1-05-10.1 Designing Equitable Chargeback Systems
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Payoff
IS departments have long wrestled with the concept of charging for both the use of computing resources and the services their staffs provide to customers. The growing complexity of the technical environment, especially the proliferation of client/server computing and the use of the Internet, introduces new issues into the chargeback debate. This article proposes alternative charging methodologies and outlines actions for implementing a chargeback system.

Problems Addressed
The concept of charging for computing services is not a new one. It has been in existence for as long as computers have played a key role in the business world. Because the initial use of large-scale computers in most companies was to automate accounting functions, and because the IS department often reported to the chief financial officer, it is easy to understand why cost-accounting techniques were used in allocating the expenses associated with computing.

In the early days of computing, when computers were expensive and the support staff (i.e., programmers and operators) relatively inexpensive, most chargeback systems focused on allocating the costs of the mainframe. Later, some companies incorporated operational costs and added charges for programming. As the costs of mainframes fell in relation to the rising costs of programmers, people-related costs became part of the chargeback equation, although the focus was still on the mainframe. With the current emphasis on downsizing and the movement to even less-expensive computing resources, it is important to consider all computing platforms when designing a chargeback system.

Pros and Cons of Chargebacks
For companies that do not currently have chargeback systems, the first step is to recognize the arguments for and against instituting one. Although the CFO may believe that full recovery of costs is essential for a fiscally responsible organization, the IS department's customers may have a different view.

When to Use a Chargeback System
There are three primary reasons why companies institute a chargeback system.

Chargeback Systems Increase the Customer's Accountability.

When the IS department does not charge for its services, or when the costs are allocated to departments according to factors other than use, there is no incentive for a customer to perform a cost/benefit analysis before authorizing a systems project. Nonessential projects may be undertaken and less-expensive solutions may not be investigated. When the customer department's bottom line is affected, requests for
additional services are more likely to be evaluated like any other goods or service purchased, based on their value to the department.

**Chargeback Systems Encourage Conservation of Expensive Resources.**

When online systems were first developed, many IS departments faced a dilemma. Their computers were overloaded during prime shift, when customers used the new online systems, but they were underutilized during second and third shifts. By instituting variable rates for Central Processing Unit cycles and charging a premium for first shift, IS managers could persuade customers to move batch reporting and less time-critical processes from prime shift, thereby eliminating or at least deferring the purchase of a larger mainframe. A similar approach has helped many companies wean their customers from dependency on tapes, which require operator intervention, to disk storage. In both cases, without a differential charge for the resource there would have been no incentive for the customer to conserve the resource.

**Chargeback Systems Increase the Customer's Perception of the IS Function's Value.**

“You get what you pay for” may be a trite saying, but many people believe that it is also a true one. If there is no charge for IS staff and computing resources, many customers perceive those services to be of little value. Forcing customers to pay for IS services frequently has the effect of making the customer departments regard more highly the IS services they actually use and rely on.

**When Not to Charge Back**

Although there are reasons why a company would implement a chargeback system, there are also three primary reasons why it might not.

**Chargebacks Can Lead to a Short-Term Focus.**

Although a chargeback system encourages accountability by affecting the customer department's bottom line, it can also result in tactical rather than strategic decisions. Because most companies evaluate financial performance quarterly or annually rather than over a period of years, a system with long-term benefits to the department may not be approved because of the high one-time cost of developing and implementing it. This is particularly true when programming costs are charged back, because they cannot be amortized over multiple years as hardware expenses can.

**Chargebacks Require Overhead to Administer.**

In addition to the costs involved in developing a chargeback system, there are ongoing operational costs. These include the computer resources required to run the system as well as the administrative time required to oversee it and explain charges to customers. It can be argued that this increased cost has a negative impact on the company's overall bottom line.
Chargebacks Can Create Adversarial Relationships Between IS and Customers.

During the initial stages of implementing a chargeback system, customers may resent paying for what were previously free services. They may seek alternative sources for these services, such as using outside contractors for programming, and they may try to replace mainframe processing with spreadsheets and other programs on their microcomputers. In addition, they may not consult IS on key new initiatives because of the internal chargeback. For an IS department that is seeking to establish a partnership with its customers, this may be a serious deterrent to instituting a chargeback system.

Chargeback Methods and Related Issues

The decision to implement a chargeback system is one that should be made only after considering all factors and consulting major customers. After a company has decided to charge for its services, the next issue is identifying which services should be included and how they should be charged.

Many companies have implemented complex chargeback schemes, using a different method for each of the services the IS department provides. The most commonly used methods and the issues that each raises are discussed throughout the rest of this article.

Mainframe Operations

Because the mainframe was the first computing component to be charged, it is also the one with the most clearly defined chargeback methods and associated systems to automate the charging. There are two primary methods used to bill for mainframe services: one is based on the specific resources consumed and the other is a flat charge per Central Processing Unit hour (with premiums for prime shift). Each approach has its advantages.

Specific Resources.
This is the most precise method of charging because it prices each service individually. CPU cycles are charged at a different rate than tape mounts; the cost of disk storage differs from a line of print. Although it is also the most complex method of charging, there is a variety of packaged software available to calculate usage of each component. The true complexity lies in determining the correct rate for each of the resources to be charged.

CPU Hour.
The primary appeal of this approach is its simplicity, because it requires measuring only one usage component: CPU cycles. It is, however, less accurate than the specific-resources charge because it makes no distinction between people-intensive tasks, such as tending printers, and fully automated ones, such as disk access. It also undercharges customers who use extensive disk storage but process that data infrequently.

LAN Hardware and Network Operating System

With the almost ubiquitous use of local area networks (LANs), companies must charge for both the hardware and the operating system software. Unfortunately, there is little automated software available to assist in the chargeback process.
Determining What to Charge

Before a chargeback scheme can be implemented, IS should ask a series of questions designed to determine which components to include in the costing algorithm.

· What comprises the LAN?
· Who paid for the LAN components?
· What services will be included in the charge?

Determining What Comprises the LAN.

Although most companies would agree that the servers, network operating software, and wiring are the primary LAN components, others would include PCs and workstations. Still other companies would include such peripheral devices such as async servers and fax gateways and standard applications software, including word processing, E-mail, presentation graphics, and spreadsheets.

Determining Who Paid for the LAN Components.

When initiating chargebacks, it is important to know whether IS or the individual customer departments purchased the equipment. If the LAN was acquired by the customer departments, IS will probably want to transfer the assets to its own books and give prorated charges to the departments until their initial investment is recovered.

Determining Which Services to Include in the Charge.

Before a chargeback algorithm can be developed, it is necessary to determine the components of the costs to be recovered. There are three categories of costs to consider: hardware, software, and services.

Hardware.

The cost of the LAN hardware (identified by answering question one) is the most typical component charged back to customers. The current year’s depreciation is used for hardware whose costs are amortized over several years. Purchases that are considered expense items are fully charged in the year in which they are made.

Software.

In addition to the initial purchase price of network operating software, the cost of annual maintenance or periodic upgrades should be factored into the costing equation. The same expense components should be considered for all other types of software that were determined to be part of the LAN.

Services.

A LAN does not run itself, and any chargeback scheme that seeks to bill out the total cost of running the local area network must include the people-related operating expenses. Before these can be calculated, however, IS must determine which services should be included in the total LAN charge. These may include administration (e.g., adding
new user IDs or changing passwords), regular data backup and offsite storage, software upgrade installations, network monitoring, and scanning for viruses. Initial installation of LAN workstations may be included in the total cost or may be billed as a separate one-time charge.

When charging for services, all related costs must be considered before developing a charge, particularly if IS wishes to achieve full chargeback. If, for example, LAN services require two full-time employees, all the costs associated with those employees should be included in the chargeback equation. Exhibit 1 lists typical components of the personnel-related costs.

## Components of Personnel-Related Costs

Note: As a rule, the salaries, benefits, and other expenses of the employees who actually perform the service should be part of the costing equation; some companies also include prorated costs of supervisors and managers.

<table>
<thead>
<tr>
<th>Primary Costs (costs most companies include)</th>
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<tbody>
<tr>
<td>Salaries</td>
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<tr>
<td>Benefits</td>
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<tr>
<td>Rent or Occupancy Charge</td>
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<tr>
<td>Training</td>
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<tr>
<td>Travel and Entertainment</td>
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<tr>
<td>General Expenses (e.g., stationery and other supplies)</td>
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<table>
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<tr>
<th>Secondary Costs (costs that should be included if total chargeback is desired)</th>
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<tbody>
<tr>
<td>Software Purchases</td>
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<td>Hardware Purchases and Depreciation</td>
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### Billing for LANs

Once IS has determined which costs will be included in its chargebacks, it must determine how to implement the charges. There are three primary approaches to billing for LANs: a per-user charge, one that is based on use, and a hybrid approach.
**Per-User Charges.**

The primary advantage of this approach is simplicity. To determine the charge, IS calculates its total annual LAN costs, then divides them by the number of users. If the cost calculations were accurate, full chargeback is guaranteed.

This approach is not only simple, but it can be easily explained to the customers. It does, however, have several drawbacks, the most important of which is that it penalizes occasional users of the LAN by charging them the same amount as the power users. (For companies that seek to encourage LAN use, this may be considered an advantage rather than a disadvantage, because it does not discourage extensive use.)

The second potential problem using the per-user charge is that during a period of rapid growth, when many new users are being added to the network, IS may actually over-recover its costs if the pricing scheme is based on the number of users at the beginning of the year. To avoid the perception that IS is becoming a profit center, costing can be done by projecting the number of new users and the dates when they will be added to the network, then including those usage months in the per-user charge.

**Usage-Based Charges.**

Similar to the mainframe billing scheme that charges for specific resources, this is the most precise method of charging for LAN services. It is predicated, however, on identifying the costs of each component of the LAN as well as each customer's use of that component. Because of the scarcity of automated tools to measure LAN use at this level of detail, few companies employ the approach.

**Hybrid Systems.**

Some companies have adopted a hybrid chargeback that consists of a base charge (for connection to the LAN and use of the Network Operating System) and additional flat charges for specific LAN components (applications software or FAX servers). The charge-by-component approach is discussed in the following section on LAN software.

**LAN Software**

Some companies prefer to group LAN software with the LAN hardware when charging customers. Many other companies consider these as two separate components and charge for them separately. Although LAN software can consist of either purchased packages or in-house-developed systems, for this discussion, only packages purchased from a third party will be considered. (Charges for custom in-house development, whether for a LAN, a client/server platform, or a mainframe, are reviewed in a subsequent section on programming.)

Generic LAN software, such as word processing, spreadsheets, E-mail, and presentation graphics, may be charged separately from a package purchased for a single department. In both cases, IS must consider several of the questions that were applied to LAN hardware, specifically: who purchased the software initially and what services should be included in the charge? Software-related services may extend to purchasing and applying upgrades as well as responding to customer questions.

Two of the most common ways of charging for LAN software are a flat charge per application and a charge that is based on use. Once again, the lack of precise monitoring tools keeps many companies from instituting a usage charge. Although software exists that
can track the length of time a user has access to a specific program, it is rudimentary in its monitoring capabilities and requires additional administrative effort by IS if it is to be used in a chargeback program.

In determining a flat charge for an application, IS should consider the following factors:

- **Purchase price and payback period.** Assuming that IS has purchased the software, it must determine the period over which it wishes to recover costs. Many companies adopt a payback period of two to three years and, in effect, amortize the cost of the software to customers over that period. (This approach, however, will not result in complete chargeback during the year that software was acquired.)

- **Maintenance or upgrade costs.** Usually this is an annual charge that can be fully recovered during the year in which it is paid.

- **Related services.** Like LAN hardware, software requires support including installation, monitoring, and problem resolution. The cost of providing these services should be included in the total cost of LAN software.

When the costs to be recovered within a year have been determined, IS can calculate the flat charge by dividing that cost by the number of customers. This approach is effective for both generic and department-specific applications.

**Client/Server Applications**

Although client/server applications differ from LAN-based ones, they involve chargeback issues similar to those for LANs. As in the case of LANs, few tools are available to assist in formulating usage-specific chargebacks for client/server computing.

Here again, companies must determine which components to include in the charge. These typically include hardware, operating systems, data base software, and applications software. The issues for client/server hardware and applications software are similar to those used for the equivalent LAN components. Client/server operating systems and data base software involve issues more analogous to those involving mainframes, and they raise two questions that need to be answered before the costing method is determined:

- **What are the corporate standards?** Although many companies have a list of approved operating systems and data base managers, they may allow for acquisition of others.

- **Should a premium be charged for nonstandard packages?** Because the more powerful operating systems and data base managers associated with many client/server applications require active monitoring and support, some companies have established a two-tiered charging scheme. Like the mainframe surcharge for peak shift processing, the two-tiered approach is designed to encourage compliance with the corporate standards.

Here again, once IS has determined the cost components of the chargebacks, it must decide how to recover them. There are three approaches to billing for client/server applications: a per-user charge, a charge that is based on percentages, and a hybrid approach.

**Per-User Charges.**
Although this approach is simple, it can result in charging less for an application with a few active users, high disk storage, and high Central Processing Unit usage than for one with many occasional users and little resource consumption.

**Percentage-Based Charges.**
Under this approach, each application is charged a percentage of the overall cost. Unless the application's owners are involved in the establishment of the percentages, IS is likely to be perceived as arbitrary for implementing this type of chargeback.

**The Hybrid Approach.**
A combination of per-user and per-MB of storage charges can help to mitigate the disadvantage of pure per-user costing without requiring excessive administrative overhead.

**The Internet**
The growth of the Internet as a business tool has led companies to begin developing chargeback methods for Internet use. Three methods are currently in use:

- Flat charge per month.
- Per-hour charge.
- Hybrid approach.

**Flat Charge Per Month.**
This method is the simplest. Like all per-user charges, however, the advantage of being easy to implement is accompanied by the drawback of penalizing low usage.

**Per-Hour Charge.**
A charge based on per-hour usage is highly equitable but requires more effort to administer. It may also result in the IS function under- or over-recovering its costs because—at least initially—there is a limited baseline of hours used to factor into the cost equation.

**The Hybrid Approach.**
The third chargeback algorithm is a combination of the first two. A flat monthly charge is used for up to a specified number of hours, then a per-hour charge is used. Although this approach gives IS a constant base of revenue and reduces the penalty for low usage, it is the most difficult of the three to administer.

**Programming: New Systems**
Many companies that have implemented full chargeback schemes for their mainframe computers do not charge for programming services. In most cases these decisions reflect concerns over the potentially negative effects of chargebacks (as outlined earlier in this article). Recognizing the need for establishing system priorities when there is no charge for services, many of these companies have developed executive-level steering committees to review major projects and determine which should be funded. For those IS departments that choose to charge individual customers directly for the programming services provided,
there are three primary chargeback methods: an hourly rate, fixed price, and an hourly rate with a not-to-exceed clause.

**Hourly Rates**

This approach is the safest for IS because it ensures that the department is paid for all work it performs. One disadvantage is that it makes budgeting difficult for customer departments unless IS is able to provide an accurate estimate of the amount of work it will provide to each department. For companies whose customer departments’ performance is measured by the bottom line, including internal charges, this approach may result in some work being curtailed or deferred to improve the customer department's profits.

When implementing an hourly-rate charging scheme, IS must determine how many rates to use. Companies employ four types of hourly rates: a single rate for the entire department, one that varies according to the individual and is based on salary, one which is fixed by job grade, and one based on the type of work being performed.

**Single Rate.**

This is the simplest approach because it involves only one calculation (see the Appendix). Implementing this approach is also relatively simple because once the rate has been determined, the department need only record time and generate bills. Although most IS departments use automated tools for time recording and billing, this approach can be manual in small- to medium-sized departments.

The major disadvantage to having a single rate for the entire department is that it makes no distinction between the value of work provided by entry-level programmers and the most senior staff. Customers may balk at paying what appears to be an inflated rate for a junior person or may request only the highly experienced staff for their projects.

**Individual Rate.**

From the IS view, this is the most complex rate scheme to develop and administer because it requires calculating a separate rate for each staff member. It has the added disadvantage of making salary variances, which are usually confidential, easy to determine. It does, however, allow IS to distinguish between junior and senior staff and to establish a direct correlation between actual cost and the charge.

**Rate by Job Grade.**

A variation of the individual rate method, this approach boasts the advantages of individual rates without the major disadvantages, because it reduces the number of calculations required and removes the ability to determine which employees are more highly compensated.

**Rate by Type of Work.**

Some companies have established variable rates that are based not on the person performing the work but on the type of work being performed. Using this philosophy, senior employees who are temporarily performing an entry-level function (e.g., coding from detailed specifications) will bill out at a lower rate than when they are doing higher-level work, such as designing the system or writing specifications. This approach
recognizes that some types of work are inherently more valuable than others; from an IS view, however, this charging scheme is the most complex to administer. Not only does it require all work to be type coded, but IS must be able to estimate how much of each function will be performed during the year in order to properly cost them.

**Fixed Charges**

The second approach companies use to charge for the development of new systems is fixed price. In essence, IS estimates the number of hours a project will require and multiplies that by the hourly rate to calculate a fixed price. A fudge factor may also be added.

The primary advantage to this method of chargeback is that it reduces friction between IS and the customer department; there are no surprises, no cost overruns, and no need for monthly variance explanations. This approach also aids customer budgeting. There are of course drawbacks. Unless IS is accurate in its estimates, full chargeout may not occur. To reduce this risk, most IS shops with fixed-price billing bid on only one phase of a project at a time, rather than provide a single price for the entire project. Accurate records of the time spent are important in estimating future projects.

**Hourly Not-to-Exceed Pricing**

The hourly not-to-exceed pricing scheme is a combination of hourly and fixed-price rates. IS charges an hourly rate for the work it performs but places a cap on the charge. This approach is often used as a selling tool with customers because it removes both the customers' fear of giving IS a blank check and their concern that a fixed price includes padding. The disadvantages are to the IS department. Not only does this method require slightly more overhead in billing, but it introduces the possibility of under-recovering expenses if the estimate was too low.

**Programming: Maintenance and Support**

When charging for maintenance and support of existing systems, most IS departments use either an hourly rate or a maintenance contract. As expected, each has its advantages and drawbacks.

**Hourly Rate.**

This is the classic method of charging for maintenance, and many of the issues and concerns that apply to charging hourly rates for new systems development are equally applicable here. The primary disadvantage to IS is that customers may decide not to have some maintenance performed, leaving IS with idle resources and expenses that are not fully recovered.

**Maintenance Contract.**

Like its fixed-price equivalent in new systems development, the maintenance contract provides a guaranteed revenue stream to IS and permits customers to accurately budget their IS expenditures. The IS department's primary concerns in establishing maintenance contracts should be twofold:

- *Ensuring that customers understand what is included.* A contract should include fixed-price support of the system (e.g., fixing bugs and responding to customers’ questions
about the system's operation). It may also include mandatory system changes (e.g., upgrades from a vendor or regulatory changes) but usually does not include enhancements. The services to be provided (and those not provided) should be clearly outlined and agreed to by both IS and the customer.

- **Accurately estimating the amount of work required.** Without reliable records of how much time has been spent on system maintenance in the past, IS will be unable to develop a fair price for a contract and may under- or over-recover its expenses.

### Gaining Customer Acceptance

After a company has decided to implement a chargeback program and determined the methods it will use to charge for each of its IS services, the next step is to introduce the concept to customers and obtain their buy-in. A three-step plan is helpful in gaining customers' understanding.

#### Meeting with the Customers

If chargebacks are being implemented for the first time, it is essential to explain to customers why they are being asked to pay for services that were previously free. Customers need to understand how costs will be calculated and should receive an estimate of their department's charges. IS should meet with each customer department individually and review the answers to three key questions: why, when, and how much.

#### Comparing Internal Rates to Contractor Charges.

IS should also be prepared for questions comparing its internal rates to those of outside contractors. Customers may complain that outside contractors are less expensive. To determine if this is true, IS should obtain rates for comparable work from contracting firms. Because most contract programmers work on their customers' premises and use customer computers, the rates must be adjusted to include that overhead. The specific costs to be included are:

- Rent or occupancy charge.
- General expenses (stationery and other supplies).
- Hardware depreciation.
- Software purchases (if applicable).
- Management.

These costs are a subset of the costs included in the calculation of an in-house hourly rate. The contract rate substitutes for salaries, benefits, training, and travel-and-entertainment expenses in the in-house calculation.

When contract programming costs are fully loaded, they are frequently higher than in-house programming, because they are designed to generate a profit for the contracting firm. Most IS departments seek only to recover their costs.
Establishing Formal Contracts

Although contracts are not mandatory, they help to reduce ambiguity and the interdepartmental conflicts that can result from misunderstandings about services and when they are to be provided and at what cost. Even if IS proposes a single hourly rate for all services, it should give its customers written confirmation.

Instituting a Memo-Only Period

Although this step is not possible for all companies, a memo-only period—in which charges are calculated and reported to the departments but not charged against their budgets—is useful in gaining customer buy-in. It gives customers a chance to see the size of charges they are incurring before they affect their budget and also familiarizes customers with the billing process. Benefits accrue to IS as well. The memo-only period allows IS to fine-tune and work out any bugs in its billing system without affecting customers.

Successful Chargeback System Design

A successful chargeback system is marked by two primary characteristics. The first, and most important, is simplicity. An effective chargeback system is easy to understand and to explain to customers. Not only are arcane algorithms and complex formulas difficult to explain, but they make customer departments wary of the IS department's motives. A chargeback system should also be easy to administer. If it requires substantial overhead to record resource consumption and to bill customers, no one benefits, least of all the customers, because their charges will have to be increased to pay for the billing process.

The second desirable characteristic is a correlation between the charge and the use of a resource. If a charge appears to be arbitrary, such as a flat allocation of costs to a department based solely on the department's census and not on its actual use of IS services, the basic goals of a chargeback system cannot be accomplished. Specifically, there will be no incentive to conserve resources, and customers will not be held accountable for their use of resources. An effective chargeback system charges customers fairly for their use of all computing resources and rewards them for reduced consumption.

Recommended Course of Action

Although it is unlikely that customers will fully welcome chargebacks, a program that is simple, equitable, and clearly communicated has a high chance of success. A company planning to implement a chargeback system should take these five actions.

Determine Goals.
Identifying the forces that are driving the need for a chargeback system is the first step to determine the methods to be used. For example, if IS needs to recover all of its costs, it must charge for all services. If it only seeks to reduce use of prime-time Central Processing Unit cycles, it may implement a charge for only computer-related costs. Goals should be clearly understood and outlined in writing before the program is defined.

Define the Simplest Way to Meet those Goals.
Not only should the billing algorithm be easy to understand, it should also be easy to administer. For most companies, this means buying or developing an automated time recording and billing system.
Keep Channels of Communication Open.
Both the IS staff and customer departments will have concerns about the new system. These concerns can be diffused by having clear, open communications with both groups starting as soon as the chargeback plan has been developed.

Establish a Trial Period.
By starting the program in midyear and implementing chargebacks on a memo-only basis for six months, IS can gain customer acceptance of the system at the same time that it streamlines its own procedures.

Be Prepared to Change.
It is possible that the initial approach to chargebacks may not work. It may be too complex; it may not meet customers' needs; it may not result in full recovery of the IS department's costs. IS should carefully monitor the program and be prepared to modify its approach.

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