial and accounting activities and could incur unnecessary costs, such as those associated with lost productivity.

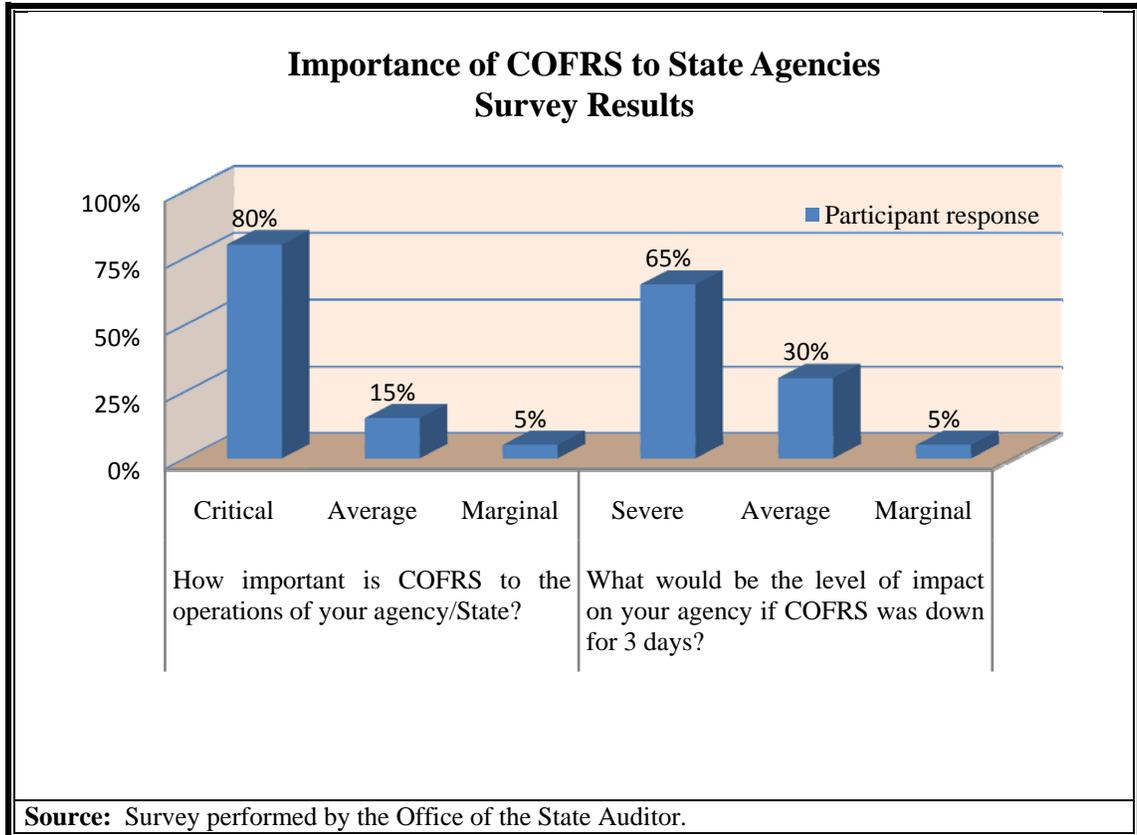
In the event that COFRS sustained a system failure or downtime, state agencies and institutions would be adversely affected. According to the Office of the State Controller and OIT, agencies' ability to perform various governmental activities would be limited or unavailable. The table on page 10 provides a snapshot of the primary governmental activities and agencies that would be affected by a partial or complete failure of COFRS. Dollar amounts in the "Financial Impact Per Business Day" column were calculated by retrieving Fiscal Year 2010 data by transaction type and dividing the totals by 250 business days in the year.

Governmental Activities and Agencies Impacted in the Event of COFRS Downtime Based on a COFRS Outage for One Business Day			
Impact to Governmental Activities¹	Example of Impacted Transaction	Governmental Agencies Impacted	Financial Impact Per Business Day
State Warrants (Checks) Could Not be Processed	No checks, such as payments to vendors providing services to the State, could be processed	All, including vendors and local governments	\$12.2 million in warrants generated from COFRS, excluding independent systems
No Electronic Fund Transfer (EFT) Transmissions	Payment to the bank for state P-Card expenses could not be made	Most state government agencies	\$36.6 million in EFT transactions generated through COFRS, excluding the Department of Treasury
No Payment Vouchers Processed / Generated	Payments to contractors for state construction contracts could not be made	Most state government agencies	\$48.7 million in payment vouchers issued from COFRS, excluding independent systems
No Inter-Governmental Fund Transfers Processed/ Generated	Division of Central Services could not be paid for services rendered to other agencies, including document imaging, data entry, and mail handling	Many state government agencies	\$10.3 million in funds received through intergovernmental transfers
No Inventory Processing	Inventory transactions related with food for prisoners could not be processed	Department of Corrections, Human Services, and Public Safety	\$72,200 in inventory adjustments and usage, not including inventory purchases
Warrants Not Cleared	Liability accounts would not be updated to reflect the State's true financial position	Department of Treasury	\$18.2 million in warrants cleared through the Department of Treasury, including warrants issued from independent systems
Draws on Federal Grants Revenue Delayed	Draws could not be made from grants because revenue would not be generated when expenditures were incurred	Some state government agencies	\$34.2 million in federal revenue, excluding pass through federal grants/contracts
Purchase Orders Not Printed	Funds would be over committed and vendor purchase orders would not be generated	Most state government agencies	Undetermined
Extracts to and Uploads from Other State Agency Systems Delayed	Food stamp payments would not be updated and the State's true financial position would not be reflected in COFRS	Most state government agencies	Undetermined

Source: Office of the State Auditor's analysis of data provided by the Office of the State Controller.

¹ If COFRS downtime occurred at month-end or year-end close, the impact to the State would be more significant and costly.

As noted previously, 2,000 employees across the state use COFRS as part of performing their job duties. To obtain user insight about COFRS, we surveyed 60 state financial officials from all major state departments in the Executive, Judicial, and Legislative Branches, including from the offices of statewide elected officials. As the following table shows, survey respondents indicated that COFRS is critical to their agencies' day-to-day operations and that their agencies would experience a severe impact if COFRS were unavailable for 3 days.



Summary of Findings

Overall, we have concluded that COFRS does not support the State's 21st century business needs, is increasingly becoming more expensive and difficult to sustain, and that the modernization of the State's financial management system should be a strategic priority for state government. Our evaluation also identified immediate and significant risks to the future sustainability of COFRS. We found that the likelihood of a partial or complete failure of COFRS is increasing and that a failure of COFRS would have significant financial, operational, and political ramifications. The following are the specific findings we identified related to the sustainability of COFRS:

- Immediate and significant risks threaten the short-term sustainability of COFRS.
- COFRS has reached the last stage of the software development lifecycle, and key decisions must be made to retain or modernize the system in the long term.
- COFRS does not support the State's 21st century business needs, such as the ability to gather and process adequate data to provide citizens with transparent information. As such, the State is missing opportunities to increase the efficiency and effectiveness of government service delivery.
- Replacing COFRS would require a high level of sustained effort and commitment in terms of decision making, time and resource commitment, and funding from agencies, state financial managers, OIT, the Department of Personnel & Administration, the Office of the State Controller, and the General Assembly. Based on modernization projects undertaken by other states, we conservatively estimate that it would take the State 3-5 years to replace COFRS, with software, hardware, and consultant costs likely exceeding \$20 million.
- Colorado is among the few states in the nation that have not upgraded their primary financial management system to a more modern, integrated system.
- The lessons learned from modernization projects undertaken by other states and the federal government should be used by Colorado if the decision is made to modernize the State's financial management system.

In the remainder of this report, we discuss these issues and make recommendations where appropriate.

Immediate Risks to the Short-Term Sustainability of COFRS

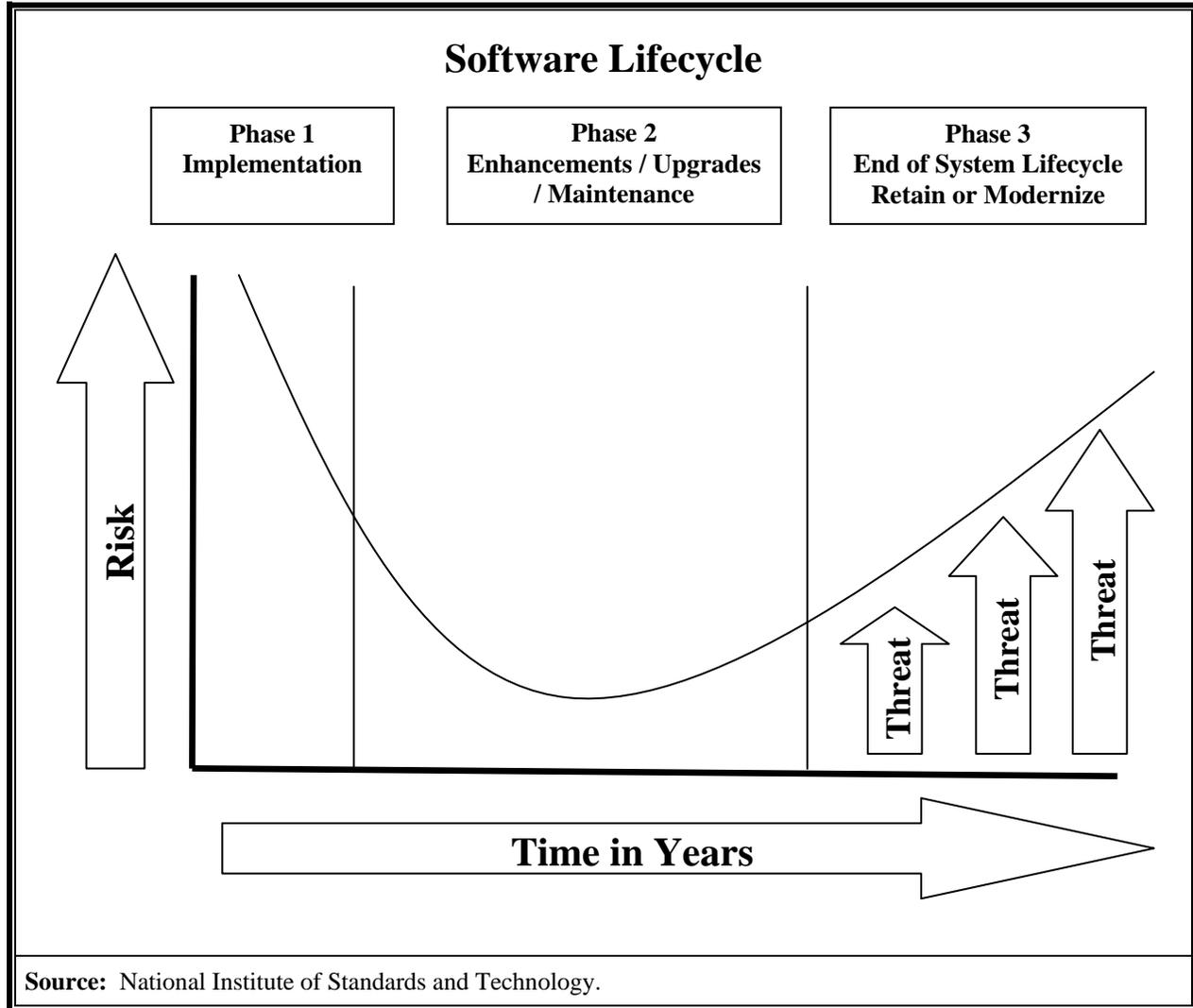
Computers and computer systems have become a significant part of our modern society. It is virtually impossible to conduct many day-to-day activities without the aid of computer systems controlled by software. As more reliance is placed on these software systems, it is essential that they operate in a reliable manner. Failure to do so can result in errors, data integrity issues, and eventually substantial high monetary loss.

According to the American National Standards Institute, software reliability is defined as the probability of failure-free software operation for a specified period of time in a specified environment. As demonstrated in the chart on page 14, as time elapses and the environment in which the software operates changes, the risk of software failure increases. Several factors, identified as threats in the chart on page 14, contribute to software failure over time, such as the lack of vendor support; obsolete technology; lack of knowledgeable staff; software errors; ambiguities, oversights, or misinterpretation of software specifications; carelessness or incompetence in writing or changing programming code; inadequate software testing; incorrect or unexpected usage of the software; or other unforeseen problems.

Software reliability specialists often describe the lifetime of a software product using a graphical representation called the bathtub curve. The bathtub curve consists of the following three phases:

- **Phase 1: Implementation**—New software is implemented. During this phase, there is a high risk of failure for various reasons, including design flaws or errors in the programming code.
- **Phase 2: Enhancements/Upgrades/Maintenance**—The software has entered its “useful life,” and most errors have been detected and fixed. During this phase, there is minimal risk of failure.
- **Phase 3: End of System Lifecycle**—The software has reached the end of its “useful life” because of changes in the environment, user requirements, and technology. As a result, the risk of failure continues to increase with time.

The table on page 14 shows these phases and how the risk of failure correlates to the passage of time.



Currently, COFRS is at the end of its system lifecycle. According to ASA research, a leader in accounting software research, accounting software generally enters its end of lifecycle by year 15. We evaluated the short-term risks to the sustainability of COFRS and identified two immediate threats: lack of available personnel to support COFRS and limitations in the COFRS technical environment. We discuss these threats in the following sections.

Lack of Available Personnel to Support COFRS

The most immediate risk to sustaining and maintaining COFRS in the short-term is an ongoing loss of staff who are knowledgeable about the system and can provide the necessary technical support in the event of a system failure. Within the last 5 years, the number of COFRS support staff with needed technical and domain expertise has been reduced substantially as a result of normal attrition,

retirement, and budget cuts. Currently, COFRS is supported by 4.5 FTEs, a decrease of 77 percent since 2000. Additionally, one of those staff has already retired but continues to provide support as a contractor, and half of the others are expected to retire within the next 12 months. By 2014, the remaining staff are expected to have retired, taking with them the historical knowledge of state business practices and problem solutions. As these individuals leave the State, the risk of an unrecoverable COFRS system failure increases exponentially. The unexpected failure that the system experienced in 2009 was averted only because of the knowledge and expertise of these staff, two of whom will be retired as of June 2011.

The following table shows the positions, years of experience with COFRS, and expected retirement dates for the current COFRS support staff.

OIT Staff Supporting COFRS Expected Retirements			
Staff Position	FTE	Experience With COFRS	Retirement Status
Business Analyst	0.5	21 years	Retired, but working under contract with the State
Lead Programmer	1	23 years	Retires June 2011
Support Programmer	1	19 years	Retires 2013
Support Programmer	1	11 years	Retires 2014
Operations	1	7 years	Retires August 2012
Source: Office of the State Auditor's analysis of personnel records and interviews with OIT staff.			

The risk associated with retiring staff is compounded by the fact that there is a scarcity of available talent within OIT and the private sector to replace these critical FTEs. In October 2010, OIT attempted to recruit technical resources to support COFRS. It was unsuccessful because none of the potential candidates met the technical and business requirements of the position. Several factors contribute to the lack of a candidate pool for old systems such as COFRS. The technology that old systems use has fallen out of general use, so younger generations see little value in learning that technology. In addition, older technology is no longer taught extensively in colleges.

Even if the State manages to recruit candidates with the appropriate technical expertise, the learning curve to support COFRS and make future updates is steep due to the number of customizations and modifications that have been made to the baseline COFRS application and a lack of comprehensive documentation for those modifications. According to the lead application programmer, a new staff person with significant technical and business experience still would take a minimum of 8 to 12 months to learn the system.

Senior workers represent a precious resource not only for understanding, maintaining, and integrating aging systems, but also for offering critical insights into system functioning—such as the original intent behind the system’s technical structure, how the system would handle any errors that occur, the history of repairs, and how COFRS communicates with other state-owned systems—that otherwise might take a new staff person significant time to learn. Because of the lack of available technical resources to support COFRS and the steep learning curve that would be required to learn to support the system, it is necessary that OIT develop a succession plan and increase the level of knowledge transfer currently occurring between retiring and existing OIT staff. OIT should also work on increasing the sufficiency of COFRS source code documentation so that new staff and/or contractors can quickly understand the design and architecture of the system.

Limitations in the Technical Environment

As noted previously, COFRS comprises a technology stack that includes a mainframe, transaction server, operating system, two programming languages, a database, and several supporting security components and utilities. Each component of the technology stack is provided by a specific vendor, is a specific version, and is required to function effectively with the other components in the stack. Each component has a lifecycle, whereby vendors release new versions and progressively withdraw support from older versions. Eventually, the stack components might completely lose support, because the vendor goes out of business or is acquired or simply loses interest in continuing to support the product. While there is generally no major problem running a business application with unsupported stack components, it is not satisfactory for mission-critical applications, such as COFRS, to operate with any unsupported components.

We evaluated the components of the COFRS technology stack and noted that all critical components will have continued vendor support for the foreseeable future except for the compiler and programming source code. The compiler is a program that reads the statements in a human-readable programming language and translates them into a machine-readable executable program. At the time of our evaluation, we found that the COFRS compiler was outdated and no longer supported by the vendor. We immediately notified OIT of this deficiency and the compiler was updated and is now vendor supported as of April 2011.

We also determined that the COFRS programming source code is at a critical threshold, meaning that any additional changes to the code could create unforeseen errors. COFRS is based on 1.7 million lines of complex programming code, the majority of which was written more than 20 years ago before standard coding practices and documentation standards that make a code maintainable and sustainable in the long-run were established. Since its implementation in 1991,

COFRS has been highly customized to support the Colorado state government's organizational structure, business processes, and interdependent subsidiary systems. Because of these extensive modifications, there is little resemblance to the original source code, and the State cannot accept updates from the vendor for COFRS core processing functionality. In addition, due to the State's customizations of COFRS and budgetary restrictions, the State has not entered into a maintenance contract with the original vendor for the past 12 years. As such, state staff are solely responsible for maintaining the COFRS source code, including resolving any errors or bugs. And, as previously mentioned, the state's most knowledgeable programmers and analysts will be retired at the end of this fiscal year.

As part of the evaluation, we also contacted the original vendor to determine if the company would be willing to take over support of COFRS from the State. Due to the age of the system and outdated technology on which the system relies, the original vendor would be willing to take over primary responsibility for the maintenance and support of COFRS only as part of an overall initiative to modernize the State's financial management system to the most current version. The vendor estimated that a 5-year support contract would cost the State between \$2.6 million and \$3.6 million.

The short-term reliability of COFRS is also threatened by other issues with the source code design, including four high-risk areas that have the potential to cause a partial or complete system failure. First, the COFRS source code is not flexible to allow for the creation of new fields or variables, making code changes difficult to implement. For example, due to system limitations in the size of the General Ledger record (350 bytes), over time state agencies have used the same General Ledger fields for different purposes. As a result, code changes that involve such fields in the General Ledger are complex and time consuming, because such changes can cause data consistency issues and make reporting from the General Ledger difficult.

The second issue with the COFRS source code design is that the code is missing automated unit tests. An automated unit test helps programmers gain a better understanding of the system, guarantees that repair and enhancements will not break existing functionality, and permits testing of individual system components to reduce design degradation over time. Without automated unit tests, there is always a potential that implementing even one code change can introduce faults in the application that may not become known until a system failure occurs.

Third, unlike more modern programming languages, the source code is not portable, meaning that it cannot run on any other components of the technology stack than those components on which it was originally designed to operate. As a result, if one of the components of the technology stack is not available, the entire

COFRS system may not be able to function. Additionally, the State cannot take advantage of other, less expensive platforms to run COFRS.

Finally, the current architecture or design of the COFRS code is cumbersome, which makes it hard to learn, maintain, and modify in an effective and efficient manner. Consequently, the resources needed to make further code changes increase substantially with every change. Moreover, because the source code already contains limitations, any change that is implemented resembles more of a workaround than a real enhancement to the system's existing functionality. As the number of workarounds increases, overall system performance degrades and more failure points in the code are introduced.

These source code limitations, in combination with the State's loss of knowledgeable support staff and lack of vendor support, pose a significant risk to the short-term sustainability of COFRS. It is imperative that OIT implement immediate stop gap initiatives to maintain the sustainability of COFRS, while, as discussed in the next recommendation, immediately begin working on the modernization of the State's financial management system.

Recommendation No. 1:

The Governor's Office of Information Technology (OIT) should work to mitigate the immediate risks threatening the short-term sustainability of the Colorado Financial Reporting System (COFRS) by:

- a. Immediately establishing a succession plan to ensure that the State continues to employ adequate staff with sufficient technical knowledge to maintain COFRS by either identifying and training resources from within OIT or actively pursuing candidates from outside the State, or both. OIT should also increase the level of knowledge transfer occurring between retiring and existing or replacement OIT staff and ensuring that system documentation, including critical functionalities and control points within the source code, is current and regularly updated.
- b. Working in cooperation with the Office of the State Controller to continue to limit the number of code changes made to COFRS to only those required by federal, state, or accounting industry requirements.

Governor's Office of Information Technology Response:

- a. Agree. Implementation date: Implemented June 1, 2011.

The Governor's Office of Information Technology (OIT) realizes the critical nature of having adequate and knowledgeable staff available to support COFRS. OIT has created a succession and support plan for COFRS, including the filling of vacant positions. As indicated by the auditors, OIT has had limited success in recruiting staff to provide COFRS technical support and, therefore; will work with the Department of Personnel on alternative recruitment strategies and a potential plan to bring in some vendor support to augment staffing gaps. As new staff are hired, knowledge transfer with existing COFRS staff and adequate system documentation will be top priority.

- b. Agree. Implementation date: Implemented June 1, 2011.

OIT will continue to work with the State Controller's Office in limiting the number of code changes to only those required by federal, state, or accounting industry mandates.

Department of Personnel & Administration Response:

- a. Agree. Implementation date: Implemented June 1, 2011.

The Department of Personnel & Administration agrees that knowledge transfer to technically competent staff identified internally or externally is an important risk mitigation strategy, and DPA will assist the Governor's Office of Information Technology in the search for and vetting of competent candidates. While DPA recognizes the importance of adequate internal resources to manage the COFRS system, we are concerned that relying solely on internal resources will leave the State at risk of inordinate dependence on key individuals. As a result, we believe the State should also enter an external contract with a vendor that is highly motivated to assist the State in mitigating the risk of COFRS failure. Such a vendor would provide a deeper pool of resources for the State and bring the experience of supporting multiple legacy systems. DPA also agrees that documentation of the system should be of the highest quality, but is not able to assist OIT in this area.

b. Agree. Implementation date: Implemented.

The Office of the State Controller agrees that it is important to minimize changes to COFRS in order to mitigate the risk of COFRS failure. As implied in the Auditor's recommendation, many of the changes that occur are the result of federal mandates or State legislative changes and must be implemented. In addition, there are many requests from State agencies to approve subsidiary systems and the related interfaces to COFRS. While the State Controller discourages State agencies from making such requests, we are often faced with causing a business process failure at a State agency when we deny those requests. It is very difficult to convince State agencies to wait on improving their processes through such subsidiary systems when the State has not committed to a timeline for providing comparable service through an enterprise wide system. The State Controller will continue to discourage additional subsidiary systems and interfaces and will limit any nonessential COFRS changes or interfaces.

Modernization of the State's Financial Management System

While the State can take steps to mitigate the short-term risks to COFRS, over the long term, the system will become increasingly difficult and expensive to sustain. Additionally, the limitations inherent in COFRS will continue to drive state agencies to develop and purchase their own, disparate systems, which in turn results in overall higher technology costs for the State, data redundancies, less public transparency, and inefficient and ineffective business processes. In a May 2011 letter, the designated representatives from the Colorado Controllers Forum expressed these concerns and emphasized their support for replacing COFRS. (See Appendix E for the full text of the letter.) In the following sections, we discuss the specific COFRS limitations that make it important for the State to immediately undertake a modernization initiative.

Technology obsolescence. COFRS is supported by technology that is more than 20 years old. COFRS is not portable, which means that it cannot operate in an environment (such as an operating system or hardware platform) that is different from the one it was originally designed for without rewriting the source code. In other words, as vendors start withdrawing support for components of the COFRS technology stack, the system's sustainability will become increasingly uncertain.

Changing business needs. COFRS was developed and implemented based on user and state business needs that are now outdated. Over the past 20 years, accounting practices, the way the State conducts business, and the way the State utilizes and reports on information have changed. In today's fast-paced business environment, the expectation is that information will be reliable and readily available in real time, and that it will allow business processes to operate at the most efficient and effective level. To meet these changing business needs, the State has continued to customize COFRS. The ongoing customization has yielded a complex application with approximately 1.7 million lines of programming code that is still not able to respond to simple changes in business needs. For example, COFRS does not accept records after the "final" close of the State's accounting records. Hence, agencies cannot enter post-closing and audit adjustments for approval or disapproval by the State Controller. As such, post-closing and audit adjustments must be made outside COFRS, which requires the State Controller to prepare the State's financial statements using a separate database maintained on an employee's desktop computer, instead of within COFRS on the mainframe. This increases the complexity of preparing the state's financial statements. By contrast, modern accounting systems accept post-closing records and therefore maintain all financial transactions, including post-closing adjustments, in one, well-controlled system.

COFRS also is not set up to allow basic transaction-level functionality, such as the ability to record comments or notes on an accounts receivable account for future reference; automatically initiate payments on a certain day of the month; generate reporting for the Public Employees' Retirement Association, the State's pension plan, based on a certain number of working days; or generate automated, intergovernmental transfers. When an application does not meet business needs on an ongoing basis, over a period of time the software renders itself obsolete.

Inability to effectively and efficiently support multiple business functions or provide managers with access to real-time information. COFRS was initially designed as a data repository to record and generate financial statements. As a result, it does not have the capability to process real-time information related to all of the State's business functions, such as payroll, human resources, procurement, and inventory management. Currently, agencies request more than 200 data extracts from COFRS on a nightly basis to obtain information that is otherwise not readily available from COFRS. Because COFRS cannot support these other business needs, much of the State's financial, personnel, and other administrative data originate and reside in various independent systems at different agencies. We identified more than 60 independent systems that support financial management processes, more than 15 independent systems that support human resources and payroll processes, and widespread use of Excel spreadsheets and independent databases to support budgeting processes. Some of the independent systems currently in use are SAGE (fixed asset), Global Shop (accounts receivable and invoicing), Great Plains (general ledger), Alpha (sub

ledger county accounting), Maximo (purchase order and inventory), AWARE BEP (accounting related to the Business Enterprise Program), DCIS (time keeping), ETTA (time keeping), PHIT (time keeping) and KRONOS (time keeping and leave tracking). Such a fragmented environment requires the same information to be recorded and reconciled multiple times, which challenges the expectation of real-time, reliable, and readily available information. Without real-time synchronization of information among purchasing, inventory, and accounts payable modules, it is not possible to establish real-time inventory across the state. If the State could obtain this real-time inventory information, it would result in significant cost savings and better vendor pricing and prevent purchases from vendors who are not party to the high-volume, low-cost contracts established by the State.

Additionally, three external studies conducted on behalf of the State by the Hackett Group, Oracle, and Rebound Solutions Consulting have all concluded that COFRS limitations are preventing the State from achieving significant administrative efficiencies. Specifically, according to a 2008 study conducted by Oracle, a more centralized and modern financial accounting system could improve labor productivity by 78 percent, producing \$8.2 million to \$24.7 million in efficiencies at the end of a 5-year implementation period plus ongoing annual benefits thereafter of \$5.7 million to \$17 million. The majority of these cost efficiencies were based on improving the State's procurement decision making and enforcement of statewide price agreements and reallocating staff resources from duplicate and data entry to other projects.

Inability and/or difficulty meeting new legal and regulatory requirements.

Over the past several years, new state and federal requirements have been enacted requiring more transparency in government spending and more detailed tracking of specially designated funds. Due to system limitations, COFRS has been unable to meet these additional requirements. For example, House Bill 09-1288, better known as the Colorado Taxpayer Transparency Act, required the State to provide the general public access to detailed governmental expenditure data. To meet these requirements, OIT created a publically accessible website known as the Transparency Online Project (TOPs). TOPs relies on COFRS's data to provide the public with the "State's checkbook." However, because of COFRS's limitations, TOPs is able to provide only aggregate-level data and not the detailed transaction-level data some have demanded. For example, the detailed transaction data for CDOT are maintained in a separate information system. CDOT uploads only summary data to COFRS, which is then used to populate the TOPs website. Due to these and other limitations, Colorado's TOPs website was given a grade of "C" by a recent, independent transparency report of the states.

In addition, due to OIT's inability to add variables to the COFRS database, the State was unable to utilize COFRS to meet the tracking and reporting requirements contained in the American Recovery and Reinvestment Act of 2009.

To meet these and other regulatory requirements, the State had to implement complex COFRS workarounds, as well as build additional reporting mechanisms using manual and time-intensive reconciliations and independent single purpose information systems, databases, and spreadsheets.

COFRS was also unable to meet the requirements of House Bill 10-1119, known as the State Measurements for Accountable Responsible & Transparent or SMART Government Act. The SMART Government Act requires the State to use a performance-based budgeting system designed to:

- Increase the oversight by the Legislature and ensure that actual performance by departments is used in making budget decisions.
- Ensure that state government is responsive to taxpayers by tying actual performance to funding and by focusing on specific goals, measures, and outcomes.
- Increase transparency by requiring annual reports on each department's progress in meetings its goals and measures.

As part of the SMART Government Act, OIT was required to perform a feasibility study on the implementation of an e-budgeting solution. OIT hired a consultant to perform the feasibility study. The consultant determined that COFRS, in its current form, was not capable of meeting the requirements of the SMART Government Act because:

- Detailed transactional data were not electronically available.
- Financial and budget data are limited to pre-defined reports.
- State FTE data are difficult, if not impossible, to track in either COFRS or through the State's personnel system known as the Colorado Personnel Payroll System.
- Multiple and duplicative budget schedules require repetitive, time-consuming data entry.

Because of COFRS's limitations, the consultant concluded that the State should explore a commercial off-the-shelf solution to meet the requirements of the law.

Finally, OIT staff are currently struggling to redesign COFRS to meet new federal requirements, such as enhanced 1099 reporting and a new 3 percent tax withholding required by the Federal Withholding Law (Section 511 of Public Law 109-222). The public law requires the State to withhold 3 percent of any payments

made for property or services that are over a certain amount. Although the 1099 reporting law was repealed in April 2011, the challenges it would have caused for the State in trying to implement the law illustrate the complexity and outdated design of COFRS. The 1099 reporting law would have required the State to identify vendors by their federal tax identification numbers, rather than their social security numbers. However, COFRS currently can only record social security numbers for vendors, not federal tax identification numbers. Hence, implementing the 1099 requirements would have been difficult and time consuming. According to the lead COFRS programmer, it would have taken months to make this single change to COFRS. While the State is not required to implement 1099 requirements, it still faces the challenge of implementing the 3 percent withholding requirement by 2013. COFRS currently lacks a mechanism to identify entities that are exempted from this withholding versus entities that are not. The complex rules associated with this requirement cannot be implemented without significant programming changes within COFRS. Additionally, based on assessments we requested each member of the COFRS support staff to complete, the system's ability to be redesigned to comply with new federal and state laws was rated as "average" or "below average," which raises concerns that there may be other areas of potential noncompliance with regulatory and legal requirements. (See Appendix A for the complete results of the technical assessment completed by COFRS support staff.)

User efficiencies. COFRS utilizes an archaic "green screen" format for its user interface. The user interface lacks the modern, intuitive navigation controls of more modern systems. For example, COFRS users do not have access to navigational buttons, scroll bars, and "point and click" text. Navigating COFRS is entirely dependent on inputs from the keyboard and is slow, cumbersome, and non-intuitive. Additionally, user help options like those available in more modern applications are not readily available in COFRS. Users also lack the ability to search and view completed transactions from within COFRS because the system purges transactions 5 business days after acceptance. To demonstrate the outdated design of the COFRS user interface, we have provided several screenshots of heavily used COFRS records in Appendix D.

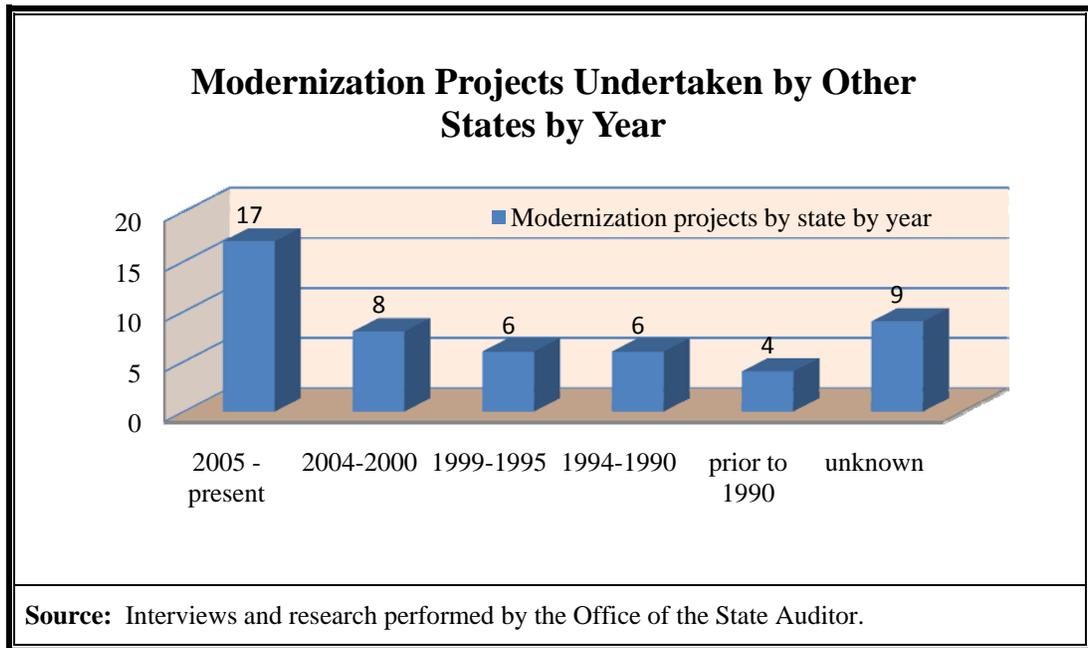
Limited account code structure. COFRS has run out of fields to hold agency-specific and statewide codes, due to the fixed format and length of the account code structure. The impact of this issue varies from agency to agency. To overcome this limitation, some agencies have redefined certain COFRS fields to serve dual purposes. Without the addition of new account codes, it will continue to be difficult to link COFRS transactions to their supporting, detailed activities which are often recorded in separate, information systems.

Transaction balancing. Generally Accepted Accounting Principles require the State to report transfers within and between funds and balances due within and between funds in equal amounts. Modern financial management systems require

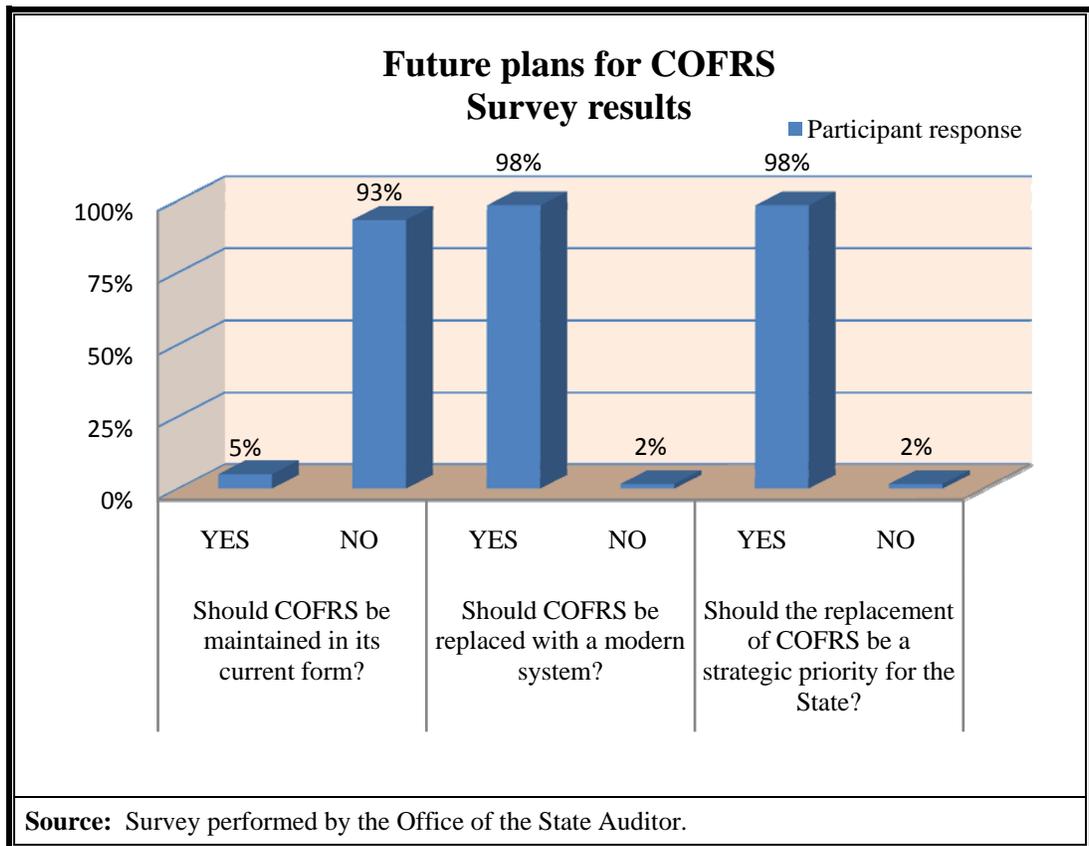
such interfund and intrafund transfer and accounts receivable and payable balancing at the transaction level. As such, a user is unable to create a transaction that places the transfers or receivable and payable out of balance. COFRS does not have this built-in feature, which results in significant manual efforts by state agencies and the Office of the State Controller.

Modernization Initiative

The short- and long-term risks to COFRS’s sustainability, as well as the General Assembly’s desire to improve government efficiency, effectiveness, and transparency through initiatives such as the SMART Government Act and TOPs, have made it imperative that a process be immediately initiated to modernize COFRS. As shown in the graph below, since 1995, nationally, 31 other states have either undergone or are undergoing modernization projects because, similar to COFRS, their systems were at risk of failure or no longer met their states’ business needs. In addition, these modernization projects have allowed states to operate systems that are more citizen-centric and transparent and that facilitate information sharing among agencies.



To determine if modernization of the state’s financial system would be supported by our state’s financial leaders, we surveyed 60 state financial management officials from all major departments in the Executive, Judicial, and Legislative Branches, including financial officers from the offices of statewide elected officials. As the following table shows, survey respondents indicated that COFRS should no longer be maintained in its current form and that modernizing COFRS should be a strategic priority for the State.



Before a modernization project can begin, agreement and support must be secured from the General Assembly through the budgeting process and through sponsorship from the highest levels of the Executive Branch. A modernization project of this size will fail unless executive-level and General Assembly support is maintained throughout the life of the project. Based on our analysis, we have concluded that the risks to the State from relying on COFRS currently outweigh the costs and risks associated with a modernization project. Therefore, the Department of Personnel & Administration and OIT should immediately begin working with state financial managers and the General Assembly to develop and execute a plan for modernizing COFRS.

Recommendation No. 2:

The Department of Personnel & Administration (the Department) should immediately begin working with the Governor's Office of Information Technology (OIT), state financial managers, and the General Assembly to develop and execute a viable plan for modernizing the Colorado Financial Reporting System (COFRS). The plan should incorporate the lessons learned

from other states' financial system modernization projects, as discussed in the following section of the report.

Governor's Office of Information Technology Response:

Agree. Implementation date: November 1, 2011.

The Governor's Office of Information Technology will work with the Department of Personnel & Administration to develop a phased modernization approach to present to the General Assembly during the next budget cycle.

Department of Personnel & Administration Response:

Agree. Implementation date: November 1, 2011.

As early as 1999 when the Office of Information Technology was a division in the Department of Personnel & Administration, the Executive Branch began efforts to modernize COFRS with the first study done on the subject. The Department believes that the risk of COFRS failure documented by the Auditor's Evaluation along with the studies already performed by the Department and the consensus already built around modernization are an important start to developing the recommended plan. However, funding is now and will be for the foreseeable future the key factor and central challenge to executing a viable COFRS modernization plan. The Department and the Office of Information Technology are in a unique position to recognize that all other services provided by State government are inextricably dependent on the functioning of the State's accounting system – none of them can be delivered without COFRS. Therefore, the Department will begin anew its efforts to obtain funding for modernization of COFRS in cooperation with the Office of Information Technology.

Lessons Learned from Other States and the Federal Government

As mentioned previously, the federal government and other states have undergone modernization projects because, similar to COFRS, their systems were at risk of failure and no longer supported their entities' business needs. The lessons learned

from these organizations' modernization projects can provide valuable insight as decision makers in Colorado determine how to best address COFRS' short- and long-term sustainability issues. The principles outlined below are based on lessons learned from multiple financial management system modernization projects undertaken throughout the public sector. (Appendix B provides a complete state-by-state comparison of financial management system modernization projects.)

- **Engage stakeholders early and often.** It is critical to establish a shared vision and objectives with the key stakeholders involved in the modernization project. This includes identifying, developing, and articulating the goals of the project with senior management and business users so everyone clearly understands the benefits of successfully implementing the new system. It is equally important that stakeholders and executive level sponsors embrace organizational change and demonstrate a commitment to make changes within the organization.
- **Simplify and standardize business processes.** To ensure that the benefits of a modernization project exceed its costs, the State should work to streamline business processes by taking advantage of industry-proven, commercial-off-the-shelf software functionality and workflow.
- **Thoroughly plan the acquisitions necessary to modernize the financial management system.** This requires that the project team and state executives understand the requirements for the modernization initiative and how these requirements connect to the State's mission. System requirements should be limited to those necessary to support the mission of the State. Requirements are not what the State wants, but what the State must have to conduct business effectively and efficiently while optimizing resources and access to information.
- **Tighten project scope.** Deliver functionality in phased, successive "chunks" targeting specific processes and outcomes, including establishing clear milestones for success with specific deliverables in either 90- or 120-day increments. It is equally important to identify and achieve early wins that demonstrate the project's value to stakeholders.
- **Commit resources.** Plan and deploy appropriate resources throughout the entire project lifecycle to fulfill project requirements. Personnel assigned to the project should be relieved of their other duties and dedicate 100 percent of their time to the modernization effort.
- **Proactively manage the project.** Employ a rigorous and robust project management approach overseen and coordinated by qualified project managers. Also important is that roles and responsibilities between

agency and contract staff be streamlined and consolidated so that accountability for specific project deliverables is clear and understood.

- **Establish strong partnerships with contractors.** Facilitate and sustain open dialogue among agency stakeholders and contractors to create a partnership with software vendors and system integrators. Project success depends heavily on the ability to implement an integrated project team that gives agency and contractors shared responsibility for the project. It is also important for the State and contractors to agree on both quantitative and qualitative measures for periodically assessing project success. These success measures should be established at the onset of the project.
- **Guide organizational and business process change.** Provide stakeholders the right information at the right time about project changes and how those changes will affect them throughout the entire lifecycle of the project. Communication and training are vital components of a financial management system modernization project.
- **Conduct periodic project reviews.** Conduct continual and proactive quality and risk management reviews and related communication to enable project success. A key component of the review process is the scheduling of independent verification and validation reviews by an independent third party to confirm that the system was implemented in accordance with established businesses processes, standards, and contractual requirements.
- **Test thoroughly.** Conduct dry run of data conversion, test business processes end-to-end, and involve users across all levels of the organization in “real life” testing prior to moving the new financial management system into production. It is equally important to test downstream transactions against converted documents to minimize post-conversion issues. Thorough and complete testing will help ensure that problems are addressed prior to “go live.”
- **Executive-level commitment.** Ensure that upper management plays a crucial role in the project, as they are the only stakeholders who can provide adequate resourcing and fast decision making, and establish statewide acceptance of the project. Establishment of an overall steering committee consisting of top state government executives who have the ability to make project decisions, resolve inter-departmental disputes, and reward and discipline staff and contractors would provide the necessary level of commitment.

As the Office of the State Controller, OIT, the General Assembly, and other stakeholders consider how to address the sustainability of COFRS, it will be important for them to anticipate both the short- and long-term implications of

their decisions. Any decisions made to address the risks to the system's ongoing sustainability could have far-reaching impacts to the State's ability to manage its financial information, comply with federal requirements and effectively and efficiently complete other important business processes. If the decision is made to modernize COFRS, it would be prudent for these stakeholders to consider the lessons learned from other government entities to ensure that any financial system modernization project that Colorado undertakes is successful.

Appendix A

OIT Technical Assessments of COFRS Sustainability

Sustainability of COFRS Software COFRS Support Staff Technical Assessments (1-3 = Highest Risk, 4-7 = Medium Risk, 8-10 = Low Risk)				
Function	Senior Business Analyst Ranking	Lead Programmer Ranking	Operations Analyst Ranking	Average Risk Ranking
Portability	1	N/A	N/A	1
Unit Testing Capability	1	3	N/A	2
Availability of Technical IT Staff Resources	1	4	2	2.3
Hours Required to Make Changes to Source Code or add a new interface (last year)	3	3	6	4
Ease of Making Changes to Source Code or adding a new interface	6	3	5	4.7
Hours Required to Make Changes to Source Code or add/maintain a new interface (last three year)	5	4	5	4.7
Technical Expertise Needed to Learn COBOL Source Code or interfaces	5	5	5	5
Ease of Navigation for the End User	5	5	N/A	5
Ease of Navigation for Programmer	5	5	N/A	5
Compliance with Federal and State Laws	3	7	N/A	5
Standardization (configuration, data transfer protocol, etc.)	N/A	N/A	5	5
Security of existing interfaces	N/A	N/A	5	5
Data integrity of transferred data	N/A	N/A	5	5
Ease of scheduling jobs	N/A	N/A	5	5
Ease of changing job schedule	N/A	N/A	5	5
Compatibility with support software (compiler, utilities, etc.)	N/A	N/A	5	5
Error rate associated with job schedule	N/A	N/A	5	5
Technical Documentation Available	5	5	6	5.3
Effectiveness of Database Management System	8	3	N/A	5.5
Readability of Source Code	7	4	N/A	5.5
Ease of Restoring the System or broken interfaces	9	5	5	6.3
Supports Agency Business Requirements	5	8	N/A	6.5
Scalability	10	3	7	6.7
Application or interface Error Rate	9	8	5	7.3
Application/Interface Performance	9	9	6	8
Downtime with interfaces	N/A	N/A	8	8
Compatibility with Support Software	9	9	N/A	9

Source: COFRS assessment completed by OIT Technical Staff.

Appendix B

Financial System Modernization Projects in Other States (This Table is Organized Based on Year Implemented)

Financial System Modernization Projects State by State Comparison					
State	System Implemented	Year Implemented	Last Upgraded	Implementation Costs (In Millions)	Comments
New York	Oracle's PeopleSoft	CAS – 1982 Oracle - 1998	Not Upgraded 2006	Information not available	
Florida	Custom Built System Oracle's PeopleSoft – licensed but not yet implemented	1983	Continually	Financials - \$89 (not implemented)	SAP – HR/Payroll (\$350)
Washington	KPMG R*STARS	1984	Information not available	Information not available	SAP – HR/Payroll WaDOT – CGI Advantage
South Dakota	GEAC	1988	2010	Information not available	Lawson – HR
Colorado	CGI Advantage (heavily customized / no longer vendor supported)	1991	1997	\$17-\$19	CDOT - SAP
Wyoming	WOLFS	1989	2007	Information not available	WYDOT- PeopleSoft CGI AMS- Financials
Idaho	KPMG STARS	1993	Information not available	Information not available	IdDOT – CGI Legacy HR System
New Jersey	CGI Advantage – heavily customized / no longer vendor supported	1993	Information not available	Information not available	
Wisconsin	CGI Advantage – heavily customized / no longer vendor supported	1993	1996	Information not available	Selected Oracle's PeopleSoft in 2006
Michigan	KPMG FAMIS	1994	2001	Information not available	Lawson HR/ Payroll
Alabama	CGI	1996	2002	Information not available	CGI also has HR/ Payroll
Kentucky	CGI Advantage	1997	2005	Information not available	SAP HR/ Payroll (\$50 million)
Maryland	KPMG R*STARS	1997	unknown	Information not available	Oracle's PeopleSoft for HR
Oregon	KPMG R*STARS	1997	As needed	Information not available	Legacy HR System

**Financial System Modernization Projects
State by State Comparison**

State	System Implemented	Year Implemented	Last Upgraded	Implementation Costs (In Millions)	Comments
Montana	Oracle's PeopleSoft	1999	2007	Information not available	
Arizona	KPMG R*STARS – Financials	Pre-2000	Information not available	Information not available	AzDOT implemented CGI Advantage Uses Lawson HR/Payroll
Arkansas	SAP	2000	2003	\$43-\$60	
Nevada	CGI	2000	As needed	Information not available	
Pennsylvania	SAP	2001	unknown	Information not available	SAP for HR / Payroll
Vermont	Oracle's PeopleSoft	2001	2007	Information not available	
Connecticut	Oracle's PeopleSoft	2003	2006	\$125	
Nebraska	Oracle's JD Edwards	2003	2010	Information not available	
Iowa	CGI	2004	2008	\$44.5	Legacy HR
Massachusetts	CGI	2004	Information not available	Information not available	Oracle's PeopleSoft – HR
New Mexico	Oracle's PeopleSoft	2006	2008	\$28 - \$33.8	
Rhode Island	Oracle e-Business Suite	2006	Upgrade planned for next year	\$7.2	
Maine	CGI	2008	2011	Information not available	GEAC – HR
Ohio	Oracle's PeopleSoft	2008 (2006-2008)	Information not available	\$120 - \$158	Full ERP implementation
New Hampshire	Lawson	2009	Information not available	\$22.0	Lawson – HR
Georgia	Oracle's PeopleSoft	2010	Information not available	\$75	
Indiana	Oracle's PeopleSoft	2010	Information not available	\$17	PeopleSoft HR Pay
Kansas	Oracle's PeopleSoft	2010	information not available	\$35 – financials	
Delaware	Oracle's PeopleSoft	2010	Information not available	Information not available	
Minnesota	Oracle's PeopleSoft	2011	Information not available	Information not available	
Mississippi	SAP ERP Contracted Q4-2010 (awarding Implementation Services Q2 2011)	2011	Information not available	Information not available	
Tennessee	Oracle's PeopleSoft	2011	Information not available	\$88.8	

**Financial System Modernization Projects
State by State Comparison**

State	System Implemented	Year Implemented	Last Upgraded	Implementation Costs (In Millions)	Comments
Alaska	In Progress	In Progress	Information not available	Information not available	Alaska is in the process of selecting a vendor for its modernization project.
Texas	Oracle's PeopleSoft	In Progress	Information not available	Information not available	Currently limited to an eight agency pilot
Virginia	KPMG R*STARS	In Progress	1986-87	Information not available	Recently selected Oracle's PeopleSoft for both financials and HR/Payroll
California	Multiple	In Progress	Information not available	Information not available	Project Underway (IBM-SAP, Accenture-Oracle's PeopleSoft, CGI) Legacy Systems – HR/Payroll SAP Payroll SAP Financials (DOC – Corrections)
West Virginia	Multiple	In Progress	Information not available	Information not available	
Louisiana	CGI – Financials	Information not available	Information not available	Information not available	SAP – HR LaDOT Financials – SAP
Illinois	CGI & In-house Systems	Information not available	Information not available	Information not available	
Missouri	CGI	Information not available	Information not available	Information not available	
North Carolina	SAP	Information not available	Information not available	Information not available	Full ERP
Oklahoma	Oracle's PeopleSoft	Information not available	Information not available	Information not available	
Utah	CGI	Information not available	Information not available	Information not available	SAP – HR / Payroll
Hawaii	Information not available	Information not available	Information not available	Information not available	
North Dakota	Oracle's Peoplesoft	Information not available	Information not available	Information not available	
South Carolina	SAP	Information not available	Information not available	Information not available	

Source: Information obtained from other States, financial management system vendors, and public records.

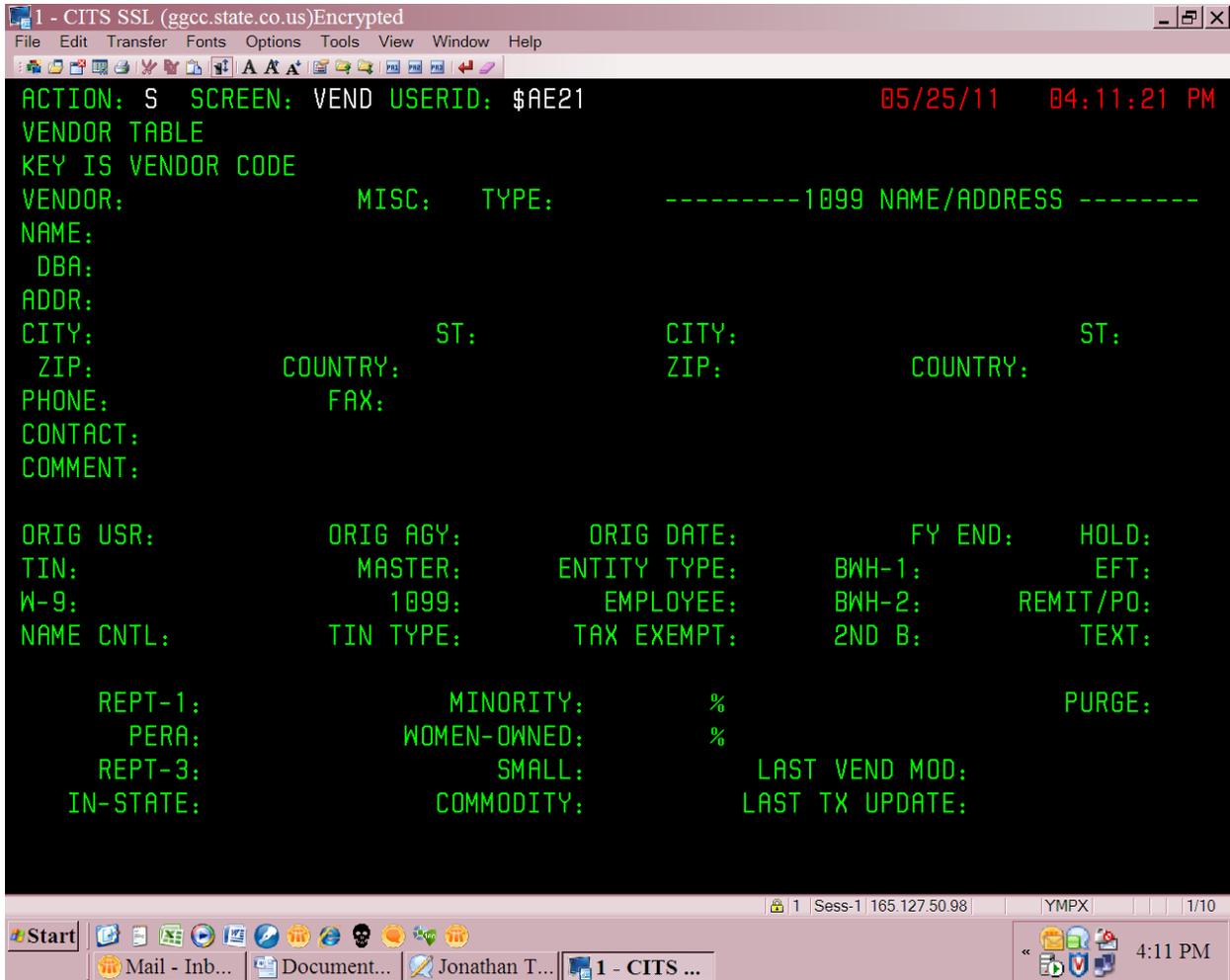
Appendix C

COFRS Sub-Systems and Modules	
COFRS System/Module	Purpose and/or Functionality
GFS CORE	The CORE base system contains the programming necessary to control the system's overall functioning and other sub-systems/modules, including input/output and system processing.
GFS Base Systems / Modules	
Budgetary Accounting	This subsystem is used to develop and monitor budgets in COFRS. Expense, revenue, and appropriation types of budgets can be constructed using the facilities in this subsystem. Appropriation budgets mirror the legislatively approved Long Bill and establish budgetary authority.
General Ledger	This subsystem is used to process journal vouchers and to maintain online balances for funds, bank accounts, and balance sheet accounts in COFRS. It provides an online screen for viewing the General Ledger.
Revenue and Accounts Receivable	This subsystem provides accounting for revenue recognition and revenue collection. It supports a database of "customer" information and maintains an audit trail for all revenue and accounts receivable activity.
Expenditures and Accounts Payable	This subsystem controls all accounts payable activities in COFRS. It includes facilities to create pre-encumbrances and encumbrances and to process payments. Disbursements are automated, using either warrants or electronic funds transfer. Specialized accounting functions are provided to handle inter-agency billing within the State.
Optional Subsystems / Modules	
Labor Data Collection	This subsystem offers online timesheets for tracking labor charges to grants, projects, and programs within COFRS
Grants Management	This subsystem is used to manage the accounting for grants received by State agencies. It provides automated mechanisms for recording grant charges and revenues, and for ensuring that grant spending does not overrun grant budgets.
Project Accounting	This subsystem provides accounting for projects. This system is similar to the Grants Management subsystem but adds more flexibility in accounting for activities funded by multiple revenue sources.
Cash Management	This subsystem is used primarily by the Office of the State Treasurer and the State Controller. It provides online screens to facilitate the management of Colorado's cash resources and assists in the reconciliation of State bank accounts.

COFRS Sub-Systems and Modules	
COFRS System/Module	Purpose and/or Functionality
Extended Purchasing	This is the largest subsystem in COFRS. It provides an augmented set of pre-encumbrance and encumbrance functions that improve upon the Expenditures and Accounts Payable subsystem. This subsystem also includes non-accounting information from receiving reports and vendor invoices.
Federal Aid Billing	This subsystem was used primarily by the Department of Transportation to bill for highway projects.
Inventory Control	This subsystem provides extensive operational and accounting facilities for support of in-agency warehouses.
Extract Manager	This subsystem is used to respond to agency requests for data extracts. The subsystem offers mechanisms for extracting information from the COFRS database, and provides automatic scheduling for extract jobs.
Revenue Tracking	This system is used by agency budgeting personnel, the Office of the State Controller, the Governor's Office of Planning and Budgeting, and the Joint Budget Committee to monitor the State's adherence to the Taxpayer's Bill of Rights restrictions on state revenue. The subsystem also supports the development of revenue budgets, and aggregation of revenue budgets and collected revenue amounts at the department and Statewide levels.
1099 Production	This subsystem is used to prepare IRS Form 1099 filings for the State of Colorado.
Fixed Asset Management	This subsystem provides a means of accounting for fixed assets and reporting on fixed assets. It includes programs for calculating depreciation on fixed assets.
Contract Monitoring	This subsystem is used to document information related with contract that agencies have entered into.
Vendor Offset	This subsystem is used to obtain owed money from a vendor before making a payment to that vendor
Document Direct	This system is used to retrieve, view and print mainframe computer reports
Financial Data Warehouse	This system is used to retrieve, view and print finance related reports from COFRS
Source: Governor's Office of Information Technology and the Office of the State Controller.	

Appendix D

The following are examples of the COFRS user interface.



The screenshot shows a web browser window titled "1 - CITS SSL (ggcc.state.co.us)Encrypted". The browser's address bar and menu bar are visible. The main content area displays a terminal-style interface with green text on a black background. The interface shows the following information:

```
ACTION: S  SCREEN: VEND  USERID: $AE21  05/25/11  04:11:21 PM
VENDOR TABLE
KEY IS VENDOR CODE
VENDOR:          MISC:   TYPE:   -----1099 NAME/ADDRESS -----
NAME:
DBA:
ADDR:
CITY:          ST:      CITY:          ST:
ZIP:          COUNTRY:  ZIP:          COUNTRY:
PHONE:        FAX:
CONTACT:
COMMENT:

ORIG USR:      ORIG AGY:      ORIG DATE:      FY END:      HOLD:
TIN:          MASTER:      ENTITY TYPE:      BWH-1:      EFT:
W-9:         1099:      EMPLOYEE:      BWH-2:      REMIT/PO:
NAME CNTL:    TIN TYPE:      TAX EXEMPT:      2ND B:      TEXT:

REPT-1:      MINORITY:      %      PURGE:
PERA:      WOMEN-OWNED:  %
REPT-3:      SMALL:      LAST VEND MOD:
IN-STATE:    COMMODITY:    LAST TX UPDATE:
```

The browser's status bar at the bottom shows "Sess-1 | 165.127.50.98" and "YMPX | 1/10". The Windows taskbar at the bottom includes the Start button, several application icons, and a system tray showing the time as 4:11 PM.

1 - CITS SSL (ggcc.state.co.us)Encrypted

File Edit Transfer Fonts Options Tools View Window Help

FUNCTION: DOCID: PV MDA 11000001031 05/25/11 04:14:37 PM
 STATUS: BATID: ORG: 000-000 OF 000

LN	REFERENCE	COM	VENDOR	INV	SUB	APPR
NO	CD	AGY	NUMBER	LN	LN	INVOICE
LN	FND	AGY	ORG	ORG	CODE	PGM
01-						MDA
02-						MDA

1 Sess-1 165.127.50.98 YMPX 12/6
 Start Mail - Inb... Document... Document... Jonathan T... 1 - CITS ... 4:17 PM

1 - CITS SSL (gcc.state.co.us)Encrypted

File Edit Transfer Fonts Options Tools View Window Help

A A A

ACTION: S SCREEN: VNAM USERID: \$AE21 05/25/11 04:12:30 PM

VENDOR NAME TABLE

KEY IS VENDOR NAME, VENDOR CODE

VENDOR NAME, ADDRESS, CITY, STATE, ZIP	VENDOR CODE	HOLD	DBA	REMIT/PO
01-				
02-				
03-				
04-				
05-				

1 Sess-1 165.127.50.98 YMPX 1/10

Start Mail - Inb... Document... Document... Jonathan T... 1 - CITS ... 4:12 PM

Appendix E
STATE OF COLORADO

DEPARTMENT OF MILITARY AND VETERANS AFFAIRS

6848 South Revere Parkway
Centennial, Colorado 80112
Phone (720) 250-1500
Fax (720) 250-1509



May 31, 2011

John Hickenlooper
Governor

Major General
H. Michael Edwards
The Adjutant General

Legislative Audit Committee, Office of Information Technology
and Office of the State Controller
c/o Jonathan C. Trull
IT Audit Manger
Colorado Office of the State Auditor
200 E. 14th Avenue
Denver, CO 80203

Dear Ladies and Gentlemen,

We are writing to you as designated representatives of the Colorado Controllers Forum, an organization of Colorado departmental controllers who meet to evaluate and determine the best practices for operation and implementation of the financial activities of the State. The members of the Forum have jointly discussed the COFRS Sustainability Survey and wish to express our thoughts and concerns with COFRS and support for its replacement.

Using COFRS is like driving a Model-A Ford. It can be driven, but sacrifices speed and efficiency, and could become unreliable. When (not if) it breaks down, finding a mechanic with the proper knowledge and parts to make the repairs is difficult. The car can be out of service for a very long time or permanently un-repairable. This is our concern with COFRS. The out-of-date technology behind COFRS combined with the retirement of knowledgeable support personnel who are properly educated and experienced to support the system puts the financial operations and reporting of the State at risk.

The current demands for transparency, legislative mandates and budget cuts require us to do more with less. We have already seen configurability issues with the implementation of ARRA documentation and reporting, and the need to develop a separate contracts management system. COFRS reporting through Document Direct and Financial Data Warehouse is generally high to mid-level, leaving detail activity out of the picture. The detail level is where most of the work is performed. Many departments have been forced to develop secondary systems in an effort to capture and report details necessary to accomplish the daily tasks with more of these being purchased or developed on a daily basis.

Times have changed and it would be nearly impossible to meet the current legislative, audit, budget and financial reporting demands accurately and timely without a properly functioning financial system. The impacts of a non-functional financial system are monumental. We will lose our ability to provide legally required transparency and other reporting. We will lose our ability to provide the award winning financial reports so necessary for State creditors and debt rating agencies. We will lose our ability to record and draw revenues from cash and federal sources. We will lose our ability to pay vendors, grantees and other contractors on time, which will negatively impact small business owners and other constituents. What truly is the cost of replacing COFRS? The question should be what are the costs if we don't?

Sincerely,


Will Thomson, Controller
Department of Military and Veterans Affairs


Don Rieck, Controller
Department of Public Health and Environment


Flo Nath, Controller
Department of Law

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Office of the State Auditor
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A bound report may be obtained by calling the
Office of the State Auditor
303.869.2800

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