

DOCUMENT RESUME

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The Federal Software Exchange Program: A Small Step in Improving Program Sharing. FGMSD-78-11; B-115369. January 13, 1978. 17 pp. + appendix (3 pp.).

Report to Jay Solomon, Administrator, General Services Administration; by D. L. Scantlebury, Director, Financial and General Management Studies Div.

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The General Services Administration (GSA) created the Federal Software Exchange Program to identify and collect computer programs developed by Federal agencies that could be used by other Federal agencies. The sharing of such computer programs and related documentation among agencies with common needs is intended to avoid the time, effort, and expense involved in replicating software. Software, as defined by GSA, means all computer programs and routines used to extend the capabilities of computers, including single programs, independent routines, related groups of routines, and sets of systems or programs.

Findings/Conclusions: Agencies submit abstracts of computer programs they believe useful to the National Technical Information Service which publishes abstracts of the computer programs in a catalog. The first catalog of software abstracts published in January 1977, contained 100 abstracts. The October 1977 catalog contained 365 abstracts. No programs had been sold through October 1977. Generally, such operations related to sharing technology have had limited success. Recommendations: GSA should: stimulate more agencies to submit abstracts of computer programs for the catalog, adopt a policy to guarantee that the catalog will include abstracts only of programs that have been documented according to prescribed standards, and provide more technical assistance to purchasers so that they can overcome any problems in changing the programs to work in their environment. (RRS)



*UNITED STATES  
GENERAL ACCOUNTING OFFICE*

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## The Federal Software Exchange Program -- A Small Step In Improving Computer Program Sharing

The Federal Software Exchange Program was established in February 1976 so Government agencies could share common computer programs and related documentation. By sharing, the computer program development work done before need not be duplicated. While it is true that an agency that gets a program developed elsewhere must often change it for its own use, this approach is much cheaper than writing a new program. It also makes earlier operation possible.

The Program's first catalog of computer programs available to share was published in January 1977. No programs had been sold through October 1977.

The Program is only a small step toward better sharing. The General Services Administration should improve the Program to save money, time, and other resources throughout the Government.

04538



UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

DIVISION OF FINANCIAL AND  
GENERAL MANAGEMENT STUDIES

B-115369

The Honorable Jay Solomon  
Administrator of General Services

Dear Mr. Solomon:

This report discusses our evaluation of the Federal Software Exchange Program, which was created to increase software sharing among Federal agencies and suggests ways to strengthen the Program. Computer program costs have become the largest cost of operating an automatic data processing system. This review was made to validate the concepts of a software exchange program. We discussed these matters with officials of your Office of Agency Assistance Planning and Policy and have incorporated their comments.

This report contains recommendations to you on page 16. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Acting Director, Office of Management and Budget, and the Chairmen, House Committee on Government Operations, Senate Committee on Governmental Affairs, and House and Senate Committees on Appropriations.

Sincerely yours,

A handwritten signature in cursive script that reads "D. L. Scantlebury".

D. L. Scantlebury  
Director

D I G E S T

The cost of software--that is, the cost of designing, operating, and maintaining the programs that direct the computer to do its various logical and computational steps--has become the predominant cost of automatic data processing systems. One means of coping with the increased cost of, and demand for, programs is to share them with others at a modest cost. (See p. 1.)

Software sharing can reduce cost and shorten the time needed for it to become operational at a receiving agency. (See p. 1.)

The General Services Administration created the Federal Software Exchange Program in February 1976 to collect computer programs that might be shared. Agencies with common needs could then purchase programs in lieu of developing their own. (See p. 3.)

The Program is being funded from the General Services Administration's automatic data processing fund and is operated by the National Technical Information Service of the Department of Commerce. Both agencies establish the Program's policies. (See p. 4.)

Agencies are supposed to submit to the National Technical Information Service abstracts of computer programs which they believe may be used by others. These abstracts are published in a catalog. The first catalog was published in January 1977, but no computer programs had been sold as of October 31, 1977. (See p. 6.)

The Federal Software Exchange Program is a catalog operation. Generally, such operations related to sharing technology have had only limited success. The Program needs improvement to increase the prospects of its success. Specifically, the General Services Administration should:

- Stimulate more agencies to submit abstracts of computer programs for the catalog. (See pp. 6 to 9.)
- Adopt a policy to guarantee that the catalog will include abstracts only of programs that have been documented according to prescribed standards. (See pp. 9 to 12.)
- Provide more technical assistance to purchasers so that they can overcome any problems in changing the programs to work in their environment. (See pp. 12 and 13.)

These improvements will increase costs, but will be worth it. The potential benefits of increasing software sharing among Government agencies will exceed possible extra costs.

#### AGENCY ACTIONS

GSA officials generally agreed with this report. Regarding the specific recommendations, GSA stated:

- Within the constraints of their authority, GSA could do little more than persuade agencies to submit abstracts. In its view, the Program could be strengthened by support and direction from the Office of Management and Budget.
- GSA requests documentation when inquiries or requests are received. To evaluate all programs would be costly and would increase the price of the software, as the Program must be self-sustaining.
- GSA plans to increase its technical assistance.

GAO plans to closely monitor GSA's actions to improve the operation of the Program.

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<u>ABBREVIATIONS</u>		
ADP	automatic data processing	
GAO	General Accounting Office	
GSA	General Services Administration	
NTIS	National Technical Information Service	

## CHAPTER 1

### INTRODUCTION

The cost of operating automatic data processing (ADP) in Federal agencies has increased significantly. Although the exact cost is not available, we estimate the Government's cost to be over \$10 billion annually. In recent years the cost of computer systems has been shifting from hardware to software.

Software, as defined by the General Services Administration (GSA), means all computer programs and routines used to extend the capabilities of computers. It includes single programs, independent subroutines, related groups of routines, and sets or systems of programs.

A task force report of a computer manufacturer's users group, issued in September 1974, concluded that the predominant cost of an ADP system is for software. This group estimated that the number of computers in use in the United States could double in the 1980s and that unless certain data processing problems and limitations are met, one of which is coping with the increased demand for software, the growth of the data processing industry would be limited. A strategy study, completed for GSA in March 1975, estimated that software is expected to account for 90 percent of all ADP costs by 1980.

One means of coping with the increased demand for software is the reuse of computer programs by making them available for others to share at a modest cost. Such software sharing can reduce cost and shorten the time before it becomes operational at a receiving agency. Examples:

- The annual report of the National Association for State Information Systems, <sup>1/</sup> issued in January 1977, states that State ADP officials support and assist one another in reducing the cost of implementing new applications. The report also contained a table identifying systems and programs transferred to or from other States and on information received from 27 States.

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<sup>1/</sup>An organization of State government ADP officials.

- A contractor developed a computerized accounting system for two agencies in the Department of Health, Education, and Welfare and later was the successful bidder for developing computerized accounting systems for three other agencies. The contractor was successful principally because it was able to modify its design of the accounting system to meet the needs of the other agencies, its proposal was priced considerably lower than other offerers, and it promised the system would be operational significantly earlier than those offered by others.
  
- The Department of the Treasury started developing two computerized integrated payroll and personnel systems in April 1976 (to replace five existing systems). The systems are based on a Department of the Interior system being used by two bureaus in the Treasury. Treasury estimated that new systems would have taken 5 years to develop and implement, whereas a modification of the Interior system could be implemented in 18 months. A Treasury official told us that it is implementing one system on a bureau-by-bureau basis, and that by the end of December 1977, this system will be operating in 11 of the 12 bureaus to be serviced.

The private sector has been increasing its use of commercially developed software packages for specific functions and, in many cases, has purchased such software because it was more advantageous than developing new programs.

Some Government agencies have tried to promote software sharing.

- The Department of Defense has published catalogs of some of its computer programs.
  
- The Air Force operates a design center to develop standardized software for its installations.
  
- The National Aeronautics and Space Administration has contracted with the University of Georgia's Computer Software Management and Information Center to collect and sell or lease to the public software that was developed by the agency and its contractors.
  
- The Argonne National Laboratory of the Energy Research and Development Administration collects



software developed by its agency and contractors. This software is distributed to the agency's installations as well as the contractors that operate installations for it.

--The National Technical Information Service (NTIS) of the Department of Commerce, as part of its function as a central source for public sale of Government-sponsored technical information developed by Federal agencies, receives computerized data files and computer programs from Federal agencies for sale to the public and private sector.

--The National Bureau of Standards has developed an index of computer programs to serve as a central reference point for organizations wanting computer programs.

The software exchanges enumerated above that make their products available to others outside their agencies have had only limited success.

--The National Bureau of Standards statistics show that it receives about 150 inquiries annually.

--NTIS computer products sales have been for ADP machine-readable data files as well as software.

--The University of Georgia Center's software sales and lease for fiscal year 1976 totaled \$204,000.

Pursuant to its authority under the Brooks Act (Public Law 89-306), GSA amended the Federal Property Management Regulations (101-32.16) in February 1976 to create a Federal Software Exchange Program. (See app. I.) The Program is to identify computer programs developed by Federal agencies that can be used by other Federal agencies. Sharing of such computer programs and related documentation among Federal agencies with common needs is intended to avoid the time, effort, and expense involved in replicating software.

The Program collects computer programs--such as management business applications, scientific or engineering applications, and utility programs--and publishes abstracts of them in a catalog. Computer programs are for sale only to Federal, State, and local governments.

As part of the Federal procurement process, an agency official must certify, for any computer program the agency plans to acquire from commercial sources, that it is not already available in the GSA software exchange catalog.

The GSA ADP revolving fund is used to fund the Program. A Federal Software Exchange Center was created and is being operated by NTIS for GSA pursuant to an interagency agreement which was effective on June 24, 1976. The agreement specifies that a joint policy committee, consisting of four designated officials (two from GSA and two from NTIS), will provide the overall policy for management of the center. NTIS estimated that the first year's operating costs (fiscal year 1977) would range from \$334,000 to \$583,000, depending on the volume of software acquisitions and sales.

GSA published the first catalog in January 1977. Examples of software abstracts are shown on page 5.

#### SCOPE OF REVIEW

We obtained information on the Program and on software exchange programs administered by NTIS, the University of Georgia Center, the Argonne National Laboratory, and commercial software firms. We also discussed the prospects of sharing computer programs with officials of several Federal agencies.

## EXAMPLES OF SOFTWARE ABSTRACTS INCLUDED IN THE GSA SOFTWARE EXCHANGE CATALOG

**FSWEC-77/0031**

### **Crec - Tape Read Error Analysis**

**Software.** A simple Fortran program which is used by our staff in diagnosing customer tape problems. This program will read a variable number of files from tapes, noting blocks where read errors occur and displaying an array of block sizes (20 per line) at the end of each 10k blocks and at the end of each file.

**Keywords.** \*Computer storage devices, \*Computer programs, Error analysis. **Manf** = Univac 1108, **System** = OS 1100, **Type** = Computer program, **Mode** = Combination, **Appl** = Support/utility, **Lang** = Fortran, **Memory** = 10k, **Prog statements** = 75, **Drives** = 8C.

**Price:** \$100.00. Includes documentation. Documentation also available as FSWEC-77/0031-1, write for quote.

**FSWEC-77/0089**

### **Budget Presentation**

**Software.** This system converts internal base budgets into products that meet the external requirements imposed by the Bureau of the Budget and Congress. It provides Budget Division with updated budget detail and informs operating divisions of what was included for them in the most recent budget submissions. The original data input is very similar to current year operating budget structure and through a series of distributions all indirect budget data is converted to direct appropriations. Then the current year data is adjusted to the budget year for Congressional Submission. Positions and cost data are balanced.

**Keywords.** \*Budgeting, \*Computer programs, \*Budget presentation. **Manf** = IBM 360/40, **System** = Dos, **Type** = System, **Mode** = Batch, **Appl** = Business, **Lang** = Fortran; Cobol; ALC, **Memory** = 20k, **Prog statements** = 6495, **Drives** = four.

**Price:** \$1950.00. Includes documentation. Documentation also available as FSWEC-77/0089-1, write for quote.

## CHAPTER 2

### OUR OBSERVATIONS ON THE FEDERAL

#### SOFTWARE EXCHANGE PROGRAM

GSA's first catalog of software abstracts, published in January 1977, contained 100 abstracts. The current catalog, published in October 1977, contains 356 abstracts. Most are utility computer programs; that is, (1) programs that serve as productivity aids in using a specific manufacturer's equipment and (2) mathematical and scientific subroutines.

As of October 31, 1977, no computer programs or documentation had been sold. Income was derived solely from the sale of the catalogs. GSA's statement of income and expense for the ADP fund as of September 30, 1977, summarized the Program's operations for fiscal year 1977 as follows:

Income	\$ 41,025
Expenses	<u>-110,578</u>
Net income (deficit)	<u>\$-69,553</u>

The catalog has existed for only a short period, but we believe the need for changes in the Program is already evident. We have evaluated the features of the Program in the light of what we believe constitutes an effective software exchange program and have concluded that it is only a small step toward achieving more software sharing among Federal agencies. In our opinion, GSA will have to strengthen the Program significantly in order to increase the prospects that software will be reused more extensively by other agencies.

The Program's success is dependent largely on the quality of computer programs that are submitted to the Federal Software Exchange Center. 1/ Within this constraint, the Program can be instrumental in increasing software sharing if it:

--Provides a mechanism to encourage agencies to submit computer programs.

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1/NTIS operates the Center for GSA.

- Adopts a quality control procedure to determine which computer programs are to be abstracted in the catalog.
- Provides for a certain level of technical assistance to purchasers of software.
- Establishes reasonable prices for the computer programs.

We believe significant improvements are needed in each of these four areas, as discussed in detail in the following sections of this report.

#### ACQUIRING COMPUTER PROGRAMS

Under Federal Property Management Regulations creating the Program, agencies are supposed to submit abstracts of computer programs to NTIS that they believe other agencies could use. The regulations specify that the computer programs must have been operational for at least 90 days. They must also include certain documentation such as user instructions, flowcharts, and sample inputs and outputs. Determining what programs to transmit to NTIS, however, rests with each agency; GSA cannot force agencies to submit programs.

The budget was approved in October 1976 by GSA, and NTIS officials estimated that Federal agencies would submit 3,500 to 7,000 abstracts to the Federal Software Exchange Center through the end of fiscal year 1977.

GSA statistics show that as of November 10, 1977, the Center had received only 457 software abstracts from 19 agencies. A tabulation of abstracts received by source and number follows:

<u>Submitting agency</u>	<u>Abstracts submitted</u>
Department of Agriculture	156
Department of Commerce	107
Defense Mapping	99
Department of the Interior	36
Department of Health, Education, and Welfare	23
General Services Administration	7
Tennessee Valley Authority	5
Department of the Navy	3
Federal Power Commission	3
Panama Canal Company	3
Department of the Army	2
Energy Research and Development Administration	2
Veterans Administration	2
Central Intelligence Agency	1
Defense Nuclear Agency	1
Department of the Air Force	1
Department of Transportation	1
Environmental Protection Agency	4
United States Information Agency	<u>1</u>
Total	<u>457</u>

These statistics show that the number of abstracts submitted to the Center and the number of agencies submitting them have been far fewer than estimated. A GSA official told us that one reason so very few abstracts have been submitted was that many agency officials responsible for ADP were not aware of the Program. GSA has been encouraging agency officials to submit more abstracts by publicizing the Program in newsletters, conducting meetings to explain the Program, and answering inquiries. GSA officials believe that some positive results of these meetings will be forthcoming. For example, the Departments of the Army, the Air Force, and the Navy are now compiling abstracts to be submitted to the Exchange Center. GSA anticipates additional abstracts from other agencies.

GSA officials stated that their authority allows them to do little more than persuade agencies to submit abstracts. They believe the Software Exchange Program could be strengthened if the Office of Management and Budget expressed support for the program.

We have identified what we believe are other reasons why many agencies have not submitted abstracts to NTIS:

- GSA has no means of requiring agencies to submit abstracts.
- Some agency officials lack enthusiasm for the exchange.
- Other officials have placed low priority on this effort and, therefore, devote only limited time to determining whether their computer programs are potentially transferable.
- Some agency officials who developed potentially transferable computer programs might not have submitted them because they believe the documentation would not meet the standards specified.

Unless agencies can be stimulated to submit more abstracts of computer programs that are potentially transferable, many opportunities to reuse them will be lost.

#### EVALUATING COMPUTER PROGRAMS

In accordance with its agreement with GSA, NTIS is responsible for developing and maintaining the software exchange catalog. This catalog consists of abstracts of software. The abstracts include a brief description of the computer programs, keywords of the subject matter, and a summary of technical information--such as computer manufacturer and model, programming language used, and computer resources required to run the programs.

The abstracts in the catalog are prepared from a standard information form received from agencies. <sup>1/</sup> Regulations governing the Software Exchange Program require eventual submission of documentation supporting the computer programs, but agencies are not required to furnish this documentation to the Center when they submit their summaries. A GSA official told us that the regulations did not include this requirement because many agency officials objected to furnishing the documentation with the abstracts. Further, many agencies objected to GSA's "warehousing" software programs;

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<sup>1/</sup>The National Bureau of Standards developed the form for agencies to use in abstracting their software under its Federal Information Processing Standards Program.

therefore, the current practice is to require only submission of abstracts. When inquiries or requests for programs are received, GSA requests documentation from the agencies. GSA officials told us they have received requests for documentation in the last 2 months.

NTIS decides whether the abstracts are to be included in the catalog based on the completeness and clarity of the information submitted by the agency on the standard information form. No attempt is made to evaluate the subject matter. NTIS' review of abstracts consists of editing the titles of software and narratives submitted by agencies, formatting the technical information, editing the keywords, assigning an identifying number to the abstract, and pricing the computer program.

An NTIS official said that his agency does not make any technical evaluation of abstracts of the computer programs. He indicated that such an evaluation was not critical because it could be assumed that an official in the submitting agency had determined that the programs could be used by others and that they met the requirements specified in Federal Property Management Regulations; otherwise, the abstracts would not have been submitted.

NTIS requests agencies to submit to the Center those computer programs and related documentation for which a request or an inquiry has been received based on the abstract in the catalog. NTIS then determines whether the required documentation has been submitted. An NTIS official told us that, in some cases, not all documentation was submitted. The Center also transcribes the computer programs on a magnetic tape.

NTIS does not verify whether all the routines and sub-routines comprising a computer program have been submitted. This verification can be done only by using the program on the ADP equipment for which it was originally written.

A GSA official said that GSA did not intend for computer programs to be evaluated initially. He stated that some agencies were opposed to submitting copies of the programs supporting the abstracts. GSA decided to include in the catalog the abstracts submitted and let the market place determine which programs would be in demand. An agency official justified this position on the basis that GSA had no means to determine which programs would be in demand, and the cost of processing an abstract for inclusion in the catalog was minimal. GSA plans to purge those programs for which no



demand exists after the Program has been operating for awhile. GSA officials stated that evaluating all programs being submitted would be costly and, as the Software Exchange Program must be self-sustaining, these evaluations would result in increasing the price for the software.

In our opinion, the process for screening the abstracts to determine those to include in the catalog must be strengthened considerably if the Program is to work well. NTIS requests agencies to submit documentation supporting the abstracts for the separate software directory it administers. Computer programs submitted to the University of Georgia Center and the Argonne National Laboratory must pass certain tests before they are included in their software catalogs. These two organizations verify that all the routines and subroutines are included in the software packages submitted. The importance of such checks was emphasized in a 1973 report prepared for the National Aeronautics and Space Administration that evaluated the University of Georgia Center operation. The report stated:

"The one comment that seems to permeate the overall response is to conduct more rigorous and thorough operational checkout of the programs before they are issued. Presumably this would cost more money and may result in fewer programs being made available. Since the program costs are inexpensive compared to purchasing elsewhere or developing in-house, an increase in cost to carry out this suggestion would probably not prevent users from purchasing the programs and would provide more satisfied and repeat customers."

Inclusion of abstracts in the software catalog without determining whether the software package is complete also is a disservice to potential users. They could be wasting their time trying to acquire a software package which is not transferable because the documentation is missing or incomplete.

In our opinion, no abstract should be included in the software exchange catalog unless NTIS is assured that the software package is complete.

We also believe that GSA should consider revising its policy to require that the Center verify that all routines and subroutines have been included in the software package submitted. We recognize NTIS would probably need to use ADP equipment of several manufacturers to do this; it could be done by arranging to use ADP equipment owned by other agencies in the Washington metropolitan area. This is the

practice used by the University of Georgia Center which has arranged to use computer resources of the State of Georgia if necessary.

TECHNICAL ASSISTANCE PROVIDED  
TO PURCHASERS

Transfer of computer programs is a technical process. Most programs must be modified somewhat to work on another system because each user has some unique requirements, and the equipment configurations are not always identical.

The Director of the Institute for Computer Science and Technology, National Bureau of Standards, affirmed the vendor's need for such technical assistance. In response to a question concerning the acquisition of software products, the Director stated:

"\* \* \* Software products are not simply copied, but must be provided as a package of service to each recipient that includes all of the assistance necessary to make that software perform as a part of each installation. \* \* \*"

NTIS' technical assistance under its own program consists of responding to telephone inquiries, but such assistance is limited by the amount of information available to it. NTIS also generally gives the purchaser the name of the agency that developed the software. The extent of assistance provided by each agency is dependent on its ability and willingness to help, over and above its efforts to include programs in the catalog.

NTIS officials told us that the technical assistance their agency will provide under the GSA Software Exchange Program will be similar to that provided in its own program. <sup>1/</sup> GSA and NTIS officials did not believe technical assistance would be adversely affected even though the Software Exchange Program regulations specify that the developer of the computer programs will not be identified to the purchaser. GSA officials stated that some agency officials did not want their computer programs identified as it could

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<sup>1/</sup>NTIS' software program is addressed primarily to the private sector; the GSA Software Exchange Program is to facilitate sharing of Federal Government-owned programs with other governmental organizations at all levels. Some consideration is being given to a merger of the two programs.

trigger an inordinate number of inquiries. They believed, however, that many officials in these agencies would be receptive to providing assistance to purchasers of their agencies' programs.

GSA officials told us they plan to increase their technical assistance for the Program at a later date. GSA is considering selecting some programs and providing maintenance for them either through GSA or by an agency for GSA.

NTIS' role is limited to acting as a conduit between the purchaser and the developer when the developer desires to be identified. The budget approved by GSA and NTIS officials for NTIS in fiscal year 1977 provided only for slightly less than 1 staff-year for technical assistance.

Many purchasers require more than superficial assistance in resolving problems, such as getting the developer's software to work on their computer systems. Commercial vendors of software packages generally consider providing assistance to purchasers of their packages as an integral part of their packages. The National Association for State Information Systems annual report, issued in early 1977, stated that the principal reason there was a decrease in transferring system design and computer programs among States was that the States that transferred these programs were reluctant to direct people away from their current assignment to assist in the transfer.

The GSA Software Exchange Program, as presently operated, is primarily a catalog sales operation. In our opinion, many agencies will not buy software from this source because adequate technical assistance is not being provided.

#### COMPUTER PROGRAM PRICING

The Program is being financed by the ADP fund. Therefore, GSA's policy is to establish prices for software that will recover the costs of the Program.

The basis for pricing software was developed jointly by GSA and NTIS. Prices were established by valuing certain factors, such as type of software (system, computer program, or subroutine), programming language used, and application area (utility, management, and scientific).

Published prices of software in the catalog range from \$100 to \$2,550. The catalog of software abstracts, including updates for the year, was priced at \$75. Documentation supporting the software purchases was priced initially at 20 cents a page.

We brought to GSA's attention inconsistencies in the prices established in the Federal Software Exchange Catalog as compared with the same packages included in the NTIS catalog. A comparison of prices of four software packages that were listed in each catalog follows:

<u>Program</u>	<u>NTIS catalog price</u>	<u>GSA price</u>
A	\$150	\$1,100
B	175	1,950
C	175	1,100
D	200	1,100

An NTIS official said six more computer programs currently in the NTIS catalog tentatively have been selected to be included in the GSA catalog, and the tentative prices established by GSA will also be considerably higher than the ones charged by NTIS.

In January 1977 GSA requested NTIS to explain why prices and proposed prices for the same programs in the software exchange catalog were so much higher than the prices in the NTIS catalog. NTIS responded that the Program was a stand-alone operation and had to recover all costs from the sale of software. On the other hand, software is only one of several products sold by NTIS and its overhead costs are distributed over a broader base.

In July 1977 GSA officials told us that it proposed to NTIS downward revisions of some of the valuations of its pricing factors, and as a result, the prices of about 30 software packages would be reduced. GSA also proposed reductions in the sales price of documentation.

These reductions will further the cost effectiveness of sharing to the purchaser, and we believe GSA can demonstrate this advantage more clearly by citing in the catalog the original development cost of such programs and comparing it with the catalog purchase price. 1/ The great differences

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1/Where original development cost is unknown, conservative estimates can be used. For example, it is generally accepted that program statements in high-level languages cost \$8 or more each, depending on the complexity of the program. For the programs shown on page 5, the catalog would show a purchase price of \$1.33 per program statement (Crec Program) and \$0.32 per program statement (Budget Presentation Program). This would contrast with a much higher development cost.

between purchase price and development cost would provide an indication to the purchaser of the extent of savings to be achieved through sharing--even granting that program modifications will be needed--to say nothing of the reduction in time to get the program in production in his installation.

## CHAPTER 3

### CONCLUSIONS AND RECOMMENDATIONS

#### CONCLUSIONS

Software sharing can benefit many agencies, as compared to developing their own software, as it can reduce cost and shorten the time before software becomes operational. The Federal Software Exchange Program, in its present state, however, is only a small step toward achieving more computer program sharing among Federal agencies. The Program is essentially a catalog sales program. Generally, catalog sales operations dealing with technology transfer have had limited success.

GSA needs to improve the Program's operation; otherwise, the potential benefits of sharing will not be realized.

We have identified several areas in which GSA could make the Program more effective. GSA needs to take aggressive action to stimulate agencies to comply with the requirement to submit abstracts of software that are potentially transferable. Because computer products are technical, GSA must provide a review process which will assure that the software catalog includes only abstracts of software packages that are documented in accordance with the Program's standards, and those for which some demand may be expected. GSA also needs to adopt a policy to provide purchasers more than cursory technical assistance. Technical assistance could be provided by augmenting the technical personnel in the Program or by encouraging the developer agencies to provide this assistance on a voluntary or reimbursable basis.

We recognize that adopting these policies and practices will require additional resources. However, the benefits to be achieved in accomplishing more software sharing among Government agencies far exceeds the additional costs that would be incurred by an efficient GSA operation. Moreover, if GSA improves its operation and services under the Program, it should increase its prospects for making sales.

#### RECOMMENDATIONS

We recommend that the Administrator, GSA, take steps to improve the operation of the Software Exchange Program by:

- Stimulating agencies to submit more program abstracts for inclusion in the catalog.
- Requiring evaluation of the technical adequacy, completeness, and operability of all programs submitted for inclusion in the catalog.
- Providing for sufficient technical assistance to purchasers to facilitate implementation of the shared program on the purchaser's system.

#### AGENCY ACTION AND OUR EVALUATION

In lieu of requesting written comments on our draft, we met with GSA officials.

GSA officials generally agreed with the content of this report. With regard to the three recommendations, GSA believes:

- It is doing all it can to stimulate agencies to submit abstracts to the Center; however, within the constraints of their authority, they could do little more than persuade agencies to submit abstracts. GSA officials suggested that the Program could be strengthened by some support from the Office of Management and Budget.
- The current practice is to require submission of abstracts only, since many agencies object to GSA's warehousing software programs. GSA requests documentation from agencies when inquiries or requests are received. GSA officials also pointed out that to evaluate all programs would be costly, and as a result, would increase the price for the software as the Program must be self-sustaining.
- GSA plans to increase its technical assistance for the Program at a later date. GSA is considering maintaining selected programs.

Because we believe a properly designed and operated software exchange program can contribute significantly to economy and effectiveness in Government operations, we plan to follow closely GSA's progress in addressing the matters discussed in this report.

FEDERAL PROPERTY MANAGEMENT REGULATIONS  
CREATING THE FEDERAL SOFTWARE EXCHANGE PROGRAM

## SUBPART 101-32.16

FEDERAL SOFTWARE  
EXCHANGE PROGRAM

101-32.1603(d)

Subpart 101-32.16—Federal Software  
Exchange Program

## § 101-32.1600 Scope of subpart.

This subpart provides policy and procedures describing the Federal Software Exchange Program, the reporting of common-use ADP software to the Federal Software Exchange Center (FSEC), and subsequent use of this information for Government-wide sharing. The Software Exchange Program will gather only computer programs and logically related sets of computer programs. No data files or data bases will be included. No private or personal data will constitute any portion of the computer programs to be reported and exchanged by FSEC. This program, administered by the General Services Administration (GSA), is established to promote the sharing of computer programs and/or other related documentation. While the resources and aid of FSEC/GSA will be extended to users in obtaining information concerning technical problems with software released through FSEC, the ultimate responsibility for successful implementation of all programs rests with the user.

## § 101-32.1601 Applicability.

The provisions of this subpart are applicable to all Federal agencies (as defined in § 101-32.201(a)) having ADP facilities, resources, or requirements. This subpart is applicable to common-use software developed or revised by either Government or contractor personnel. This subpart is not applicable to software that is classified, proprietary, or developed with revolving funds where reimbursement of all costs is required, such as the ADP Fund. Nor is it applicable to software to which the Government does not possess the full rights of ownership.

## § 101-32.1602 Definitions.

Terms used in this subpart are defined as follows:

(a) "Software" means all programs and routines used to extend the capabilities of computers, as distinct from "hardware" and "firmware." Software includes independent subroutines, related groups of routines, single programs, and sets or systems of programs.

(b) "Common-use software" means that portion of software which deals with problems common to many agencies, that would be useful to other agencies,

and is written in such a way that minor variations in requirements can be accommodated without significant programming effort. Examples of such software are: management business applications, computer systems support and utility programs, simulators, scientific or engineering applications, programming aids which are application-independent, and bibliographic or textual programs.

(c) "Computer program" means an identifiable series of instructions or statements, in a form acceptable to a computer, prepared to achieve a certain result.

(d) "Automated data system" means a set of logically related computer programs designed to accomplish specific objectives or functions.

(e) "Software summary" means a condensed description or abstract of a computer program or automated data system.

(f) "Federal Software Exchange Center (FSEC)" means an organization established pursuant to the authority of the Administrator of General Services for the collection, announcement, bibliographic control, and dissemination of common-use software among Federal agencies.

(g) "Federal Software Exchange Catalog" means a reference publication, maintained by FSEC, which summarizes information about Government-owned common-use software produced by and for Federal agencies.

## § 101-32.1603 Common-use software.

For the purpose of this subpart, common-use software is that which:

(a) Satisfies the definition of § 101-32.1602(b).

(b) Has been tested and proven operational for at least 90 days and is maintained by or for a Federal agency.

(c) Is composed of stand-alone subroutines, programs, or subsystems; i.e., not dependent on special or unique hardware options or software features unless such options or features can be readily translated or simulated for hardware other than the original and can be similarly useful on different hardware.

(d) Was developed by Government personnel or through contract or grant with Government funding. (If it was developed under contract or grant, all rights of ownership to the software must be vested in the Government.)



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**§ 101-32.1604 Program operation and policy guidance.**

The Federal Software Exchange Program is operated by GSA or its authorized representative pursuant to the overall policy guidance and direction of GSA. The regional Agency Services Coordination Divisions of ADTS will handle direct operational contact with agencies as outlined in § 101-32.1602.

**§ 101-32.1605 Program objectives.**

The objectives of the Software Exchange Program are to provide for the:

- (a) Collection of common-use software information.
- (b) Development and maintenance of a listing of common-use software to minimize the redevelopment of programs already tested and in use elsewhere.
- (c) Publication and distribution of a software exchange catalog containing abstracts of common-use software.
- (d) Dissemination of common-use software and/or documentation.
- (e) Reduction of overall costs, time, and use of personnel resources for software acquisition and/or development.

**§ 101-32.1606 Services performed by the Federal Software Exchange Center (FSEC).**

The functions of FSEC include:

- (a) Maintaining a central library of summary descriptions of common-use programs and systems, including a complete index of this inventory and master copies of requested programs, systems and documentation.
- (b) Editing, screening, and compiling agency abstracts of common-use programs or systems submitted for exchange by Federal agencies.
- (c) Functioning as a central point of contact with agencies for information and dissemination of available software.
- (d) Publishing and distributing the basic Federal Software Exchange Catalog with periodic updates.
- (e) Assisting Federal agencies in identifying currently available software to satisfy their requirements.
- (f) Assisting agencies in obtaining information concerning technical problems with software released through FSEC.
- (g) Notifying agencies of changes to software obtained through FSEC.

**§ 101-32.1607 Agency actions.**

Federal agencies are required to:

(a) Continually review software within the agency to identify programs or systems which would be of use to other agencies meeting the criteria set forth in § 101-32.1603.

(b) Submit abstracts of programs meeting the criteria in § 101-32.1603 to FSEC, National Technical Information Service, Springfield, VA 22151, on Standard Form (SF) 185, Federal Information Processing Standard Software Summary. Common-use programs and systems meeting the specified criteria will be described and reported to FSEC on a continuing basis. In addition to the instructions on SF 185, the GSA publication, ADP Management Information Systems, ADP MIS Reporting Procedures, Appendices A, D, and E, shall be used for information concerning organization codes, computer manufacturers, and models.

(c) Notify FSEC, using SF 185, of changes to software previously reported. Such changes should have been adequately tested to ensure the effective performance of the software.

(d) Notify FSEC, using SF 185, of previously reported programs that the agency no longer maintains. (Reports shall be made within 30 days terminating maintenance.)

(e) Make a one-time submission, within 15 days of receipt of the FSEC request, of an actual program and or its documentation. System program documentation shall be provided to the extent that it can be implemented by other users and should contain as a minimum the following:

- (1) A narrative;
- (2) User instructions which should include program interface requirements, system resource requirements, identity of the computer on which the software is operational, program language, the name, number and release of the system under which the software is operating, applicable data communications interface requirements and applicable error message descriptions, with recommended corrective actions;
- (3) A broad logic flowchart to indicate the ease of removal or addition of program modules;
- (4) Sample inputs and outputs; and

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(5) Program listing of the source and object coding as well as available cross-reference listings generated by the applicable assembler or compiler.

(f) Notify FSEC of technical problems with software submitted to or obtained from FSEC within 15 days of detection of the problem.

NOTE: The submitting agency will not be responsible to another agency for the maintenance of software submitted to FSEC that has been implemented in another agency. The reports required by this FPMR have been cleared in accordance with FPMR 101-11.11 and are exempt from reports control.

**§ 101-32.1608 Arrangements and guidelines for use of the Software Exchange Program.**

(a) Agencies having requirements for software that they plan to acquire from commercial sources shall screen existing Federal ADP software resources by reviewing the Federal Software Exchange Catalog or by obtaining assistance from FSEC to meet its software requirements.

(b) Programs or systems listed in the Federal Software Exchange Catalog are available through FSEC which will contact the contributing agency for the requested documentation and/or programs. The contributing agency shall send the documentation and a copy of the program on either tape or cards to FSEC only once per program.

(c) FSEC will make a copy of both the documentation and the program to be kept on file for future requests. FSEC will provide the software package to the requesting agency at the published price.

**§ 101-32.1609 Effect on the software procurement process.**

(a) When an agency is unsuccessful in obtaining the required software from those available through FSEC, the usual procedures for the procurement of software; i.e., submitting GSA Form 2068, Request for ADP Services, or submitting

an Agency Procurement Request (APR), will be followed. In these instances, the provisions of § 101-32.203-2 apply to the development of custom software services, and the provisions of § 101-32.404 apply to proprietary software packages.

(b) The agency shall include a certification statement on GSA Form 2068 or on the APR that FSEC was screened unsuccessfully on a specified date. A delegation of procurement authority will not be granted if such certification is not provided.

**§ 101-32.1610 Form availability.**

Supplies of Standard Form 185 may be obtained by submitting a requisition in FEDSTRIP/MILSTRIP format to the GSA regional office providing support to the requesting activity.

**§ 101-32.1611 Federal Software Exchange Catalog availability.**

The Federal Software Exchange Catalog of common-use programs and systems may be obtained from the National Technical Information Service, Springfield, VA 22151. Revisions to the catalog will be published quarterly.

**§ 101-32.1612 Software Exchange Program review.**

GSA will review FSEC after it has been operational for a period of 6 months, and at least annually thereafter, to determine the efficiency of operations, effectiveness of mission, and significance of software cost avoidance realized.

**§ 101-32.1613 Assistance by GSA.**

Assistance in any phase of the Software Exchange Program covered by this subpart may be obtained by contacting the General Services Administration (GSA), Washington, DC 20405, or the appropriate regional Agency Services Coordination Division.

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