Chapter 9 Managing Computers

9.0 Purpose

This chapter examines the acquisition, management and accounting of computers in today's competitive environment. Business, particularly business involving the development of complex products and technology, has seen dramatic growth in the volume and importance of computing resources in almost every facet of the Enterprise. Managers with vision recognized the opportunities for increased productivity, and the technical workforce pushed for more computer resources even where the management did not see the handwriting on the wall. Whether managers liked it or not, the voracious appetite for distributed computing changed the face of business information systems. This explosive growth, coupled with the computers lightning-like obsolescence, has made this element of the cost of doing business a major management challenge.

9.1 Background

In 1980, with the emergence of powerful small computers known as then as "minis" like the DEC VAX series, many companies found themselves with an inconsistent application of their accounting practices because they were classifying computers by their size, rather than their capabilities. In an attempt to fix this problem, many companies chose to treat all computers like milling machines and charge them into overhead. This simplified the accounting problem but created fundamental management problems that plagued these companies for the next fifteen years.

For those who chose this approach, this decision removed scientific computing costs from the direct contract cost base and put them into overhead at a time when these costs were burgeoning in response to the requirements of their work. The immediate effect was to reduce the direct base and increase the overhead to be allocated. The next effect was for senior management to expend far too much of its time trying to micro-manage the cost of these resources because no one other than general management had ownership of them. This was destined to fail. It was assumed that if computer cost was budgeted as controllable overhead, management of this cost could be delegated to burden center managers. In fact, the cost of computing spiraled upward in spite of a great deal of management attention, and for good reasons.

In government contracts, ever-increasing customer specifications dictate how software must be developed, how computer modeling will be done, often with the requirements to deliver software in a specific format or higher-order language, or for use on a specific host machine. There are also ever-increasing customer requirements on security that preclude the sharing of facilities and operating systems between programs. These are unique to programs, not to services or agencies. The result is a tendency to preclude the efficient sharing of computer resources. Yet the government also requires its suppliers to demonstrate a credible benefits received vs. cost incurred relationship on individual contracts as well as in the aggregate.

9.2 The Computation Demands of Today's Business

Complex computational effort is an integral and growing part of the development of complex products. It is accordingly a growing element of the cost of fulfilling the *work* and closely coupled to the ability to do the work.

Increasingly, all work involves the creation and management of information. In my business, for example, this was typified by the signal *and* data processing of surveillance, target acquisition and recognition sensors, and the use of this data either onboard a sensor platform (such as a satellite) or remotely. This trend continues with the great increase in graphics in real-time simulation and multimedia presentations, so we can expect to see still more rapid growth in computing requirements.

It is not possible to estimate or negotiate the cost, nor to implement the work on a project without knowing what computer tools will be used to support those tasks. During the conduct of the work there are tradeoffs between the use of computer resources and personnel, and often between conducting tests and computer modeling, and always between the type of computer resources and programming cost. Charging computing to overhead, as many companies do, prevents the proper tradeoffs, and moreover, in some cases does not properly distribute the cost to the benefiting effort.

Budgeting the cost of computing equipment from the top down ignores the real linkage between the job and tools required. General management cannot manage computing any more than it can specify how may hours it takes to write a program or run a test. General management is therefore forced to make Solomonic decisions between needs...and frankly, is doomed to do a lousy job of it.

When computers are part of overhead, prudent lower levels of management, who use computers efficiently and make the tough cost-benefit tradeoffs, recognize that they pay for the waste of the sloppy manager anyway. They are therefore incentivized to make maximum use of overhead to reduce their direct cost and contract risk.

9.3 A Better Approach

The answer is not top-down management, but rather the delegation of responsibility down to the same level in the organization that we delegate people management. I believe that computers should be budgeted and accounted for as if they were people.

9.3.1 Computers as Employees

The fundamental concept behind this proposal is that in most businesses computers are like direct employees. We therefore should manage them, plan for and account for them just like people. Computers are model employees. They take direction well, they do the tasks requested, and generally follow directions faithfully. They have good memories, and help reduce work for others, but sometimes get sick. They faithfully maintain timekeeping records. They can even have an employee number.

The cost elements of computers in this context are as follows:

COMPUTER	***SALARIED EMPLOYEE***
• Amortized acquisition cost based on useful life and depreciation strategy	• Annual salary
• Ownership Cost • Operating cost • Maintenance & repair • Improvements/upgrades	• Administrative support costs • Medical care and benefits • Education, training & promotion
• Cost of unsold time due to less than expected utilization	• Lost productive time
• Planned utilization over which cost is spread to establish rate	• Standard work week over which cost is spread to establish rate
• Direct rate per hour	• Rate per operating unit

Figure 9-1 Computer Labor Cost Analogy

9.3.2 Computer Management

When we hire an employee it is on the basis of a planned need with an expected time-span. If the predicted work does not occur, we do not adjust the rate of the employee upward while the employee works fewer hours. We charge that employee's time to lost productive time until we can find another assignment. If none can be found, the employee is laid off.

Why should it be different for a computer? Why is it that we trust first-line supervision and first level managers to plan for and hire and layoff direct people, but not computers? Perhaps the answer is that for labor, there are two red flags that alert senior management if lower levels of management are not doing their job. First is the contract cost impact or deviation from plan. Second is the sudden increase in lost productive time if people haven't got a charge number. This proposal allows the same thing to occur with computers.

9.3.3 Pricing Strategy

We should insist on a plan of utilization and depreciation before acquisition. That plan should be the basis of the decision and the pricing for recovering the cost. We should not second-guess the manager's needs any more than we do for people, but rather measure that manager on how well he or she meets that plan.

9.3.4 A Proposed Pricing Approach

Before acquisition, for the specific application, the cost-recovery strategy must be established.

A. Dedicated Computers. Dedicated computers are those computers that are used only for a single project, or are imbedded, such as a simulator or test equipment, or are required by security to be isolated. This type of computer should be treated as either a piece of special contract equipment. Or, if its life is greater than the application, its yearly cost can be recovered fully by simply dividing the yearly cost by standard shift time or calendar time for weekly billing. There is no lost productive time, and the contract using the computer pays all of the cost regardless of utilization, since the equipment is not available for other use.

B. Multiple-use Machines. These are to be used primarily on one project but several tasks and available for other users some of the time. For these the basis for "full employment" of the computer should be established. An example might be 1.5 shifts five days per week with 10% lost productive time and 1.5 shifts for maintenance or growth.

Costs for the pool should be established for amortized acquisition cost in $/yr. planned depreciation; cost of ownership including maintenance and repair, operation, utilities, software fees, etc; and the amount of lost productive time that is reasonable for overhead planning.

C. Rate Stability. Computers would not be re-priced upward retroactively, but would charge to overhead when not productively employed. If overhead charges exceeded reasonable levels, management would be expected to "surplus" the computer. If usage went above the plan, the benefits of the effective lower cost per unit could be retroactively priced, or used to adjust the prospective price. Computer acquisition would be tied to the proposal strategy for new business and on the basis of direct cost minimization for ongoing contract effort. Managers would not go buy computers before they were needed. They would be incentivized to share when the work load allowed it so that their direct costs on contract would be lower.

The key, in short, is to present the manager with a direct tradeoff under his or her control. He is the one that proposes the work, justifies, negotiates it with the customer and is later measured on his performance in getting the work done within cost.

9.4 Implementation

9.4.1 Data System Requirements

It has been suggested that new systems must be developed in order to charge computers direct. I would argue that the problem can be quickly solved with a duplicate of existing labor accounting system using the analogies of section 9.3.1. Any enterprise labor cost accounting systems, if adapted for computers, can obviously handle as many computers as there are employees, and account for them properly to contract, overhead, or whatever. Suppose we wanted to direct-charge ALL computers-even PC’s. Computers that have a clock could certainly have a job log and billing algorithm. Those that don’t could have a time card filled out by users and signed by the responsible supervisor just like an employee’s timecard.

9.4.2 What to Do Before The Work Arrives.

What do you do with people before the work is there? Computers can be handled in the same way. They all get charged to overhead (lost productive time). Remember, everyone has to be somewhere.
