Woman C.P.A.

Volume 38 | Issue 1 Article 6

1-1976

Electronic Data Processing: Using Contracted Computer Services

Elise G. Jancura

Electronic Data Processing

Using Contracted Computer Services

Dr. Elise G. Jancura, CPA
The Cleveland State University
Cleveland, Ohio

Often companies need to use the speed and power of computer processing but do not have enough demand for such services to justify the investment in a computer and its supporting organization on their own premises.

The Range of Contracted Computer Services

There is a great variation in the kinds of contracted computer services available. They are purchased for a variety of reasons. Sometimes these services are used by small firms that cannot justify the investment in time and resources to maintain their own center but that can benefit from the use of computerized processing if that processing can be purchased in sufficiently small units. In contrast, many large organizations with their own computer center and staff purchase certain specialized services from outside sources when the applications involved are not suited to their own in-house computer center.

There are many organizations available that offer computer services on a contract basis to those who need access to computers but cannot install their own. These range from situations in which all services — programming, operations, and the availability of the computer itself — are provided by the service organization and the user supplies only the data to those instances where the hardware and all supporting personnel are physically located at the user site but are managed by an outside service organization.

Contracted computer services can be provided by organizations formed exclusively to provide those services, or they can be provided by equipment manufacturers (usually through a division or subsidiary of the manufacturing firm), by banks, by CPA firms, or by other financial service organizations. Sometimes computer services are offered by firms with large installations having excess capacity and sufficient skills to enable them to attempt to recoup some of their costs through sale of that excess capacity.

Facilities Management

The type of contracted service that is probably closest in nature to the installation of an in-house computer and employment of the support staff necessary to run that computer is a type of service that has come to be known as facilities management. In this environment the computer center is physically located on the premises of the user organization. The hardware may or may not be paid for by the user. The staff, however, including both systems design and programming personnel and operating personnel, are employees of the service organization employed and controlled directly by the user.

This kind of arrangement is frequently used by companies that feel that they do not have the necessary technical expertise to develop and manage the computer services and do not wish to take the time nor expend the resources to develop that expertise. Yet the company usually has a sufficient volume of activity and need for computer services so that the total expenditures of an in-house installation are economically justified. Thus a contract with the facilities manager to operate and manage the company's internal data processing function can provide the advantage of an in-house location, with its immediate accessibility, while at the same time freeing the user's management from the potential drain on management time related to having to oversee the day-to-day supervision and control of the data processing function.

The concept behind the use of facilities management is not much different from that in other areas of special expertise that are frequently purchased on a contract basis, such as legal services. In some cases the facilities management arrangement involves only operational responsibility for the center. In other instances it includes the entire data processing function from systems design through programming and day-to-day operations. Facilities management has gained popularity as the complexities of processing systems have increased, as the variety of available equipment and programming packages has complicated the choice of equipment and procedures, and as many managements have come to feel that they have not received maximum benefit from their computer facilities because of less than optimum management of these facilities.

The potential advantage prompting a firm to make use of a facilities management arrangement is the expectation that specialists in the management and control of computer services can produce a better use of the resource per dollar invested. The user's management retains the same responsibility it has with an in-house installation of determining the objectives to be obtained by the processing resource, determining the total expenditure that will be allocated to that resource, and exercising such control over the information system as necessary to insure its accuracy. These are, of course, the same responsibilities that management has under any circumstances, and the user organization simply delegates to the facilities manager such authority as is necessary to imple-

ment the objectives defined by the management.

Service Bureaus

In a service bureau environment a service organization installs on its own premises computer equipment (and other appropriate data processing equipment) and processes the client's data on the service bureau's premises with its own equipment. This type of service is probably more suitable than the facilities management approach for smaller clients. A service bureau serves many customers with its equipment and programming personnel, enabling it to spread the cost of its organization and equipment over many potential users. Thus it is economically feasible for a small user to buy access to that equipment and programming personnel as needed, with a cost that is much lower than would be required if the organization were to install its own facility.

The fact that processing is done at a site remote from that of the user introduces into the control process the necessity for procedures to prevent loss of information through the transmission to and from the service bureau. Further, since the data is now handled by two completely separate groups of personnel, steps must be taken to insure adequate communication between the staffs involved, so that there is a mutual understanding of the processing to be employed, of the type of data to be handled, and of the controls to be observed. The user retains the responsibility for establishing the basic description of the processing to be performed, for defining clearly and completely the data to be collected and processed, and for defining the reports and other results to be produced. While it is the service bureau's responsibility to implement the system specified by the user (by taking the user's specifications and translating them into a systems design, writing the individual programs required, and testing the system), it is the user's responsibility to evaluate that system when it has been developed and to notify the service bureau of its acceptability or its unacceptability.

To avoid any misunderstandings or subsequent difficulties, the user and the service bureau should execute a detailed agreement as to the processing required, the terms upon which the service will be provided, the provisions to be made for any file conversion or other special conversion service, and the procedures by which design and programming specifications can be changed over a period of time. The latter item is one that is quite important and is frequently overlooked. No system, however well designed, can exist over a period of time without the need for some changes. If the user is to have continued good service, arrangements must be made for incorporating those changes as they arise. Further, to protect the user, control must be exercised to prevent any unauthorized changes or interference with the user's processing from occurring subsequent to the initial testing of the system.

The fact that processing is done in an off-site location with non-user personnel imposes a need for additional controls beyond those that normally address themselves to the transmission of data from one physical location to another and from one control group to another. Most processing done by service bureaus is done on a batch mode basis, so that, for the most part, these additional controls take the form of control totals, batch totals, and record counts accompanying the data to the service bureau and accompanying the return of results from the service bureau to the user. In addition, the multiplicity of customers in the service bureau suggests that additional attention should be paid to the procedures by which the service bureau guarantees the confidentiality of the records and programs of individual customers.

In some instances arrangements are made by the service bureau user to send original or nonmachine-readable data to the service bureau, and part of the service performed is the transcription procedure by which machine-readable records are produced. In other instances the user assumes the responsibility of converting the data to machine-readable form and transmitting those machine-readable records to the bureau. Similarly, the service bureau in some instances sends back to the client only finished reports and retains at the service bureau location the permanent master files of the client. In other instances both reports and master files are returned to the client firm for storage at its location. Sometimes the service bureau designs a specially tailored processing system for the user. In other instances the user makes use of certain standardized programs already available at the bureau for a smaller fee. The result is a reduced cost or charge from the service bureau, however the user needs and/or data formats must be tailored to fit those of the standardized packages maintained by the service bureau.

A variation of the standardized package is the development of standardized subpackages or subprograms for certain processing functions. The user can then select from a group of these subprograms or application modules those that fit the firm's particular processing needs. In this way the user gains the benefit of a semitailored system and still has the benefit of the economic savings involved in using standardized packages.

Standardized Prewritten Programs and Rental of Machine Time

A third approach to the use of contracted computer services occurs in those instances where a firm has its own equipment installed and employs its own operational and programming support staff but minimizes the systems design and programming costs by making use wherever possible of standardized prewritten programs. All installations do this to some extent, for all installations make extensive use of the service and utility programs provided by the equipment vendor, but an increasing number of service organizations have turned to the area of developing standardized solutions to application problems.

Many organizations offer payroll programs, bill-of-material processors, data base management programs, billing programs, and classroom-scheduling programs. The use of this kind of contracted service really represents no change at all to the auditor as she/he attempts to evaluate the adequacy of the computer operations from those concerns that exist in any other user maintained and operated computer environment. Assuming that the user firm exercises adequate care in defining its needs and in selecting a package that is carefully tested and documented, the control concerns are no different from those that exist when the installation is developing and programming its own application programs. By being willing to do its processing in a standardized, predefined way the installation normally can purchase one of these programs at a cost less than it would take to develop a program and test the application with its own programming staff.

Still another form of purchased computer service that really introduces little additional control requirement is the process by which a business simply rents computer time on a computer other than one installed at its own premises. In this situation the user provides the programs (either by programming or buying prewritten packages) and employs the operating personnel to execute the programs and other operating procedures. The only distinction is that the computer itself is at some off-site location and that the user pays only for those hours in which the system is actually being used. Thus there is no question of a third party, with the potential of third-party interference, but

there is the additional function of having to transport data to and from the off-site processing location. Occasionally this arrangement is used by an installation that has insufficient volume to justify the kind of system that it wants to use for the few hours in which it requires processing. On the other hand, this arrangement is sometimes used by organizations that have their own on-site facilities but rent additional hardware for overloads or special processing requirements.

Time-Sharing Services

A form of contracted computer service that has grown in popularity in the last few years is that of the time-sharing service. In a time-sharing arrangement some communication terminal (usually a relatively low-volume interactive terminal although occasionally the user may have a high-speed batch device) is installed on the user's premises for communication with a centrally located computing facility. The user firm prepares and transcribes into machine-readable form its own data and frequently provides its own processing programs. The service organization provides the central processing facility and central storage capacity to hold master files and user programs in an on-line library facility. Frequently the time-sharing service also maintains a library of standardized programs at the center that is available on call to all users. From the time-sharing service organization's point of view, the entire system appears as a real-time on-line system. From the user's point of view, however, the system appears as a batch-processing system with an input-output device represented by the terminal at the user's location and a high-speed sophisticated computer with relatively large amounts of on-line available memory and on-line program library facilities at the central location.

The programming and hardware resources that the time-sharing service organization must have available are quite complex and sophisticated, for they must be prepared to respond to any user at any time, making available any facility of the system to which that user legitimately has right of access. At the same time the time-sharing facility must prevent access to the files or programs of any other user. The user can schedule access to the system, whether the facilities are used in an interactive mode (interactive mode means that the user can transmit information and receive an immediate response from the central system) or in a batch mode in which the user transmits a group of data. The user may call on a standard program existing in the time-sharing center's central library, a user program from the user program library (which is stored in the central facility), or a program that the user retains at the user site in source-or-object form.

If adequate assurance can be given as to the reliability of the central system and its supporting software packages (including the controls instituted to protect the confidentiality of individual user's programs, libraries, and data files), the control problems faced by the user are quite similar to those in a typical installation where the staff and equipment are located within the user's own organization. In a time-sharing environment the service facility does not directly handle or process either the user's programs or the user's data — it simply provides the processing facility. The user prepares and inputs the data, the user selects and controls the execution programs, and the user determines the content and scope of the processing done both to provide operating reports and to perform maintenance and updating of the master files.

Time-sharing service organizations lend themselves very well to the concept of third-party review, for under normal circumstances services provided for users are quite standardized. The advantage to the small user or the large user with specialized need is economic. The user gets access to a powerful, sophisticated computer for a small part of the cost of maintaining a terminal and communication facility.

Control Considerations in Using Contracted Computer Service

Both the user and the provider of contracted computer services share the responsibility for insuring that the data is both accurate and complete and has been processed according to the specifications established when the original service agreements were established. It is the user's primary responsibility to determine the kinds of processing required to produce results that are appropriate to the user's need. In most instances the user is also responsible for originating and collecting the data that will subsequently be used by the contracted service, and under those circumstances only the user can insure its accuracy. This responsibility falls on the service organization only in those instances where part of the service provided is the original capture of transaction data. The service organization is responsible for providing those controls necessary for accurate processing of data received from the client and, in those instances where the service organization performs the original data collection, for providing those procedures that will capture all data and verify its accuracy.

The introduction of contracted services represents a division of processing responsibilities for the control procedures between the user and the supplier of these contracted services. Essentially, additional controls must be instituted to insure that the transfer of data from one party to the other does not result in any distortion of that data nor loss of it. Thus additional checking is introduced for both the user and the supplier of contracted services to guarantee against that loss. The user must establish sufficient controls on the data before sending it to the service organization so that the results returned from that service organization can be reconciled to the data originally furnished. These transmission controls can take the form of control or batch totals, document counts, copies of the source data from which the transactions are recorded, or transaction logs. The exact form will depend somewhat upon the form in which data is transmitted to the service organization.

In some instances the user organization will actually transcribe the input into machine-readable records itself, in which case a transaction log or control totals may be appropriate. In other instances the user transmits source data, and it is the service organization that does the transcribing. Under those circumstances some combination of control totals and copy of source documents is more appropriate than the user's record of information sent to the service organization. Once the input is received by the service organization, it should be subjected to immediate balancing, so that the service organization can establish a record of the information received both for purposes of reconciling the controls held by the user and also for purposes of providing subsequent controls for the processing to be performed on that data. Sometimes the service organization does extensive editing of the data, whereas in other cases it simply uses machine-readable records as they are transmitted. In any event, it is usually the user's responsibility to correct errors in the data, although both the user and the service center frequently share the responsibility for detecting these errors.

The division of responsibilities created by the contract relationship also suggests that periodic reports be made to the user regarding the contents of master files. Frequently these master files are maintained by the service organization, which uses transactions submitted by the user to perform updating operations and to produce reports that are returned to the user.

Under these circumstances the service organization should submit to the user periodic reports showing the current contents of the master files and a summary of changes made to them. The traditional techniques for checking master files are periodic print-out and reviews or periodic tests against physical counts or other external evidence.

The procedures implemented to detect errors and to insure their proper correction represent another area of extreme importance. The user and the computer service should establish precise and carefully defined procedures for recording errors and controlling their correction and resubmission. These procedures represent a combination of activities on the part of both parties. The techniques mentioned earlier, such as consistency checks, limit checks, self-checking digits, and control totals can be used to identify errors. Once the errors are identified, they must be corrected by whichever party has adequate information to do so. Frequently this means return of the erroneous data to the user for correction. It is important that logs be kept of the error items returned to the user for correction and resubmitted by the user for processing. The need to detect and correct errors is not novel under contracted services, but the fact that there are two parties complicates the process and requires formalized procedures to prevent either loss or duplication of these error items.

In addition to the many control procedures that are instituted to handle the data itself, there are certain processing procedures that can influence the adequacy of results. Some of these are procedures that apply to the specific application. Others are procedures that apply to the general processing environment that influences all applications. Most of the processing controls apply primarily to the service organization, although some must be considered by the user's organization as well. Where possible, it is desirable within the user's organization to maintain a proper separation of responsibilities. Thus it is preferable that the individual who reconciles control totals and data received from the service center be someone other than the individual who prepares the source documents or other data to be transmitted to the service center. Further, the user should definitely assign responsibility for periodic review of the master files or control information sent from the service organization on the master files. The individual assigned this responsibility also should be someone other than the person generating the original source data. While this separation of responsibility is desirable, it should also be recognized that frequently the user of a service organization is a small firm without adequate staff to provide for optimum separation.

Even where it is not possible properly to separate responsibilities between individuals, it is essential that the user have some formalized process for authorizing transactions and other changes to the master file information. Similarly, as mentioned in the preceding section, the client should have some formal procedure for reconciliation of output received from the service organization and for control of the distribution of that output.

It should be emphasized that the kinds of controls necessary for accurate data do not change because the computer service is contracted rather than provided in-house. Because of the potential confusion introduced by the separation between the user and the supplier of the computer services, however, it is important that relationships be formally defined, responsibilities be formally listed, and that additional procedures be introduced to effect the transfer of information from one authority to another.