

AUDIT REPORT

COMMERCIAL OFF-THE-SHELF SOFTWARE ACQUISITION FRAMEWORK



March 2000

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL
OFFICE OF AUDIT SERVICES

March 20, 2000

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)
Inspector General

SUBJECT: INFORMATION: Report on "Commercial Off-The-Shelf Software Acquisition Framework"

BACKGROUND

The Department of Energy (Department) devotes a significant amount of its annual budget to the acquisition and maintenance of information technology resources. About \$1.6 billion, or almost 9 percent of the Department's Fiscal Year 1999 budget of \$17.9 billion, was for the acquisition, operation, and maintenance of information technology. Approximately \$200 million, or 12.5 percent of the information technology budget, was for desktop (personal computing) technology. Over 130,000 personal computers are in use Department-wide. These computers operate a wide variety of commercial off-the-shelf (COTS) computer software, including electronic mail, word processing, spreadsheet, database management, application development, statistical analysis, presentation, security and virus protection. Many Departmental offices, including the Headquarters Office of Procurement and Assistance Management, various program and field offices, and contractor-operated facilities, have independently negotiated contracts to acquire and maintain information technology related products.

Developing and implementing an effective software acquisition framework to support the information technology program is a well-recognized government and industry best practice. The framework should consist of standards governing the acquisition of computer software and enterprise-wide contracts negotiated in support of such standards. An effective acquisition framework helps to ensure the compatibility of data that is shared between locations and computer systems and also enables the purchaser to take advantage of volume discount savings.

The objective of our audit was to determine whether the Department had a framework for the acquisition of COTS software.

RESULTS OF AUDIT

The Department had not developed and implemented software standards or effectively used enterprise-wide contracts, key components of a COTS acquisition framework. Departmental offices (Federal and contractor) acquired application and operating system software that varied in type and price and duplicated procurement efforts by awarding and managing multiple contracts for the same product. Many offices purchased software over and above normal operational requirements to ensure that data could be exchanged between locations. The Department's inability to establish a framework was due to its decentralized information

technology strategy and a lack of organizational support. Without a framework, the Department has been unable to take advantage of enterprise-wide software contracts that could result in savings of about \$38 million over five years for just one of its major desktop software suites. Utilizing enterprise-wide contracts for other required applications could also significantly increase savings. Unless an acquisition framework is developed and implemented, the Department may also be unable to meet its current five-year Strategic Plan performance goals with regard to information technology related savings.

MANAGEMENT REACTION

Management agreed, in general, with the recommendations related to computer software standards and enterprise-wide software licensing to improve interoperability and efficiency.

Attachment

cc: Deputy Secretary
Under Secretary

COMMERCIAL OFF-THE-SHELF SOFTWARE ACQUISITION FRAMEWORK

TABLE OF CONTENTS

Overview

Introduction and Objective	1
Conclusions and Observations.....	1

Opportunities For Software Acquisition Savings

Details of Finding.....	3
Recommendations and Comments	8

Appendices

1. Scope and Methodology	10
2. Related Office of Inspector General and General Accounting Office Reports	12

Overview

INTRODUCTION AND OBJECTIVE

The Department devotes a significant amount of its annual budget to the acquisition and maintenance of information technology resources.

About \$1.6 billion, or almost 9 percent of the Department's Fiscal Year 1999 budget of \$17.9 billion, was for the acquisition, operation, and maintenance of information technology. Approximately \$200 million, or 12.5 percent of the information technology budget, was for desktop (personal computing) technology. Over 130,000 personal computers are in use Department-wide. These computers operate a wide variety of commercial off-the-shelf (COTS) computer software, including electronic mail, word processing, spreadsheet, database management, application development, statistical analysis, presentation, security and virus protection. Many Departmental offices, including the Headquarters Office of Procurement and Assistance Management, various program and field offices, and contractor-operated facilities, have independently negotiated contracts to acquire and maintain information technology related products.

Developing and implementing an effective software acquisition framework to support the information technology program is a well-recognized government and industry best practice. The framework should consist of standards governing the acquisition of computer software and enterprise-wide contracts negotiated in support of such standards. An effective acquisition framework helps to ensure the compatibility of data that is shared between locations and computer systems and also enables the purchaser to take advantage of volume discount savings.

The objective of our audit was to determine whether the Department had a framework for the acquisition of COTS software.

CONCLUSIONS AND OBSERVATIONS

The Department had not developed and implemented software standards or effectively used enterprise-wide contracts, key components of a COTS acquisition framework. Departmental offices (Federal and contractor) acquired application and operating system software that varied in type and price and duplicated procurement efforts by awarding and managing multiple contracts for the same product. Many offices purchased software over and above normal operational requirements to ensure that data could be exchanged between locations. The Department's inability to establish a framework was due to its decentralized information technology strategy and a lack of organizational support. The Department has not taken advantage of enterprise-wide software contracts that could result in savings of about \$38 million over five years for just one of its major desktop software

suites. The use of enterprise-wide contracts for other required applications could also significantly increase savings. Unless an acquisition framework is developed and implemented, the Department may also be unable to meet its current five-year Strategic Plan performance goals with regard to information technology related savings.

This audit identified issues that management should consider when preparing its year-end assurance memorandum on internal controls.

Signed

Office of Inspector General

OPPORTUNITIES FOR SOFTWARE ACQUISITION SAVINGS

The Department Did Not Have A Framework

The Department had not developed and implemented a framework for software acquisitions. Specifically, it had not established Department-wide standards governing the acquisition of computer software and had not effectively used enterprise-wide software contracts. Departmental offices acquired application and operating system software that varied in type and price across the Department, and duplicated procurement efforts by awarding and managing multiple contracts for the same product. Many offices purchased software over and above normal operational requirements to ensure that data could be exchanged between locations.

Software Standards Not Developed

Department-wide software standards, necessary to support an acquisition framework, had not been established. Despite several initiatives by the Chief Information Officer (CIO), beginning as early as 1996, Departmental officials have been unable to agree on standards. A number of Federal and contractor officials, both at Headquarters and in the field, disagreed with various components of the proposed standards and desired voluntary versus mandatory compliance. Ultimately, the Department's Information Technology Council, comprised of senior information technology officials from Headquarters and field offices, did not support the adoption of the proposed standards.

While a follow-on standards development initiative had begun, the effort was limited in scope and was not intended to address the entire enterprise (Department). Officials from the Office of the CIO indicated that future standards development initiatives would be limited to Federal employees. Current development efforts are confined to the Headquarters Collaboration Group, comprised of information technology managers and specialists from the Department's various program offices, and contractor compliance will not be required. The effectiveness of standards agreed to by this Group will be limited in that they will only apply to about 15 percent of the over 110,000 individuals employed by the Department.

Enterprise-Wide COTS Acquisition Practices

The Department had not made effective use of enterprise-wide software contracts. Instead, the Department allowed various offices to duplicate procurement efforts by separately negotiating and awarding contracts for the same application. For example, based on data obtained from software vendors, we identified 45 different offices throughout the

Department that awarded separate contracts for the same major database application. In another instance, 24 different offices awarded separate contracts for the same Internet security software.

While the Department had awarded certain Headquarters-level software contracts, the contracts were not based on software standards. Only one of the seven contracts (for a particular anti-virus application) was available for Department-wide use and offered quantity purchase discounts. The usefulness of the remaining contracts was limited because their use was not mandatory, they were not available to contractors, and they were infrequently updated.

A lack of enterprise-wide licenses also led to significant price variances for the same software application. Separately negotiated contracts for the same application resulted in substantial price variations. For instance, two separate offices purchased the same word processing product at prices that differed by 44 percent, \$232 versus \$335 per user license. Also, the same desktop software suite was purchased by two different locations at prices that varied by 59 percent, ranging from \$155 to \$247 per user license.

Data Compatibility

Due to the diversity of application software used to perform the same function, many offices surveyed found it necessary to purchase extra software over and above that needed for operational purposes in order to ensure data compatibility. Organizations found it necessary to acquire and maintain data translation software or multiple applications for functions such as word processing and electronic mail attachments to ensure that data produced by one office could be used by another. About 34 percent, or 15 of the 44 organizations that provided information, indicated that they purchased additional software to address problems with exchanging data. For instance, one office indicated that they spent \$200,000 to purchase software to permit the use of data received from other Departmental locations.

Variations in software used were also observed among the various offices and within the same site. For example, as shown in the following chart, numerous different major database applications were in use among the various offices. Inconsistencies in application usage also were observed within the same site. About 23 percent (10 of 44) of the organizations indicated that they used three or more different electronic mail and word processing applications.

The following table details the diversity of applications used across the Department at the 44 offices surveyed:

Number of Different Software Packages in Use

Function	Number of Packages
Word Processing	4
Electronic Mail	12
Virus Protection	9
Desktop Platform	11
Database	14

Software Acquisition Framework Requirements and Best Practices

The Paperwork Reduction Act of 1995 and the Clinger-Cohen Act of 1996 outline a number of requirements designed to help Federal agencies better manage their information technology resources. The Paperwork Reduction Act is the “umbrella” information technology legislation for the Federal government, while the Clinger-Cohen Act requires that Federal agencies establish a disciplined approach to managing information technology resources. These Acts require the head of each executive agency to design and implement a process for maximizing the value and assessing and managing the risks of information technology acquisitions.

The Office of Management and Budget (OMB), the General Accounting Office (GAO), and the General Services Administration (GSA) have developed guidance to assist agencies in managing information technology. Software standards are identified as a key component of an agency-wide information technology architecture. The guidance emphasizes that Federal agencies should develop a framework for software acquisition by issuing mandatory standards for use throughout the agency and by developing and implementing an investment strategy. OMB specifically noted that the establishment of (software) standards both “guide and constrain information technology

asset acquisition” and “enable interoperability” (data compatibility) of systems throughout an agency. The guidance stresses that standards should address all components of the enterprise architecture and may specify products that implement the standards.

Acquisition Best Practices

The Vice President’s National Performance Review (NPR) emphasized that Government agencies should strive to be more efficient by eliminating program redundancies. The objective of this and other NPR initiatives is to make Government programs work better and cost less. Establishing enterprise-wide, standards-compliant software contracts to leverage an agency’s buying power is widely recognized as a prudent business practice within both Government and private industry.

Both agency and industry officials believe that centrally negotiated enterprise-wide software contracts can significantly reduce acquisition costs. A recent best practice study commissioned by the Department of Defense (DOD) recognized that enterprise-wide software agreements reduce acquisition and support costs and should support an agency’s software standards. Other often cited advantages to this software acquisition approach include:

- reduced computer-training costs by migrating to a standard software environment;
- reduced administrative costs by centrally acquiring and administering enterprise-wide contracts, as opposed to offices independently negotiating software contracts; and
- enhanced data compatibility between computer systems.

Barriers to Establishing A Software Acquisition Framework

The Department’s lack of progress in developing and implementing a framework for software acquisition was due to its decentralized information technology strategy and a lack of organizational support. Contrary to OMB guidance and despite initiatives by the CIO, organizational support for the software standards and the consolidated acquisition of information technology products had not developed. Acquisition authority for virtually all software had not been consolidated and remained highly decentralized. Authority to determine the type and brand of software to be used for a particular purpose was maintained by individual offices rather than the CIO or the Information Technology Council. In addition, information technology funding and approval authority was vested in the Program Secretarial Officers rather than being centrally controlled.

The lack of organizational support for a software acquisition framework hindered the Department's ability to satisfy key provisions of the Clinger-Cohen Act. In our report on *Review of the U.S. Department of Energy's Information Management Systems* (DOE/IG-0423), it was noted that the CIO's authority to direct and control the information technology program remained unclear. Similarly, the lack of organizational support for a centrally controlled software acquisition framework detracts from the Department's ability to satisfy Clinger-Cohen requirements to maximize value in information technology acquisitions.

Benefits of Enterprise-Wide Software Not Achieved

The Department had not taken advantage of enterprise-wide software contracts that could result in significant savings. Based on the analysis of a single major desktop software suite, savings of approximately \$38.2 million over a five-year period could be realized by the adoption of software standards and the use of a supporting enterprise-wide contract (see Appendix 1). Additional savings could also be realized by using enterprise-wide contracts for standard applications, such as database and security. Such contracts would permit the Department to exercise substantial purchasing leverage and would permit it to take advantage of significant volume purchase discounts. Based on the audit analysis and the success of recent initiatives by several other large Federal organizations, it is possible that savings of at least \$30 to \$50 million could be realized over five years, as predicted by the Department in its December 1996 Information Architecture Baseline Analysis Summary.

Recent experience in the Federal sector also demonstrates that the Department could obtain significant benefits by developing and implementing a framework for software acquisitions. Enterprise-wide software licenses have recently been negotiated by other Federal entities, including the Internal Revenue Service (IRS), the Department of Labor, the National Aeronautics and Space Administration, and DOD, and have allowed those organizations to take advantage of significant savings. For instance, the IRS projects savings of \$60 to \$80 million as a result of awarding an enterprise-wide software contract. In another example, the Defense Logistics Agency projects savings of \$89 million, by utilizing a Department of Navy enterprise-wide contract. Both savings estimates are projected over the five-year life cycle of the respective contracts.

Estimates of significant savings prepared by the Department's Office of Science also serve to bolster Department-wide savings estimates. During 1999, the Office of Science found that it could save more than \$400,000 over three years simply by migrating from multiple software platforms to a single platform environment. The projected savings were conservative when considering all Office of Science employees because they were based only on the 500 personal computers owned by the Office of Science within Headquarters.

Meeting Performance Goals

Without the development of Department-wide software standards and the use of supporting enterprise-wide software contracts and the achievement of associated cost savings, the Department may not be able to achieve previously established performance measures. As required by the Government Performance and Results Act of 1993, the Department established a September 1997 performance measure of achieving \$100 million in cost avoidance over the next five years by establishing a Department-wide information architecture with supporting software standards. An additional performance measure was established to cut information technology expenses by \$245 million over a five-year period through better systems, large-scale procurements, and eliminating redundancies. However, the Department may not be able to meet these established goals unless it is able to develop and implement an effective framework for software acquisitions.

RECOMMENDATIONS

To meet the provisions of the Clinger-Cohen Act and realize significant savings available through the adoption of a software acquisition framework, we recommend that the Chairperson for the Executive Committee for Information Management require the:

- development and implementation of mandatory Department-wide standards governing the acquisition of computer software, to be phased in as software is upgraded or replaced, and
- negotiation and award of Department-wide COTS software contracts, or the use of similar multi-agency contracts, that include enterprise-wide deployment based on the above standards.

**MANAGEMENT
REACTION**

Management agreed, in general, with the recommendations related to computer software standards and enterprise-wide software licensing to improve interoperability and efficiency.

Management indicated that it would supplement its current guidance with policy on the adoption of approved Federal, DOE technical, or accredited industry standards. Standards are being drafted to facilitate information exchange and to ensure that critical systems align to the Department's information technology architecture. Policy development will be focused on requirements that will be applicable to the Federal community, and to the greatest extent feasible, the contract population. A pilot program designed to improve Department-wide interoperability through information technology infrastructure core and common services will be initiated in March 2000. A simultaneous total cost of ownership study will be conducted to measure and potentially reduce information technology service costs.

**AUDITOR
COMMENTS**

Management's proposed actions are responsive to our recommendations.

Appendix 1

SCOPE

The audit was performed between June and December 1999 at Departmental Headquarters in Washington, DC and Germantown, Maryland; the Savannah River Site in Aiken, South Carolina; the Lawrence Livermore National Laboratory in Livermore, California; and the National Energy Technology Laboratory in Pittsburgh, Pennsylvania. We also surveyed Departmental offices, including Departmental program and field offices and contractor-operated laboratories and facilities, to determine how and what types of software were being acquired. Based on our on-site work and survey results, we accumulated statistics on 44 separate Departmental entities with software contracting authority. Our audit was limited to COTS software for desktop computer applications. Commercially available business information systems were not within the scope of this review.

METHODOLOGY

To accomplish our objectives, we:

- Reviewed applicable laws and regulations pertaining to the use and acquisition of information technology. We also reviewed reports by the Office of Inspector General, the General Accounting Office, and various task forces and advisory groups.
- Reviewed numerous documents related to the use and acquisition of software. We also reviewed Departmental planning documents, including the September 1997 Information Management Strategic Plan.
- Held discussions with program officials and personnel from the Offices of the Chief Information Officer, Procurement and Assistance Management, Chief Financial Officer, Field Integration, Science, and Defense Programs. We also held discussions with various officials and staff at the operations offices and laboratories we visited.
- Reviewed information from the Internal Revenue Service and the Department of Defense regarding initiatives undertaken to establish enterprise-wide software contracts. Discussions were also held with information technology vendors to gain their perspective on the Department's acquisition practices. These vendors also provided data on the number and types of contracts they had been awarded by Departmental entities.
- Administered a questionnaire to Departmental offices to determine how and what types of software were acquired.

In order to determine potential savings, we obtained enterprise-wide software pricing information from the Department of Navy, which recently negotiated an enterprise license for a major desktop software suite for the Defense Logistics Agency. Using the prices obtained, we calculated the difference between the enterprise-wide software prices and GSA contract schedule prices, since use of the GSA contract schedule is a common method of procurement within the Department. Utilizing available information, we conservatively estimated that the Department's 130,000 personal computers would need their key desktop software replaced or upgraded within five years. We then multiplied the Department's 130,000 personal computers by the difference between the enterprise-wide prices and GSA prices to arrive at our estimated savings for the five-year period.

The audit was conducted in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objectives. Accordingly, we assessed internal controls regarding the use and acquisition of software. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not rely on computer-processed data to accomplish our audit objectives. An exit conference was held with appropriate Headquarters officials on January 21, 2000.

Appendix 2

RELATED OFFICE OF INSPECTOR GENERAL AND GENERAL ACCOUNTING OFFICE REPORTS

This review concerned the Department's efforts to develop a framework for software acquisitions, consisting of software standards and enterprise-wide software contracts. Prior related Office of Inspector General and General Accounting Office reviews include:

- *The U.S. Department of Energy's Procurement and Assistance Data System*, DOE/IG-0436, January 1999. The report stated that the system did not meet user needs or comply with current generally accepted system practices. Consequently, Departmental offices developed their own systems to meet information needs.
- *Review of the U.S. Department of Energy's Information Management Systems*, DOE/IG-0423, August 1998. The report stated that the CIO lacked the authority and resources necessary to ensure development of information architectures at the program office level, which form the building blocks of a Departmental architecture. The report added that, as a result, the Department had not developed and implemented an information technology architecture, although its Strategic Plan called for the implementation of a Department-wide information architecture with supporting standards by January 1998.
- *Information Management: Energy Lacks Data to Support Its Information System Streamlining Effort*, GAO/AIMD-96-70, July 1996. The report concluded that the Department had allowed its management and operating contractors wide latitude in developing and implementing software inventory procedures and standards. As a result, the Department did not have a complete inventory of specific systems used by the Department and its management and operating contractors as required by the Paperwork Reduction Act and related OMB guidance.

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