A BRIEF REVIEW OF THE GAO TASK GROUP'S RECOMMENDATIONS ON MANAGEMENT GUIDELINES FOR PRICING COMPUTER SERVICES IN THE FEDERAL GOVERNMENT

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Introduction

Computer systems and software applications in the Federal government have provided many wide-ranging benefits. Data processing activities and systems presently consume over $10 billion - about $3 out of every $100 in the Federal budget. All indications are pointing to even greater utilization of data processing systems in the future to:

--conserve other resources,

--maintain and improve the quality of services, and

--enable more efficient and effective delivery of services.

It is, therefore, quite important for the Government to employ the most effective and consistent methods of cost accounting and cost control as means of intelligent and efficient management and direction of Federal data processing activities and systems.

Background

In the late 1950's concurrent with the increasing acquisition of computer systems in the Federal government and elsewhere, the GAO created an Automatic Data Processing (ADP) review and evaluation group in its Office of Policy and Special Studies. As the field of data processing and computer applications in the Federal government grew rapidly through several successive stages of development in the 1960's, the GAO's role, capabilities, and responsibilities grew and matured. With its increasing observations of management deficiencies and reports of less-than-successful application projects in the latter 1960's and the increasing Congressional concern about ADP management in the Federal government, GAO initiated in the early 1970's several studies which led to coincidental conclusions and recommendations. They were:

--the development of principles and standards for managing ADP and computer-based information systems was feasible,

--such development was urgently needed, and

--the GAO should assume a leadership role in a cooperative development process with participation by Federal agencies, State and local government activities, professional societies, academics, and other professionals.

--that the general principles and standards of accounting could significantly aid in the management of ADP in the Federal government, if several controversial areas of application were worked out cooperatively, that is, if accounting and ADP professionals in the Government were to work together in developing specific guidance.

At about the same time, a GAO study, initiated in 1970 at the request of Senator Proxmire, and reported to him in a letter dated April 25, 1973 (B-115369) reported that a more comprehensive and precise estimate of the total annual expenditures for ADP in the Federal government was impossible without an impractical expenditure of audit effort due to:

-the sizeable ADP operation financed by the Government but not required to be reported to the General Services Administration in its annual government-wide report,

-differences among the Federal agencies in recording summarizing, and reporting ADP cost data, and

-most importantly, the lack of clear agreement among professionals and managers concerning the proper accounting treatment of ADP cost data.

The Task Group on Principles, Standards, and Guidelines for Management Control of Automatic Data Processing Activities and Systems

A task group of very highly qualified ADP management professionals was commissioned in September of 1973 to study the problems of management control of ADP activities and systems and to make recommendations to the GAO of suitable guidance which could be given to the appropriate managers and auditors in the Federal government. This task group settled on a building block (phased) approach to the subject of management control guidance as the best means of achieving meaningful results and successful implementation. Their initial effort addressed the cost accounting and cost control processes as a critical central element of management control. Specifically it addressed itself to three of the four areas of concern:

--systems design and development activities,

--data processing and communications operations activities, and

--cost assignment to end user units of the organization,

while leaving the fourth area of concern to subsequent studies, i.e., total information handling and processing activities of an organization. The task group submitted its report of recommendations in September, 1975, to the GAO.* It has been cleared for release to interested individuals upon request and we will be very interested to receive their comments on these concepts and recommendations of the task group.

I am going to summarize the concepts and recommendations of guidelines in the first two areas to give you an idea of the fairly comprehensive view of the problems and potential solutions that the task group reported on to GAO. I will then go into the area of cost assighment to end user units of the organization, or the pricing of computer and systems development services, in a little more detail.

It is important for you to recognize that computer-based data processing systems are a unique and very pervasive resource to the Federal government. There are a myriad of applications and application situations which are to be comprehended within the scope of government-wide guidance on automatic data processing activities and systems. The task group has done an outstanding job of anticipating the potential problems of implementation of its recommendations over this vast range of applications and situations.

It should be recognized that ADP activities are but a part of the totality of the Federal government--a very pervasive part to be sure--but still only a part of Federal activities. Thus, in developing its guidance the task group, and now GAO, must be very cognizannt of the accounting, budgeting, and financial management systems that are in existence in the Federal government and assure that such guidance is implementable and complimentary. The GAO's Accounting Principles and Standards for Federal Agencies (Revised 1972) is the most authoritative guidance to the Federal agencies on accounting. Thus, it is the most appropriate baseline for any guidance or recommendations.

Management Control Concepts

The task group set forth four very important concepts basic to the issues of cost accounting and cost control:

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* Entitled "Management Guidelines for Cost Accounting and Cost Control for Automatic Data Processing Activities and Systems" A report of recommendations to the Director, Financial and General Management Studies Division, U.S. GAO, September 17, 1975. It is not a GAO report.

Formal Planning: Maintaining current formal plans and budgets for ADP activities and systems, which are related to organizational objectives, and which view the future to the point where objectives and investment benefits could be realized.

This concept anticipates a "family of plans" closely related and integrated by consistent assumptions and correlated anticipated actions and results. Emphasis is given to:

--financial and operational expressions of these plans and budgets,

--stated measurable accomplishments anticipated,

--long range period plans and financial projections, supplemented by annual and lesser period plans and budgets,

--project and system life cycle plans and budgets,

--period and accomplishment-related reviews, and

--a process for maintaining the currency of plans and budgets.

Life Cycle View: Planning, controlling, and accounting for ADP system with a view to the expected overall life cycle composed of the four major phases: design, development, operations, and evolution. Recognizing that the expected life cycle of critical components (such as expensive hardware and software) influences an expected overall ADP system life cycle.

This concept anticipates carefully designed life cycle financial plans, reviewed and revised at meaningful time points, as essential to both long-range planning and operating management control.

Resource Utilization Measurement: Measuring, relating and reporting resource availabilities and uses in terms of objectives served, results achieved, and management responsibilities for ADP systems, projects, and functions. Laying specific stress on expression of such resource utilization measurement in both financial and operational terms meaningful to ADP management and to top management.

Quantitative measurement of resource utilization (i.e., personnel, equipment, material, etc.) is needed for effective management control. The task group states that all levels of management control are dependent upon timely, organized resource utilization information and unit cost information, with actual-to-planned comparisons and variance identification.

Management Reporting: Reporting is required in financial terms meaningful to management and to end users of ADP services of the benefits, costs, and accomplishments, relatable to their responsibilities, decisions, and actions.

The payoff of formal planning, life cycle view, and resource utilization in controlling ADP activities and systems comes largely through an effective management reporting system. The task group views the end user of ADP services as principally responsible for their effective and economical usage. Their approach to expressing this responsibility is through requiring that the full cost of ADP products and services be transferred, assigned, to the end user units of the organization.

Note: The following material is extracted directly from the Task Group's report of recommendations, Chapter IV, pp. 32-38 and Chapter V, pp. 42-43.

Cost Assignment to End User Units of an Organization*

The task group states that implementing a cost assignment procedure aids management in several ways. First, when the user knows the cost of his service, he is in a position to perform a cost/benefit analysis and can determine whether the value received from a service is worth its cost. As a result, users become more cost conscious and sometimes reduce their demand for services. Second, the ADP manager is aware of the cost of operations of each user, and is in a position to concentrate on those high cost and demand areas warranting attention. And finally, top management can benefit from the cost information in fulfilling its responsibility for making sound ADP investment decisions.**

Their view is that the principal elements of defining responsibilities through cost assignments are to reflect

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*The report refers to organizational unit(s) receiving the products and services from the ADP activities as the "end user units." Because of the large number of "users" who receive reports and other types of ADP products and services, we believe cost control can be enhanced by the designation of an official within an end user unit as a focal point of responsibility for the cost of ADP products and services. This person is referred to as an "end user."

**In their report it is noted that a senior management official may be designated as having agency-wide responsibility for reviewing and evaluating the cost-effectiveness of all ADP products and services.

accurately, to the extent possible:

--The authority of the manager for cost incurrence;

--The accountable responsibility of the manager;

--The degree of cost controllability exercised by the manager; and

--The relationship of the cost to his decisions.

The proper assignment of cost depends on a number of factors, sometimes referred to as the attributes of cost assignment. The attributes considered in this report, although not explicitly mentioned in our guidelines, are a prerequisite to any assignment of costs. Briefly stated, they are that:

--The value of the information provided through cost assignment should be greater than the cost of administering the procedure;

--Cost assignment should result in equitable charges to all users;

--Cost assignment should result in charges which will be consistent for like work;

--The cost information provided be relevant to the decisions, actions, and responsibilities of management; and

--Cost assignment should satisfy legal and other official administrative restrictions and requirements.

Formal Planning and Life Cycle View

Cost assignment and planning have an important relationship. Management decisions concerning future operations are better when based on accurate cost records. Cost assignment contributes cost records to the users facilitating their planning.

There should be consideration of cost assignments with respect to long-term objectives as well as for immediate management needs. Cost assignment relates to long-range planning in two directions, one from the user's viewpoint and the other from the supplier of services' viewpoint. The users need to have information on the future availability of service and the expected costs. From the other viewpoint, the supplier of services needs to know the extent of the users' intentions to use the service. This market should be defined and estimated as part of the long-range and life cycle plans.

The life cycle view concept envisions the aggregation of "birth" to "termination" costs of major ADP systems and their major components into a cumulative sum of actual costs for comparison with planned life cycle costs for the same periods and accomplishments. The cumulative costs for comparison with the life cycle projections are made available through the cost accounting system as discussed in chapter III, where costs can be aggregated according to management desires for meaningful information.

One of the difficulties in the interrelationships of long-range and life cycle plans with cost assignment is the fact that an accounting period of 1 year is the most common interval for rate setting. Thus, long-range considerations, not present in the rate-setting period, are difficult or impossible to include. Under such conditions, as a minimum, there should be an awareness of the long-range plan on the part of the individuals concerned with cost assignment.

Another relationship between cost assignment and planning involves the general concern that plans, budgets, cost accounting, and cost assignment be in terms that are relatable to each other. It must be possible to compare cost assignment results with budgets and plans. Ideally, accounting should be formatted in the same way and in the same terms as budgeting and planning; or conversely, budgeting and planning should be done in exactly the same terms and format as accounting. While this ideal may not always be achievable, our use of the words "relatable terms" indicates that it must be possible to check results against plans directly or by means of a simple translation process. It is also necessary that cost assignments be in terms useful to management and in compliance with statutory requirements.

One of the topics discussed in this chapter is priorities as a control over the schedule. The use of priorities and premium and discount rates for priorities permits load leveling and sequencing of work. These factors should be considered in the long-range and other plans.

With respect to checking the actual results against the plan, regularly scheduled checkpoints are recommended for review. A quarterly reconciliation is advisable.

Resource Utilization Measurement

The resource utilization measurement concept discussed in previous chapters applies to and aids the cost assignment process. The objectives of cost assignment are better fulfilled when resource utilization measurement is used in the cost assignment process. Normally, staff-hours is the

preferable unit of measure for assigning the cost of resources used in providing services such as, systems analysis, programming, and keypunching. In a single job stream environment, a single element - normally elapsed time - is the unit of measure for assigning the cost of resources such as the central processor unit (CPU) and peripheral equipment. The following table shows the units of measure that are used generally for measuring the computer system resources in a multiprogramming environment.

Units of Measure Commonly Used in Multiprogramming Environment

Resource	Unit of Measure
Central Processor Unit	CPU Hours, Minutes, or Seconds.
Internal/External Memory	Kilobyte hour, Number of word blocks used, Region size in kilobyte units, Elapsed time.
Input/Output	Number of accesses, Number of tape or disk drives used, Sum of unit record transfers (sometimes in a block, e.g., per 1000 cards read), Elapsed time (e.g., disk channel time in seconds).

Summary or general information is often provided when an installation has few users. More complex, specific, and detailed information is generally provided when there are many users. Cost assignments are generally based on the level of input resources used in generating ADP products and services. However, if outputs are relatively standardized, one should consider the possibility of assigning costs on the user units of output (e.g., invoices issued, transactions processed, or accounts updated). The standard cost per unit of output could, of course, be calculated on the expected or average level of input resources used to generate the output.

Cost assignment should be related to the consumption of resources actually used in providing the ADP products and services. However, in some cases, costs should be assigned on the basis of resources that have been committed whether used or not. For example, a user, in a multiprogramming environment might request the allocation of three tape drives for his program. If these tape drives cannot be used by any other program until the user's program is completed, the user could be charged for three tape drives whether he actually used all three or not. Similarly, resources can be committed by a contractual

agreement, such as an agreement to have the computer system available for dedicated use during certain hours of the day. The user could be charged whether it is used or not.

Management Reporting

The cost assignment procedures should bring to management the information needed in the form required for management decisions. The cost assignment procedures may result in a dollar-billing process based on the aggregated information. It is also possible to provide resource utilization measures in terms of equipment usage and personnel time. These may be part of the cost assignment report, separate memo billings, or contained in other management reports.

Guidelines

I. Cost assignment should generally reflect the full cost of resources used or committed.

Full cost generally includes directly relatable costs such as wages and related personnel costs, supplies, interagency and intraagency services, depreciation or amortization of hardware, long-lived software, and facilities assets.

II. In certain instances it may be desirable to employ rate differentials for those considerations which promote more efficient or economical use of the resources.

Users wanting priority turnaround, for example, should pay a premium to encourage users not to ask for fast turnaround if the added value of such service is less than the priority premium. Similarly, peak periods (e.g., during the day and at month-end) should carry higher rates to help smooth the load. In composing a budget, a balancing of total premiums against total discounts should be planned to achieve full cost assignment.

III. A priority system may be employed in conjunction with cost assignment if management control over ADP will be improved.

Generally, a priority system should be used to control systems design and development as well as data processing operations. Establishing priorities should generally be the responsibility of a management committee where both ADP and user management are represented.

IV. Cost should be assigned on the basis of predetermined rates.

In special circumstances, it may be appropriate to assign actual costs, such as in the transfer of contract service costs or travel expenses (often termed "unique costs").

V. Rates should be held stable to the extent possible

They should be reviewed at least annually and updated as necessary. Certain conditions, for example, a significant departure from planned usage may warrant rate review and possible adjustment on a more frequent basis.

VI. Predetermined rates should generally be set using either projected levels of effort and estimated costs and/or last year's actual costs and usage.

Only in certain cases may it be more advantageous to use an historical averaging of costs and usage to derive the rate. To encourage demand in new or experimental installations, predetermined rates could be set using projected levels of effort. The fact that variances may occur must be foreseen and their allocation predetermined. For example, a startup account may be designed to pick up the variance.

VII. The unit of measure chosen as a basis for assigning costs should be closely related to the resource being measured.

VIII. Cost should be assigned by applying the predetermined rate to some unit of measure of the resources actually used or committed.

IX. Variances to predetermined rates should be analyzed by management. If a variance is caused by a user, it should be applied to that user.

A material variance not so attributable may be allocated in one of four ways:

--to general overhead,

--to all users,

--to the ADP organization, or

--as an adjustment to next year's rate.

X. The frequency with which users are notified of their ADP costs should coincide with an activity's accounting cycle which is usually a monthly cycle.

Individual users may be notified on a more frequent basis by memorandum billings--usually issued upon completion of a specific task or job and including resource usage information.

XI. To the greatest extent possible, costs should be assigned in a manner that will allow user analysis and control.

Users should be able to understand their ADP bill and interpret its content properly for their decisions, planning, and control. This means that where feasible costs should be stated in terms of the user's operations or transactions, through standard product costing methods.

XII. Regardless of the formal scheme for allocating costs, every user who makes decisions that materially affect ADP costs should be provided cost information that aids him in the more efficient use of ADP resources.

Remaining Problems

The task group discerned several other problems which will require the attention of GAO and the other Federal agencies. Some of them are:

--How does one assign development costs associated with a large information system used jointly by many subunits of an organization?

--Should there be a standard approach to the capitalization and amortization of owned hardware and software, or the lease equity in such assets?

--How should excess hardware capacity be treated in cost assignment?

--What type of a data base is needed to evaluate the relative merits of competing cost assignment methods and for providing guidance on the effectiveness of specific methods in specific sets of circumstances?

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