SAGE
THE SYSTEM ADMINISTRATORS GUILD

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10 Adam Moskowitz Budeting for SysAdmins SAGE

10 *Short Topics in* Systems Administration

Rik Farrow, Series Editor

Budgeting for SysAdmins

Adam Moskowitz

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THE SYSTEM ADMINISTRATORS GUILD

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This is the tenth in a series of booklets that SAGE is presenting to the system administration community. They are intended to fill a void in the current information structure, presenting topics in a thorough, refereed fashion but staying small enough and flexible enough to grow with the community.

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Budgeting for SysAdmins

DILBERT
BY
SCOTT ADAMS
CAN YOU EXPLAIN WHY YOUR PROJECT IS BEHIND SCHEDULE?
YES. A SCHEDULE IS AN ARTIFICIAL DEVICE CREATED WITHOUT KNOWLEDGE OF THE FUTURE.
WILD GUESSES ARE USED AS SURROGATES FOR KNOWLEDGE.
PROJECT DEADLINES ARE TIED TO TRADE SHOW DATES INSTEAD OF REALITY.
THEN MANAGEMENT CUTS THE BUDGET UNTIL FAILURE IS ASSURED.
I ASSUME YOU CALLED ME HERE SO YOU CAN APOLOGIZE FOR YOUR ROLE IN ALL THIS.
WOULD YOU LIKE TO HEAR HOW BUDGETS ARE CREATED?

10 *Short Topics in*
System Administration

Rik Farrow, Series Editor

Budgeting for SysAdmins

Adam Moskowitz

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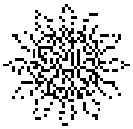


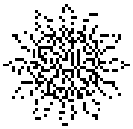
Foreword

When Adam Moskowitz suggested that he write a booklet about budgeting, I confess I wasn't terribly excited. I was certainly grateful that Adam was willing to write for SAGE, but found the topic of creating a budget less than interesting. Budgeting, I thought, is best left to bean counters and managers.

As I read various versions of Adam's manuscript, I experienced a shift in perspective. I began to see how being involved in the budget process gives you more control over your work, in terms of the systems you manage and the infrastructure that supports that work. In the most basic terms, a budget provides you with a chance to ask for what you want, as well as what you need. If you don't even bother asking, the odds that you will get what you want or need are insignificant.

I also learned that budgeting is a political process. My own career has consisted largely of self-employment, partly because I did not want to be involved in office politics. Budgeting requires working with other people, negotiating, and other people skills that take practice. Adam's text provides an excellent guide to this process, and one I believe you will appreciate, whether you are responsible for creating a budget or not. If you work in an organization, the budget for your group affects you, and the better you understand the process, the more successfully you can participate at any level.

Rik Farrow



Acknowledgments

This booklet would not have been possible without help from many people. Thanks go to Greg Hamm, who was my manager when I went through the budgeting process that forms the basis for much of this booklet, and for his help in writing the LISA '99 Invited Talk which became the outline for this booklet. Pat Wilson, as Invited Talks chair, encouraged me to give the talk. Rik Farrow has been a wonderful editor, keeping me on track and making sure I always knew what needed to be done and when. Rik deserves special thanks for being so patient with me as the project got further and further behind schedule.

Brent Chapman, Rob Kolstad, Bill LeFebvre, Tom Limoncelli, Justin Peavey, Hershel Safer, and Josh Simon all provided valuable input as technical reviewers. Mark Lamourine let me bounce ideas off him during our bicycle rides, when we could have been enjoying the scenery instead. Thanks to Jane-Ellen Long for her copy-editing and layout efforts, and to anyone else in the USENIX/SAGE office who helped in ways I never knew.

My father deserves a special thanks, for making me care about writing, and for looking "over my shoulder from inside my head" as I thought about each word I wrote. Finally, my wife Opal provided support and understanding throughout the whole process. My apologies to anyone I may have missed.

1. Budgeting Basics

The title of this booklet seems clear enough: Budgeting for SysAdmins. But what is "budgeting," what is a budget, and how are these two different? Also, exactly what is this book going to cover?

Let's start with some definitions. My dictionary defines the noun "budget" as:

- a quantity . . . involved in, available for, or assignable to a particular situation
- a plan for the coordination of resources and expenditures
- the amount of money that is available for, required for, or assigned to a particular purpose

Then there's the verb "budget": "to plan or provide for the use of in detail." My dictionary defines "budgeting" only by example: "budgeting manpower in a tight labor market." For our purposes, I would like to add a definition of my own. "Budgeting" is the process by which one:

- develops a budget
- presents it to "the powers that be" (in other words, the people with the money)
- gets the budget approved

This process involves analysis, planning, the gathering of data, discussions, a little bit of marketing (mostly in how the budget is laid out), and a fair amount of salesmanship (when you stand up in a room full of executives and managers and ask for your money).

Although the concept of a budget is well defined, there is no defined or even widely accepted form for a budget. It could be as informal as a narrative along the lines of, "We plan to spend *x* dollars, with *y* dollars going for item 1 and *z* dollars for item 2," or your company could require that you use a specific form. Some budgets have only the highest-level details about each item to be purchased, while others require an item-by-item breakdown, including lengthy justifications, and subtotals by every conceivable categorization and grouping. Given this lack of a common format, I won't give a complete example of a budget, nor will I cover laying out the budget on paper (or bits). Instead, I will show you how to perform the appropriate analyses, gather the required data, and present the final result. The exact format of the budget is left as an exercise for the reader, most often solved by going to your boss (or to the appropriate financial

person in the company) and asking for the right form, an example of a well-prepared budget, or guidelines. I suggest you obtain the form or guidelines as the first task after being asked to develop a budget, since this will help determine exactly what data you need to gather. Most likely, any additional data required by your company's particular form or guidelines can be obtained by relatively simple arithmetic, based on the information you will already have gathered by following the steps laid out in this booklet.

Why Budget?

Now that we have defined what a budget is, we should ask what purpose it serves. Why do we go through the budgeting process?

Budgets and budgeting are about business, and most business is about spending less money than you make. Business is also about deciding how best to spend money to minimize overall spending, increase productivity and profit margins, and maximize income. Budgets are part of how businesses track where they are spending their money, how much money they're spending, and how spending this money is affecting their bottom line. (Well, sort of: "actuals" keep track of how much money was spent; actuals are then compared to the budget to see what it said would be spent.) As such, budgeting means thinking in those terms, that is, like a manager or a business person and not like a "technologist." This booklet will help you think the thoughts and talk the talk; walking the walk is up to you.

It's very important to keep one thing in mind when reading this booklet: Business is all about making money; technology is just a means to help achieve that end, and if you can't make a case for how spending money on technology is going to make (or save) money for the company, you're not going to be given the money to spend. It can be argued that business shouldn't be like this, but for now that's the way it is; unless you're in a position to change the rules, your only choices are to play by the rules or not to play at all.

> This booklet focuses on budgets and budgeting in business because that has been the whole of my professional experience. However, budgets can (and probably should) exist in any setting where money is spent, including academia and nonprofit organizations. The same basic principles apply: figure out what needs to be purchased, how many, and at what cost; organize the purchases by category and/or department; develop justifications for the purchases; present for approval. However, academic environments in particular tend to have very different goals than do businesses—sometimes even multiple conflicting goals within a single department—which makes justifying the money to be spent a very different (and often difficult) proposition. If you work in such a setting, I strongly encourage you to enlist the help of a friendly department head or manager who knows the ins and outs (and politics) of the department or school.

A budget can also be a research tool, in that it is a mechanism to foster discussion about company direction and how projects are (or could or should) be related. This is usually limited to well-funded research environments. In such places, the real mechanism for getting money may be as simple as, "Tell a good story and we'll give you the money."

Budgets are also a way to make sure everyone in the company is on the same page. For example, a project may have been discussed early in the fiscal year; come budgeting time, the situation may have changed significantly. The budget is a way of saying, in effect, "Hey, the project has grown a lot since we talked about it all those months ago. It's now going to cost five times as much as we originally thought. So, do you still want to take on this project?"

Budgets are a planning tool. They force you to think about the long-term aspects of projects and to consider such factors as company growth and changes in technology. Acting with forethought is almost always better than reacting; budgeting forces you to think things through before taking any actions.

Companies often have very short memories. A budget is a way to keep track of what was decided, and why. When it comes time to make a purchase, it's a lot easier to point to your previously approved budget and say, "It says right here we're supposed to buy this system this month for this much money," instead of having to justify the purchase all over again. It is reasonable to ask whether the company's circumstances have changed since the budget was approved and whether the project for which the purchase is being made is still planned, but once those questions have been answered (affirmatively, we hope), there should be no reason to delay the purchase. This system can come in particularly handy when submitting large purchase orders.

Why Me?

If budgeting is part of the work of management, why should you, a system administrator, care about it? The most important reason is that someday you're going to be the senior member of the group, and your manager is going to come to you and say, "Help me prepare the budget," or even, "Prepare a draft budget." If you're an administrator who has been promoted to a management position, budgeting has already probably fallen squarely into your court. Another possibility is that your position is partly administrator, partly manager, in which case it's most likely going to be your responsibility to prepare the budget. Being asked to (help) prepare a budget is not a form of punishment; rather, it's an opportunity to exercise a significant influence over what happens in your department and, to some extent, in the company as a whole.

Budgets and Accounts

Budgets (how much money will be spent) and accounts ("pots of money") are related, but managing the relationships can be complicated. For example, do desktop workstations appear in the budgets of the departments that need them, or in the IT department's budget? There are pros and cons to each approach; in the end, what matters is

that the correct number of workstations are purchased. If something needs to be purchased, put it in your budget; if an accountant or a manager wants to transfer it to another budget, so be it. Don't be surprised if, when presenting your budget for approval, you are told to redo it with the items and money broken down differently. You may also be told that you will get the money you're asking for, but that before you will be given final approval, you need to rearrange your budget to fit certain requirements imposed by the accounting department. This happens because different "pots" of money in the company may be handled differently, with different business or tax implications, and you need to present your budget in terms of those pots in order for the company to see the actual cost of spending money for the items in your budget. Remember, what's important is that you get the money you need; these changes are purely administrative. Being asked to make such changes is usually nothing more than a formality.

Most often, such rearrangements, if demanded at all, are simple, requiring nothing more than cutting and pasting, changing or adding some headings, and recalculating some subtotals. You might be able to get the accounting department to show you exactly what needs to be done or even get them to do it for you, since they are often the ones who know exactly what goes where and care most that the budgets be prepared to their specifications.

Charge-back

Some companies have a mechanism known as charge-back, in which each department "pays" the IT department a certain amount of money to cover the cost of the IT staff and IT infrastructure needed to support the employees of that department. These amounts may be figured per computer or per person, or be based on how much support a person or computer is likely to need, or any number of other factors. In some cases the IT budget will be limited to the planned "income" from charge-backs; in others, charge-backs will form part of a total IT budget.

Whether your company should use charge-back is somewhat beyond the scope of this booklet. However, charge-back amounts, if applicable, need to be considered come budgeting time. If it costs the IT department $100 to support each user, but the charge-back amount is only $75, the other $25 has to come from somewhere. If the company doesn't agree to add the rest of the money to the general overhead, the IT department will be perceived as "losing" money—which means IT projects will be underfunded.

Determining the correct charge-back amount is difficult, as salaries, benefits, and many other "hidden" costs come into play. If you find yourself having to examine charge-back amounts, get help from your manager and/or from the accounting department.

"Most Economical" Versus "Cheapest"

A commonly heard business term is "return on investment" (ROI). Strictly speaking, this may not be the correct use of the term, but the basic idea is this: Spending $5 million to increase revenue (or, better, profit) by $50 million is usually better than spending $1m for a $5m increase. Unfortunately, if the company only has $1m to spend, the chances of convincing it to spend $5m are vanishingly small.

Don't forget, too, that this calculation applies to savings as well. Consider the following scenario: The WingAndPrayer Aircraft Corporation employs 100 engineers in their analysis group, all of whom are wholly dependent on the compute servers to do their jobs. WingAndPrayer pays $8,250,000 in salaries per year; the group works three shifts, 7x24. It's time for a new compute cluster. The lead administrator recommends a Rack-N-Stack R1011, but his boss wants to know why they can't buy a Clusters-R-Us C747 instead, at some apparent cost savings?

The two systems offer roughly the same performance, but the R1011 is more reliable and easier to manage. For the sake of example, let's say the R1011 offers 95% availability, the C747 only 85%. The former system leaves the engineers idle, but still on the clock and being paid, for only 5% of their combined time, at a cost of roughly $412,500; however, the latter system weighs in at 15% idle hours, costing $1,237,500! If the difference in cost between the two systems is less than $825,000 ($1,237,500 – $412,500), WingAndPrayer will actually get a better return on investment if they buy the more expensive cluster.

Remember that this is a simplified example. A calculation of the cost of downtime is more complicated than just adding the employees' salaries, and it's rather unlikely that every member of the group would be 100% unproductive if the cluster goes down. However, the idea is sound: Calculate the cost of the system being down and figure that into the purchase price to see which system will actually cost the company less.

Basic Management

This booklet is about budgeting, not management. However, certain management guidelines apply to preparing a budget; here is a brief overview of some of the things you need to know.

In general, budget details should only be shared with people of an appropriate level, at an appropriate time. While the budget is being prepared, it's appropriate to ask junior staff for estimates for specific items or tasks, but not to discuss the budget as a whole. It may be appropriate to discuss the budget in full with the team leader (if that's not the manager), but only if that person needs to know.

At least part of the reason for this constraint is confidentiality. Budgets can contain information about salaries, staffing plans (including possible lay-offs), and often projects that are not yet public. Junior staff may not understand that all such information is best kept confidential until made public by someone higher up in management.

Also, junior staff are more likely to misunderstand the meanings of the numbers, thus fueling rumors and speculation.

None of this is meant to imply that staff members at any level should be kept in the dark. Rather, use caution and careful judgment when deciding what information to give out, and to whom to give it.

Discussing your budget with other managers who are your peers is wholly appropriate unless politics dictate otherwise.

Discussing your budget-to-be with upper management is best done coyly, in the form of questions, rather than as a fully formed presentation. The idea is to make them feel they contributed, so that when you show them how much money you want, they will be predisposed to approve. This approach also avoids prejudicing upper management against your goals: If you don't "tip your hand" early on, they are less likely to come into the approval meetings thinking, "Those damned IT guys sure are asking for a lot of money," or "How could they possibly need that much money?" Instead, you have given yourself the opportunity to show them the full set of figures and the justifications at the same time.

Another reason for keeping the budget confidential is that it can often hurt your bargaining position with vendors if they know how much money you have to spend. You won't tell them, but can you trust every member of the IT staff not to let this number slip out? Better not to take the chance.

What Is a Budget?

Generally speaking, a budget is either a request for money or a plan detailing how a certain amount of money will be spent, or, often, both. More broadly, a budget is a planning tool that guides what purchases will be made, why those purchases will be made, and how much money will be spent. It is also likely to include information about how these same questions will be answered in the future, whether that's next quarter or next year. The budget is then used by management to allocate money and, as business undergoes ups or downs, to control or change how much money is spent.

A budget can also be a means of fostering discussion. In one elite California research company, much of the actual disbursement of funds was based on the principle that if you could tell a good story, you could have the money. The budgeting process, on the other hand, was used to make researchers talk about the implications of their research, how it fitted with other projects in the company, and how it affected the staff (mainly, what resources would be needed to support the research and the researchers).

While this approach is not common, it illustrates that a budget is not always just a simple management tool.

2. What's in a Budget?

The greatest challenge in creating a budget is to include all necessary items, overlooking nothing. On the surface, this requirement seems simple enough to meet. You just list all the items you plan to buy, how much they'll cost, why you're buying them, and (maybe) when you'll buy them. Easy, right?

What to put into the budget can be broken down into two parts: The list of items you plan to buy, and how many of each you plan to buy. These data are related, but initially you should treat them separately; you will bring them back together when you provide justifications for your proposed purchases. The rest of this chapter will deal with what items you might want to list; how to figure out how many of each you'll need will be covered in the next chapter. However, some item-specific tips for calculating quantities appear in this section.

One more point to keep in mind as we start listing items: You may be asked to provide the date when purchases will be made; usually, specifying the month or the (fiscal) quarter is sufficient, and often you will be asked only for a total figure for each time period. (Dates of purchase tend to be required in smaller companies and those companies still supported by venture capital.) Make sure that items that depend on other items in order to be useful are purchased in the right order.

Items

This section will provide a framework for organizing your list of budget items. An attempt at listing every possible item would be of limited usefulness, not to mention prone to errors of omission. Instead, we will break down the items into categories and list the common items in each category; this can then serve as the groundwork for your own budget.

The items in your budget can be broken down into a few simple categories:

- Hardware
- Software
- People
- Services
- Consumables
- Contingency fund

Hardware

Hardware obviously includes computers, switches and routers, printers, tape drives, and so forth—both new purchases and upgrades. However, it also includes plenty of other items that you may not realize or remember. Let's start by breaking hardware down into several subcategories:

- The obvious stuff
- "Furniture"
- Buildings
- Other big stuff
- Other little stuff

When purchasing hardware (and sometimes software, too), you need to be aware of the accounting category variously called "capital equipment," "capital purchases," or "capital expenditures."

Pretty much everything a business buys affects their taxes, generally by lowering them. With capital purchases, the tax benefit is spread over several years; the tax benefit for other (usually smaller) purchases is taken in the year the item was bought. The act of spreading out a tax benefit over several years is known as "depreciation" or "writing off"; when the company can no longer take a tax benefit for an item it is said to be "fully depreciated."

Based on current tax code, most items over $10,000 must be treated as capital goods; however, a company may choose to define items under this amount to be capital goods as well. The exact rules for deciding which purchases fall into this category vary from company to company, so ask someone in the accounting department to explain them to you. However, don't be surprised if the answer is, "It depends"; as you might expect, accountants classify purchases in the way that most benefits the company, and that can change from year to year.

What is considered capital equipment by your company is primarily of interest to accountants, but it can affect your budget in several ways.

For purchases, the most likely effect is that in any given year a company may look more or less favorably on capital purchases. Thus, at one time you may be allowed to buy a million dollars worth of equipment, as long as each item is under your company's capital limit; at another, you may be asked to budget for one large system instead of several smaller systems.

Capital purchases also affect "forklift upgrades," that is, those upgrades where the vendor takes back your old system and gives you a new one. Such upgrades happen most often with large computer systems. The tax laws are complicated, but the basic idea is this: When a company purchases a piece of capital equipment, they decide (following tax-law guidelines) over how many years they will depreciate the item. If they do not keep that piece of equipment in service for the required number of years, they may be required to file amended tax returns all the way back to the year the item was

purchased. As you can imagine, this can be quite a lot of work and can cost the company considerable money in both tax preparation fees and tax payments. If you find yourself considering a forklift upgrade, be sure to ask someone in the accounting department how this will affect their work, and whether you'll even be allowed to do it.

A related issue is that of leasing. Some companies will buy a large, expensive item, then immediately sell it to a leasing company, which in turn leases it back to the company. This is an accounting trick that lets a company spread out the cost of a purchase over a longer period of time and with different tax implications, at the apparent cost of a higher total purchase price. While not common, neither is it unheard of. Upgrades in this situation can also be tricky; again, ask your accounting department whether this applies to you and, if so, how best to deal with the situation.

Obvious Stuff

The items in this subcategory ought, by definition, to be obvious, but this booklet is about remembering details, so we'll list them: computers, memory, disks, routers, switches, hubs, firewalls, storage systems, racks, cabinets, modems, backup devices and backup media, uninterruptible power supplies (the kind you plug into the wall, not the big monsters), monitors, keyboards, mice, printers, plotters, patch panels, cables . . . we're probably forgetting something, but this is a pretty good start.

One item that should be obvious is often overlooked: ports. That is, the network outlets, wires, and switch (or hub) ports required by each new machine. If you buy workstations for new employees, are there enough free ports on the switch for these new machines? Are the offices or cubicles properly wired for these new machines? For servers, is one port per machine enough? What speed ports? The cost of these components can add up quickly, causing no end of headaches if they weren't included in your budget.

You may also need to calculate some kind of per-port charge to support network infrastructure, such as more or bigger switch-to-switch interconnects to provide additional bandwidth, more switches into which to plug the new ports, etc.

(The author is somewhat ashamed to admit that although he has never forgotten ports when making up a budget, he did forget about them in the first draft of this booklet. Thanks, Bill, for reminding me of this.)

Furniture

You can think of "furniture" mostly as "stuff that doesn't need power"; of course, lamps are a perfect counter-example to this definition, but otherwise it's good enough. Desks, chairs, bookshelves, and cabinets all fall into this category. Other items that may not ordinarily be thought of as furniture but fit nicely into this category include computer racks or cabinets, overhead cable trays in the computer room and other cable management devices, media storage units, workbenches, stepladders, "operator stations" (usually in the computer room), rolling carts, and bin systems for organizing small parts.

"Real" furniture such as desks and chairs may come under someone else's budget, but you do need to tell that manager how many you'll need, so you may as well pretend they're part of your budget.

Buildings

IT infrastructure is an important part of any new building, and it should be considered when the building is designed. Renovating a building offers an excellent opportunity to upgrade the IT infrastructure, as does building a new computer room in an existing facility. In any of these cases, you will probably be asked to supply cost estimates for certain items, or to work with the facilities department to help design the IT infrastructure aspects, or both. Consider everything related to IT as if it were part of your budget, if only to make sure all necessary items are included; whether they later wind up in another department's budget really doesn't matter.

You probably have a good idea of what goes into a computer facility, but you may not realize how many specialized systems go "around" the facility in order to make it suitable as a computer center: power (UPSes, generators, transfer switches, distribution units, and the famous "big red button"), fire mitigation, cooling, raised floors, soundproofing, physical security, cables and cable access . . . the list goes on. If you've never designed a computer facility from the ground up, get help from someone who has.

Also in this category is rent, typically from distributed data centers. This item can be very expensive, so as part of drawing up your budget you should probably consider whether multiple data centers can be consolidated, how much it would cost to do so, and how much it would save.

Big Stuff

Air conditioners, uninterruptible power supplies, emergency generators, transfer switches, and power distribution units all fall under the heading of "big stuff." These are most often purchased as part of a new facility, but existing units may need to be upgraded to handle the requirements of new equipment.

The IT department may be responsible for the telephone system, the alarm system, or the access control system. Some companies even consider fax machines and copiers to be IT's responsibility; one company the author worked for went so far as to define IT's domain as "anything that required electricity," right down to the espresso machine. (In small companies, such arrangements are not unusual.)

Little Stuff

This category contains the purchases that are small in size, though not necessarily in cost or quantity. Tools, test equipment, and cables are the most common items in this category (although some people consider cables to be "consumables").

Some tools are useful enough that you should buy them in bulk, in particular, the little pocket screwdriver and the four-way (big/small, slotted/Phillips) screwdriver.

Sysadmin tip: Buy one for every member of the system administration team, plus a

bunch for the computer room, where you should put them on strings or chains and hang them from the ceiling, to keep them from wandering off.

Cables are subject to more wear and tear than most other components, so it's a good idea always to have replacements on hand. Make sure you have at least one of every common cable; two of each of the common ones and one of everything else is better. Don't forget telephone cords, if the IT department is responsible for them. Extension cords and power strips also belong in this group.

Software

Software can be divided into two categories: the kind you buy, and the kind to which you subscribe.

The former is what we typically think of when we say "software." Expenses can include licenses (site-wide or per-user), media (the cost of the CDs or tapes for both new packages and upgrades, if not downloaded from the Internet), and printed documentation, separate charges for which are becoming more common each year.

A different type of software expense is subscription fees for services such as Westlaw (online legal research) or virus-scanning software. These may be annual fees or charges on a per-transaction basis. Such expenses should probably be included in some other department's budget, but they may be rolled in with the IT budget if the service is considered a company-wide resource. Managing a budget that includes per-transaction fees can be quite difficult unless very light use is made of the service. Find out whether a monthly or annual subscription is available and then do a cost-benefit analysis; the accounting folks can tell you how much the company spent on transaction charges last year. Showing how you can actually save the company some money may help you get the rest of your budget approved.

Some software subscriptions are more like leases. This practice used to be more prevalent in the '70s, when large software packages that ran on mainframes were standard; however, if Microsoft gets its way, software leasing may soon apply to basic desktop software such as the operating system, the word processor, and the spreadsheet. Be sure to include such expenses in your budget.

An expense you might not think of as software is hosting services. Of course, they're more than that, but for budgeting purposes they most resemble software subscriptions. Hosting services may be month-to-month or yearly; in either case, termination fees may apply. Be sure to take such fees into account in your budget. If you contract annually with your hosting provider, see if they'll work with you to align your contract with your fiscal year, as you would with a hardware support contract. This will make your life easier.

People

The money in this category is either spent "on" people, that is, it goes for salaries and benefits, or "for" people, in the form of "professional development."

Employees cost money—sometimes as much as 250% of their salary, by the time you figure in benefits, furniture, floor space, computing needs, etc. The HR department probably knows what the actual "overhead" number is, although sometimes it varies with the position, and different companies calculate it differently. How to handle this overhead, as well as tricky things like raises and bonuses, is not something the typical IT budget-maker has to worry about; employee costs are most often part of the "division" budget and not handled by first-level managers (the typical level for IT managers). If you do find yourself having to deal with these numbers, get help from someone who has experience.

A more common IT budget item allocates funds for contractors and consultants. The difference between contractors and consultants, when one exists at all, does not usually affect the IT budget, and so I use the terms interchangeably.

Contractors appear to cost more than employees, but not so much more when you consider the overhead number mentioned above. The big advantage to using contractors is that they can be released as soon as their work is done, thus saving the company money if the workload peaks and dwindles. It's also easier to get rid of an unsatisfactory contractor than it is to fire an employee. Upper management is often willing to spend more money in the short term for this lowered risk in the longer term. Many companies account for the money spent on contractors differently from the money spent on employees; sometimes this can work to your advantage.

The other kind of "people money" is that spent on professional development, which typically includes conferences, training, off-site group meetings, and group or company retreats. The first two, conferences and training, are per-employee expenses, and ideally include enough to send each employee to at least one "enriching experience" per year. Typically, more junior employees are sent to training courses, while more senior folks go to conferences.

Services

The single largest expenditure for services will most likely be for maintenance contracts. This can represent a significant portion of your annual budget, since costs can be as high as 40% of the purchase price of the machine, per year per machine! Typically, however, contracts that cover just the hardware and don't provide 7x24 two-hour response time tend to cost more like 10% of the system's purchase price per year.

The cost of any given maintenance contract tends to go up over time; hardware contracts are especially likely to rise as the machines get older. If existing contracts expire during the fiscal year, and particularly if those contracts are paid monthly, you will need to figure next year's rates into your budget. Similarly, if warranties expire during the fiscal year, you'll need to figure the cost of a maintenance contract into your budget.

Some of this hassle can be mitigated by negotiating with the service vendor to time the contracts to coincide with your company's fiscal year. Some vendors will write a

contract for less than a year, to take you to the beginning of the next fiscal year, when a one-year contract could be written. Other vendors will require you to purchase a contract for a year plus the remainder of your current fiscal year. Most will agree to one or the other method, if asked.

Since contract costs tend to go up over time, you should consider doing a cost-benefit analysis for your older systems (whether hardware or software) under contract. You may find that it is less costly to buy a new system than to maintain the contract on the old one. This is especially true for hardware, where the newer system will be significantly faster (bigger, better). Remember, if you can show that buying a new machine will cost the company less money than they're spending now, it shouldn't be a hard sell.

Some systems may not be covered by service contracts. Such systems often benefit from periodic maintenance (cleaning, overhaul, tune-ups). Whether needed once a year or more often, don't forget to take these costs into account when figuring this category of the budget. For mechanical systems (air conditioners, printers, tape drives), the yearly cost may well go up as the equipment gets older and more parts fail. Again, do a cost-benefit analysis so you can decide whether to service/repair an existing unit or buy a new one.

Certain consulting services may fall into this category. Security audits are a likely candidate. Check with the accounting folks to see how they want such costs handled.

Another service cost is for off-site storage, typically for back-ups. This tends to be charged per unit of space; be sure to keep track of how many tapes you're keeping off-site, so you know whether to increase the amount allocated for this service.

Finally, a common cost is for legal services. If you're lucky, this will be limited to escrow services, typically for software source code to be held in case the company should fail, or copies of tapes to be used in the event of an intellectual property dispute. In either case, let past years guide you in your estimates, but also check with upper management to see if any additional uses of such services should be anticipated.

Consumables

The most common—and probably most quickly used—items in this category are supplies for printers: paper, toner cartridges, ribbons, etc. Paper may be handled by whoever deals with the copiers, but the rest is almost certainly up to the IT department. Don't forget that in some laser (or LED) printers, a drum unit may need to be replaced as well.

The next most common items are digital media—recordable CDs or magnetic (back-up) tapes. The former are now common enough that you may be able to push them off to whoever handles office supplies. Tapes, on the other hand, are usually specific to your back-up system, and so should remain the charge of the IT department.

Remember that tapes should be replaced after some (limited) number of uses, before they start to give media errors. During your full back-up is no time to find out that your last tape has gone bad. If tapes are sent off-site for archiving, take that into

consideration when calculating how many to buy. Finally, as data grows, so does the number of tapes needed for back-ups.

Special-purpose cleaning supplies such as head-cleaning tapes belong in this category; always have at least one extra on hand.

Finally, fasteners of all types should be included. Don't scoff at this—you can never have too many velcro or nylon cable ties, and they tend to get consumed fairly quickly. Nor do you ever want to run out of the nuts and bolts that are used to mount systems in racks (or cabinets), especially if your racks have threaded rails that require a particular bolt.

Contingency Fund

No matter how well you plan, you're going to need a contingency fund. Even if it's easy to get out-of-budget purchases approved (and these days, that's rare), it's always good to have some money you can use in an emergency.

You may be able to list this item in your budget, although you may have to change the name to "miscellaneous expenses" or "emergency expenditures."

There are several common reasons for having to spend money you didn't plan for:

- You either forgot a need or grossly underestimated the cost.
- Someone else gave you incomplete or inaccurate information.
- A new project was started after your budget was approved.
- The price of an item went up between the time you put it in your budget and when it was purchased.

In the first case, your best course of action is to go to your manager, explain your mistake, and ask him for help. You should be able to do this once, especially on your first budget, without seriously harming your performance evaluation or credibility. Of course, the worse the error, the worse the effect will be. Remind your manager that this is the first time you've done a budget (assuming that's the case), and promise that you'll be able to do better next year.

In the other three cases, go to the manager of the new (or now under-funded) project, explain the situation, and offer to help put together a revised budget. When it's done, ask the project manager to handle getting the new budget approved, or ask to do it together. If the manager is uncooperative, inform your manager of the situation and ask how to proceed. At this point it's a management issue, not a budgeting or system administration issue, which means your manager should be involved.

Regardless of the reason for the unplanned expenditure, the point to keep in mind while developing your budget is that you don't need to plan for every possible thing that could go wrong, nor do you need to take into account projects you couldn't have known about when the budget was submitted. For those cases, all you have to do is ask for more money; it's management's responsibility to ensure that projects are funded, and that projects without funding are stopped.

Management may well balk at this item. You or they may be thinking, "If we need a

contingency fund we haven't done our job well enough." The truth is that it's just not possible to predict the future, and a contingency fund is an honest way to account for this. If management pushes, remind them that it's better to approve the money now, as part of the fiscal planning, because chances are good that at least some of this money is going to be spent later in the year.

Some people will argue that it's better to hide your contingency fund deep in your budget. A typical method is to list a "network management server" with an appropriate cost. However, like other forms of padding, this is dishonest and at root it hurts the company. Please read the section on "Padding Your Budget" in Chapter 5 for what to do if management is unwilling to let you include a contingency fund as a visible part of your budget.

3. How Much to Ask For

In Chapter 2, we defined a budget as a request for money, a plan detailing how a certain amount of money will be spent, or both. In the simplest terms, you determine the amount of money to request by multiplying the number of items you plan to buy by the cost of the item and then summing the totals. The previous chapter discussed items you might want to buy; this chapter covers how many of each to buy.

For most items, figuring out how many to buy requires help from the people in the company, primarily managers, who helped you decide to buy the item (see Chapter 2, above). This chapter focuses on how to gather this information, from whom to gather it, and how to frame questions to nontechnical people. In these conversations your goal will be to determine both what should be bought and how many will be needed of each item.

For the purposes of this discussion, we are assuming that, in your organization, projects are managed by the various departments and most projects require computing purchases. We further assume that you, as the representative from the IT department, are working with the various managers to help them figure out what their computing needs will be. You will then go off and find out how much it will cost each department, so that you can deliver back to the managers information on items, quantities, and costs they can put into their own budgets. In other words, you're not only building your own budget, you're helping the other managers build theirs.

There will always be some items one or more groups want but no one group is willing to purchase, and items a single group requests but management wants shared throughout the company. A good example of the latter is a wide-bed color plotter: Who buys it, who gets to use it, and who covers the cost of the (usually very expensive) supplies needed to keep it running? This is an issue to be solved by upper management, not the IT group. Ask them how they want it handled and how you should deal with it in your budget.

The distinction between items for the IT department and those for other departments can be ignored until it comes time to assemble the budget. That's when items for other departments will be taken out of your budget and given to the appropriate managers.

Quantities of some items, particularly those at the core of the computing infrastructure, are calculated by the IT group. This chapter will also cover those items and how to figure out how many of them to buy.

A note regarding quantities: Though I will mostly write in terms of "how many," I mean the overall specifications. For example, for servers, routers, and storage systems, you'll have to determine "how big" and "how fast."

The Accounting Department Is Your Friend

The first step in figuring out how many items you'll need to buy is to enlist the help of the folks in the accounting department.

A sad fact is that some professional system administrators have a decidedly unprofessional attitude toward the people who manage an organization's finances. Regardless of how clueless or yes, even stupid, accounting folks may seem, the sine qua non of their job is the same as for system administrators (indeed, for everyone in the organization): to help the organization succeed. To address these folks as "bean counters," "suits," or "lusers"—even privately—can only impede working with them. Budgeting is primarily a management function. Treating managers and accounting folks with respect will help win you their cooperation—which in turn helps you accomplish your assigned task. To act otherwise is folly.

It helps to remember that the basic role of the accounting department is to enforce sound fiscal practices.

In an ideal world, the way system administrators and the way the accounting folks do their respective jobs would never conflict, and everyone would get exactly the data and processes they needed. As system administrators, we are painfully aware of how far from ideal the world is, so our best strategy is to make friends with the accounting department and see if we can't find some way to help each other.

Approach the head of the accounting department and say, "I've been asked to prepare a budget, and I'm going to need some information about how we spent our money last year. Who is the best person in your department to help me?" In most cases, the mere fact that you approached the head of the department asking for help will get you all the cooperation you need. Once you've been pointed to the right person, go to that person and say, "Your boss tells me you're the right person to help me gather data so that I can prepare my budget. Will you please help me?" Again, you'll most likely be surprised at the level of cooperation such an approach elicits.

The most useful data you can get from your friends in the accounting department is where last year's money went and how quickly (the "actuals"). In many companies, accounting can give you a month-by-month breakdown of what was spent, for what, and how that compared to the budget. This data will be invaluable to you as you work your way through the planning process.

The other piece of information you might be able to get, if you ask discreetly, is how the coming year's company-wide budget is likely to compare to last year's; the company's performance over the past year should yield a clue to this. Knowing how tight money will be can help you decide whether to ask for some new, large item or to scale back. Submitting a budget that clearly shows you've taken the company's fiscal situation into account before being told to do so will boost your credibility and show management that you are both aware of managerial issues and sympathetic to the company's overall well-being.

How to Talk to Managers

I hope you'll bear with me as I point out yet another attitude problem, namely, how too many system administrators (and I strongly believe that even 1% is too many) regard management and managers.

Most managers do not understand technology—at least, not at the depth most system administrators do. This does not mean that managers are stupid! Managers almost certainly don't care much about technology. They don't need to care about it because it's not their job; it's yours. Rather, they care about the implications of the technology, about how it affects the company (and the company's bottom line). Remember, managers' basic role is to balance the conflicting needs of the different parts of the company in order to achieve the company's goals.

Your task, when dealing with managers, is to teach them what they need to know about your work. Help them understand how the technology you care about affects the company, and how spending money on this technology will help the company fiscally. Remember, if you can't see the connection, they probably can't either. It's up to you to identify the connection and sell it to the managers.

When talking to managers, try to keep in mind the following points. First, never waste their time with technical details; stick to high-level explanations and business plans, and only go into more detail if they ask you for it. Be careful not to be condescending; there's a big difference between "I'm trying to present the information at an appropriate level of detail" and "You can't possibly understand the substance of this." The latter attitude is not going to win you any points.

Along these same lines, try to avoid using buzzwords. They will more likely confuse than clarify (again, because of managers' lack of familiarity with the terminology, not because they're stupid), and they may even intimidate the people you need on your side.

Next, do not become annoyed if managers need you to explain your plans several times. They probably know as much about your job as you know about theirs, and in most cases, that's damned little. If you present the right information in the right way, a good manager will recognize the need to listen to what you're saying and will do what it takes to learn what you're trying to teach. Why? Simple, really: It helps them get their job done.

Finally, remember that managers must balance the conflicting needs of the different parts of the company, in order to keep the company working toward its agreed-upon goals.

The reason we care about talking to managers is that, just like the accounting folks, managers can answer the questions you'll need to ask to know how many things to buy (which is what this chapter's supposed to be about, remember?). Now that we've thrown out our bad attitudes, we can consider the questions we should be asking managers.

Now What Do We Do?

In a well-run business, computers are purchased to meet specific needs. (Let's agree to use the word "computers" here to mean everything from systems to networks to software; in effect, everything covered in the previous chapter.) Some computers are purchased for specific people, while others are purchased for projects; still others provide the infrastructure. Thus, from a system administrator's point of view, the process goes something like this:

- Find out from management how many computers are needed for employees and for projects.
- Figure out how much infrastructure is needed to support those computers.
- Determine the cost of the items needed.
- Do the math.

Policies

Certain company policies, whether formalized or not, affect how many computers will be needed. The most common one is whether every employee is given a computer for activities such as email and word processing. If every employee gets a computer, the calculation is easy: How many new employees will be hired in the next year? How many employees are expected to leave, and of those how many have computers that are new or powerful enough to be given to new employees? Add, subtract, then buy that many computers.

If, on the other hand, only some employees get their own computers, while others have to share, it may be difficult to determine how many computers to buy. Typical policies specify the number of employees per computer by department or by job function; if this is the case in your company, all that is required is a more detailed breakdown: How many employees will be hired, in which departments, for which jobs? Plug this data into the formula and get back the number of computers required.

Some companies can't (or won't) provide a way to calculate how many computers will be needed for a given number of employees. Here, the best you can do is provide a figure for a single computer (of each type or for each purpose if more than one kind of computer is used), and stress that the final budget cannot be determined until you know how many computers of each type will need to be bought. In some companies, this will never happen; the best you can hope for is that management will remember this cost as the year goes on. This is also a perfect place to get help from the accountants. They can tell you exactly how many people were hired last year and how many employee computers were purchased. With a little help from Human Resources, you can probably get a breakdown of hiring by position and by department. Armed with this data, you can provide management with a few charts or tables showing last year's numbers, which should at least make them aware of what they spent beyond what was included in the budget.

Figuring out how many new computers to purchase can seem like a science unto itself. The variables include how many new employees will be hired, how many are expected to leave, how many old computers are no longer powerful enough to do the job, and whether employees in different departments or job functions get different kinds of computers.

Simplify the task by breaking it down into several parts. For the sake of this example, we're going to make it easier by assuming that every employee gets at least one computer and that the company will grow in size by some number of employees. Start by ignoring the question of who will get the new computers. Budgeting is about figuring out how many are needed; let the managers figure out which of their employees get new machines and which get hand-me-downs.

With that potential rat-hole avoided, figure out how many existing computers must be upgraded this year. Next, subtract the number of employees expected to leave from the number to be hired, and add the result to the number of computers that need to be upgraded. You now have the total number of new computers you need to buy. Or do you?

If every employee gets exactly one computer, and all computers are "the same" (that is, the same type, even though models or speeds or memory sizes vary as prices and availability have changed over time), then you are indeed finished. If, however, one or both of the above is not true, there's more work to be done. Again, for the sake of this example, we're going to make certain simplifying assumptions—most importantly, that management can give you accurate figures about the positions to be filled and that there is a clear policy stating which employees get how many of each kind of computer.

Step one is to split the existing kinds of computers into categories and do the upgrade calculations for each. Step two is to recalculate the employee changes by position (since that is the most common basis for how computers are assigned). The last step is to combine the two sets of calculations for each kind of computer. See? Not as hard as you might have thought.

In some companies, different employees will get different kinds of computers, based on the employees' computing needs or their position. If your company works this way, you'll need to give management the cost for each "grade" of computer, along with a short explanation of how to determine which employees will get which grade. It helps if you can limit the number of grades of systems to two or three; four or more is likely to get confusing.

Another policy that affects computer purchases is whether projects share computers. In some cases, there will be business reasons for sharing computers, or for not sharing them. Typical cases for the latter are government contracts or customer-based projects,

where the accounting overhead of dividing the cost of a single computer among several projects is just too high. In some cases, the contracts may even require non-shared computers.

Sometimes management will turn to you for advice on whether to share computers between projects. This is where your expertise comes into play. Briefly lay out the pros and cons of sharing, suggest a policy or method of determining which computers to share and which not to share, and then work with management to come to an agreement. Keep all this simple, and try to stick to the business case and not the technical details.

Another policy that can affect the budget is whether to archive old data or buy more disks. In some cases, it may cost the company more to figure out which data to archive than it would to just keep adding storage to hold all the data. Don't forget to take the company policy into account when calculating the items needed for backups: More data means more tapes, or it means changing the way backups work so that data that changes less often is backed up less frequently. For example, if full backups are done weekly and tapes are retained for a month, the number of tapes can be reduced by saving unchanged data only once a month, rather than every week.

Infrastructure

In most cases, infrastructure (in particular, network equipment such as routers and firewalls) will be shared by all employees and projects, but, again, there may be business reasons why this can't (or won't) be true. Management probably won't think to mention such constraints to you, so be sure to ask whether all infrastructure may be shared. If they don't understand, ask them if there are any specific security or contractual reasons why certain projects (or, in some cases, certain employees) can't share infrastructure.

Questions

Here, in no particular order, are typical questions you might ask management in order to determine how many computers you'll need to buy in the coming year. Some questions are appropriate for departmental managers, others should be asked of directors, and a few may need to go all the way up to the executives; your boss can help you figure out whom to ask what. See the beginning of Chapter 5 for a more detailed description of these different management roles.

"How many new employees will we be hiring? Will we be purchasing a computer for each of them?" Be ready to suggest a typical workstation configuration (with an approximate price), and ask if there's any reason to use a different configuration. When doing this, you may also need to ask whether employees such as developers and scientists will use the same computer for general productivity (email, word processing, Web) and for specific technical work (software development, analysis). If not, you may need to provide several different workstation configurations. Finally, you'll want to ask

which employees, if any, will get laptop computers, and whether those will be instead of or in addition to their desktop machines. One possibility is that employees will be offered the choice of laptop or desktop, in which case you'll need guidance from management on how they'd recommend estimating the split. Once again, the accounting department can help provide historical data on which to base this estimate.

"Are any new projects planned? If so, what will their computing requirements be?" Don't be surprised if management turns around and asks you that same question. If they do, be wary of answering on the spot. Most likely, you'll need to discuss the project with the project manager before you answer.

Related to the last questions are these: "Are any old projects going away? If so, which ones? Can the old computers be used for the new projects?" Again, management may well expect you to answer that last question, after you talk to the managers of the new projects.

"Will any existing projects be upgrading their computers?" If so, work with the project managers to determine the costs of the upgrades.

By now, it should be obvious why a budget is considered as much a planning tool as a simple accounting exercise. IT departments need to know what kinds of computers the company needs, and the only way to find this out is to talk to the people specifying the computers for the various projects. This is an ongoing effort, one that requires regular communication between departments. In most cases, it also requires personal contact with other managers, whether formal or informal. (This is obviously harder to achieve in very large companies, but then, budgets are harder to draw up in such companies.)

Talk to project and department managers on a regular basis. Make it clear to them that it can save time and effort for everyone if they discuss their needs early in the planning cycle, and if they include you in their discussions. Show them you want to work with them, that your goal is to help them achieve their own goals. Offer your expertise and encourage them to treat you as a member of the team—at least with respect to determining or planning their computing needs. This way, not only will you avoid surprises come budgeting time, but you'll have a chance to discuss the best way of meeting their computing needs without the added time pressure at the beginning of the fiscal year (when budgets typically must be finished).

The best IT departments are viewed as allies by the other departments and are recognized for their expertise in determining appropriate computer resources.

A certain amount of research is required before you can intelligently ask the next set of questions. Using logs, trouble tickets, and data from the accounting department, figure out current resource utilization for your network, disk storage, servers (email, Web, compute, etc.), printers, and anything else that could reasonably be included in the computing infrastructure (that is, anything not assigned to an employee or a project). If possible, look at utilization over the last year (or years, if you have that data). Be sure also to gather data on numbers of employees, computers, and projects.

While this data may not accurately indicate the needs for the coming year, it's better than any other data on which to base your SWAG: Scientific Wild-Assed Guess. With data, charts, graphs, and SWAG in hand, sit down with management for the next series of questions.

"Can we buy more servers?" Here, "servers" includes storage, printers, the back-up system, switches, routers, and so forth, or upgrading any or all of them—in short, improving any shared resource. If your data shows that more horsepower is needed (more CPU cycles, more disk space, or more network bandwidth), you'll need to present this need to management and get them to agree to putting it in the budget.

A bit of explanation is in order here: You may be wondering why management is being consulted while the budget is being drawn up—isn't this part of getting the budget approved? In most cases, you will not be in charge of getting your budget approved; unless you work for a very small company, that task will most likely fall to your boss. By talking with your boss as you work on the budgeting calculations, you can prepare him or her for what you'll be presenting, and you'll have feedback before you spend too much time going down the wrong path. The meeting where the budget is approved is not the best place to have such detailed discussions between you and your boss.

Even in a company that's small enough that you will actually meet with the CEO, the CFO, and a few other managers to review and approve the budget, it's better to discuss the contents of the budget in advance—if for no other reason than to make the approval process that much shorter (if you're lucky).

Whom to Ask

Obviously, no one person is going to know the answers to all these questions (except in the smallest companies, where budgeting is often informal at best). The person to start with is your boss: Explain the kinds of data you need and the kinds of questions you're planning to ask, and have him or her suggest the appropriate people to provide the answers. Also, ask your boss whether you should talk directly to those people, or your boss should do it, or the two of you together should. It may be desirable to get all the required people together at the same time, explain your questions, and then schedule one-on-one meetings to discuss their answers.

In cases where you need to talk to your boss's superior (or, possibly, even higher up the chain of command), it is usually a good idea to have your boss set up the meeting and ask if he can bring you. This helps alleviate concerns on the part of the über-boss about wasted time, inappropriateness, etc. Before such a meeting it's particularly

important to discuss with your boss the exact questions you plan to ask; alternately, show your boss the data you're trying to get and the questions you plan to ask, to get suggestions on shaping your presentation, in terms of appropriate level of detail, suitable phrasings, and so forth.

If the person with the answers is part of executive management (such as the CEO or CFO), you most likely won't be permitted to ask the questions yourself, but instead will have to have your boss do the talking for you. If this is the case, explain fully to your boss what data you need, why, and how you plan to use it. This will help your boss get you the right answers with the least wasted effort.

On the other hand, in some companies, it may be that you (probably with your boss in tow) will be able to meet with executive management and ask your questions directly. If so, be sure to remember to keep the level of detail appropriately high and to stick primarily to business aspects, not technology.

4. Packaging Your Budget

We now know what we want to buy and how much it's going to cost. What do we do with this information? For better or worse, there are probably as many ways to write up your budget as there are companies. There is no standard form, no preferred layout, no recommended method—each company will have its own requirements, and it's not uncommon for those requirements to change from year to year. Also, expect to redo your work at least once: Either you won't understand what they were asking for, or they'll ask you to do it differently when they see the results of their first request.

This chapter covers a general approach to packaging your budget. If your boss doesn't, or can't, tell you how to do it, try this as a first pass and see how management likes it. This chapter also touches on how to present your budget—the topic of the next chapter—because the packaging and the presentation are often closely related. In most cases, points regarding presentation will be touched on here and expanded later.

Since there is no hard-and-fast way to lay out a budget, this chapter draws heavily on my personal experiences. For clarity, I will write, "Do this," and "Don't do that," but you should temper what I write with your own experiences and with advice from your boss. To reiterate: there is no "one way" here; there isn't even a best way. All I can tell you is what has worked for me, and how I would tell you to do it if you were working for me.

The Written Layout

The actual layout of the budget, either on paper or as an electronic document, is rarely formalized. Unless instructed to present the information in a particular way, I have always used something like this:

- "System 1," for "Project A" qty x price = cost
  A short paragraph that contains basic project details, system description, benefit to the company, and (if needed) justification for this particular system over other, usually more well-known solutions:
- "System 2," for "Project B" qty x price = cost
- . . .

If appropriate, I might also use section headings for related projects, departments, etc. (Explanation to follow.) Also, I use "system" to include any/all pieces of the system. Management most likely doesn't want to know which individual pieces make up the system—but be prepared to tell them what's included if they ask.

Here's a sample entry for something that will appear in almost every budget:

- Desktop computers for new employees qty 50 x $2,000 = $100,000
  To be used for basic productivity (email, Web, word processing); systems are Tangerine oFruits at $2,000 each; need 50 machines to provide for new employees (estimated 50 new hires—10 departures) as well as upgrades (10 systems from 1995 no longer meet company minimum requirements); "project" computers for scientists and engineers will be requested by project managers in separate budgets.

We're Making a List and Checking It Twice

We're going to be building several lists, so I may as well name them now to reduce confusion later:

1. The "items list"
   This is a list of every item we hope to buy; it's sorted by whatever order makes you happy (including no order), and it contains an item name or description, quantity to be purchased, and price.
2. The "reasons list"
   This is what will eventually become the bulk of the budget you'll submit; it treats reasons to purchase items (and here we treat projects as "reasons") as headings. Under each heading are the items to be purchased for that reason; sort order for the reasons is arbitrary for the time being; sort order under each reason is "1" to "4" (see later in this section); sort order under 1–4 also doesn't matter now.
3. The "ongoing costs list"
   This is a subset of the items list and the reasons list, containing only those items classified as ongoing costs (such as service contracts and media); items are grouped in however many ways you think make sense; sort order is irrelevant, but the items in each/any/every/all groupings are subtotaled for reference purposes.

   This list may (if appropriate) be added to the reasons list with "ongoing costs" as the reason.

OK, now on to how to build each of these lists.

Start your packaging effort by listing every item you plan to buy (the "items" list); for each item, include a name or a very brief description, the quantity to be bought, and the price. Keep this list and refer to it often; keep an eye out for items you've forgotten, and be sure to add them as you go. Remember that this list will become your final checklist. There's nothing worse than getting your budget approved, after significant effort, only to discover you've forgotten to include an important item.

Using this list as a guide, draw up a second list, sorted by the reason for buying the item or the project for which the item is being bought (the "reasons list"). The headings on this list, if you're lucky, will primarily be project names, with only a few items

falling under general headings such as "infrastructure" or "ongoing costs." (Why this is lucky will be explained in Chapter 5.)

As you work your way through the first list (the list of items), in the cases where you plan to buy more than one of a given item, annotate the list to show which projects get how many of this item. For example:

MoonBeam V3500 workstations qty. 6 x $15,000 = $90,000

2: "Green Cheese" project, developers

3: "Hydro-Find" project, scientists

1: For presentations in main conference room

When you think you've finished this part of the task, go back and verify that every item in the first list appears somewhere in the list that's sorted by reasons. Remember, leaving out an item can be costly (as well as embarrassing).

The next step is to arrange the items under each reason as follows:

1. Ongoing costs
2. Required purchases
3. Recommended purchases
4. Desired purchases

Do not include these headings or numbers; instead, in your own copy of the budget, show some kind of marker between the groups. For reasons that will be explained in the next chapter, do not include these markers in the copy of the budget you submit.

At this point, I suggest writing out a third list—the "ongoing costs list." This one is a breakdown of all ongoing costs, with subtotals by department, by project, by category (hardware, software, etc.), and by any other grouping that comes to mind as potentially useful. In some cases, you may choose to present this list as a single budget item (with the various breakdowns ready to hand out when they ask for them)—in which case "ongoing costs" becomes a reason in the reasons list. In other cases, you're likely to be asked for the total ongoing costs or for various subtotals; having them ready at hand when you're asked for them will often improve your standing in the eyes of the budget approval folks.

Going back to the reasons list, now you should spend some time ordering the reasons by how important they are to the company. For example, if your company has plans to develop a new flagship product, put purchases for that project at the top of your budget.

Regardless of importance, put projects within the IT department after all other projects, and put general infrastructure and/or support projects still further down. The idea here is to first discuss the kinds of projects the company wants to spend money on—the ones that bring in revenue; then, when it's clear that those projects are important, you point out that infrastructure support is also required. This makes it more clear that the infrastructure, while mostly overhead, is essential, and that the company's

projects will be hampered by an inadequate infrastructure. (This will be covered in more detail in the next chapter.)

Reorganizing Your Lists

In some cases, it may make sense to combine requirements across projects. For example, two projects may each need 500GB of storage. We're talking fast, reliable, backed-up storage here, not cheap IDE drives for transient data. There's a good possibility that a single file server could be shared by these two projects, reducing both management and backup costs and providing better expansibility; in some cases, it may even be cheaper per unit of storage.

In cases such as these, rearrange the reasons list accordingly, putting the file server just after the two projects. You may be able to present all three at the same time.

Of course, there's a catch: If management approves one project but not the other, you'll either need to have the adjusted cost for the smaller file server ready to go, or you'll need to explain that for only one of the projects, it doesn't make fiscal sense to buy a file server, and so storage will have to be added to the remaining project, with a corresponding increase in cost to that project. Having the figures ready on building either system without the other, both with and without the file server, is a good idea. The best case is that you'll be asked for these numbers for purposes of comparison; the worst case is that management will ignore your recommendation to buy the file server, and you'll have to buy storage to attach to each of the systems. In either case, you'll need the numbers.

I could give other examples of how the packaging may change during the approval process, but mostly those are more related to the presentation of the budget than to the packaging, so we will save them for Chapter 5.

5. Presenting Your Budget, Or, How to Get Your Budget Approved

This chapter is where we bring everything together: our numbers, our items, our reasons, and all the other data we've gathered. We will cover who will have the task of getting the budget approved, how the budget should be presented, how to juggle the numbers as items are approved or rejected, and miscellaneous general tips for presenting budgets, talking to senior management, and a few points not covered elsewhere in the booklet.

A typical company has the following levels of management: executive or senior (CEO, CFO, president, vice presidents, etc.), middle (directors), and departmental (your boss, or maybe you). Budgets are most often presented by the directors and approved by executive management. Sometimes you will be asked to provide justifications for the director to use when presenting your budget to senior management; at other times you will actually be asked to sell your budget to the director. Occasionally you might be asked to join your director in making the presentation to senior management, usually to handle questions of detail or to explain the more complicated items.

Whether or not you make the final presentation of the budget, it helps to be prepared to do so and to understand how it is done. This knowledge will help you to prepare the budget well and to formulate strong justifications to have ready if your director asks for them. Read the rest of the chapter with these thoughts in mind.

Before you prepare a budget presentation, move as many items as possible out of the IT budget and into the budgets of the departments who need the items. Then try to have all the other departments present their budgets before you present yours. If asked why you want the last slot, explain that IT's job is to support the other departments, so your budget will make more sense after management has heard what projects and purchases the other departments are proposing.

Groupings

The previous chapter listed four broad groupings for purchases: ongoing costs, required purchases, recommended purchases, and desired purchases. Each of these is handled a bit differently when it comes to getting your budget approved.

Group One: Ongoing Costs

The first group, ongoing costs, should be presented with as little fanfare as possible. Senior managers understand "the cost of doing business," which is exactly what these items represent. One school of thought suggests presenting these items first, so they're gotten out of the way quickly and with little discussion. If your costs are reasonable, and if they haven't changed much from last year, presenting these items first is probably

a good idea. This way, if there are arguments about the other purchases, you don't have to try to regain the goodwill of management when it comes time to present the items you truly can't live without.

If your ongoing costs are nearly the same as they were last year, say so; if they're higher, tell management what percentage higher they are. If possible, justify this increase by citing a corresponding increase in the number of systems, projects, employees, or data, or the rate of inflation, or both. Also explain that your figure includes costs associated with the systems still to be approved and may go down if some of those systems aren't purchased. Be prepared to give a breakdown of the costs for existing systems versus new ones.

The second school of thought says to present ongoing costs last. The biggest reason for this is that the number presented will have been juggled to reflect only those new purchases that were approved, and so it is the lowest number possible. While this is a good idea, I feel that the risk of having to present money that must be spent after possibly having argued about other money outweighs the small advantage of giving a more accurate figure up front, especially since you should be prepared in any case to give a revised figure at the end of your presentation for the ongoing costs, based on what was approved and what was not.

Group Two: Required Purchases

Items in this second group, required purchases, can be handled in either of two ways. First, as with ongoing costs, to the greatest extent possible you should move items out of your budget and into that of the manager of the project that requires the items. Let this manager present those items as part of the project's budget, and arrange in advance with this manager to be there to answer technical questions about "your" items in "his" or "her" budget. For one thing, if the items are presented as part of the project, they're more likely to be approved; another advantage is that management gets to see the cost of the project as a whole, at a single point in the presentation.

Obviously, if some items are to be shared among projects, you'll need to think carefully about how to handle this. The easiest way is to give each project its portion of the costs of the shared items. If that won't work, present the items in your own budget right after ongoing costs, while the projects that require these items are still fresh in management's mind.

Usually, some required items either clearly belong to the IT department or just don't fit into any other department's budget. Such purchases make up the second part of this category and should be presented immediately after any project-related required items. The justification for all items in the group should be the same, simple reason: The purchase is required to support the projects and plans the company has already approved (or at least has said will be priorities for the upcoming year). The basic idea is this: "You said you want to do X; it will cost you Y to do it." The implication ("If you don't spend Y, you need to reconsider whether or how to do X") should be obvious to management. As always, be prepared to support your recommendation.

Group Three: Recommended Purchases

The third group of items being asked for is that of "recommended purchases." It is in selling these items and those in the next category that salesmanship truly comes into play. Here's why: Most likely, the company won't have enough money to cover every item in every budget; even if a company did have that much money, it would not spend it lightly. In a perfect world, you would have only to make a good business case for making a purchase ("Buying this file server will save us $100,000 every year, and it will pay for itself in 2.5 years") and the company would give you the money.

In the real world, someone in management is almost certainly going to ask you whether the file server is really required and, if it is, why it's required. Can the company survive without this file server? How much will it cost not to buy it? Also, every other budget is going to present similar items, and you're going to be asked whether your file server or some scientist's electron microscope will benefit the company more.

The question of relative benefit is hard to answer and usually requires help from your boss and other higher-level managers, so we can skip over it.

The questions about requirements and cost come back to what was said earlier about talking to managers: If you can't see the beneficial effect on the bottom line and the overall operation of the company, neither will they. When it comes to getting your budget approved, a clear understanding of the value of the requested purchase almost always makes the difference between the item being approved and being rejected.

For every item in the "recommended" group, be prepared to explain what the cost to the company will be if the item isn't purchased, what the cost will be if the item is purchased, how much will be saved and where the savings will appear, and how long it will take to pay off the item (as a function of how much it saves the company). Just as important, be prepared to explain what the costs (and these are indeed costs) will be to the company in terms of projects that will be delayed if the item is not purchased, or in terms of reduced productivity, or lost revenue, or lack of revenue growth, or anything else that helps explain why the item should be purchased.

Group Four: Desired Purchases

Items in the last group, "desired purchases," should be handled much the same way as items in the "recommended" group, only here you may have to come right out and admit that these are optional. In fact, one way to look at the real meaning of the categories (as opposed to what you tell management) is as follows: Ongoing costs are not to be questioned. Required purchases are part of projects and live or die with the project; no additional discussion should be needed. Recommended purchases should be presented with as much data as possible to show why they're cost-effective. Desired purchases should be presented as recommendations. In other words, you can effectively reduce the number of categories of items to be discussed to two, required and recommended.

And you thought I was joking about salesmanship.

No matter how good you are with math, get someone to check your figures on these arguments. It's easy to get confused, and if you present the wrong data to management, they may interpret it as an attempt to pull the wool over their eyes rather than the honest mistake it is. Worse, it will make you look as though you don't understand the business process, or finances, which will undermine all your other arguments.

The best person to ask for this kind of help is someone who has been through the budgeting process before. This will often be your boss or one of your peer managers.

If you are the senior member of the group, and it was your boss who asked you to prepare the budget, be sure to ask her to check your figures. She is relying on you to provide her with accurate data, so it will be in her best interests to make time to give you this help.

If you're the IT manager, you have several choices of whom to ask for help. Several factors will influence your choice.

You could ask your boss, if your boss isn't so far up the management chain that it's not really appropriate to ask him. If he has the time, great.

You could ask a friendly peer manager. This assumes, of course, that you trust her judgment, and that office politics aren't so bad that she will sabotage you to help her own budget. (If the politics really are that bad, you should be polishing your resume instead of worrying about the budget.)

You could ask a senior person in the accounting department, someone who understands business, finance, and fiscal management. The problem here is that often only the most senior person in that department (the one with a title such as "Comptroller") has such knowledge, so she may be too busy to help you with budget details.

Your last option is to ask the most senior member of your own group. Think first, though: The person you ask may have to tell you you're wrong. If your senior team member is intimidated by you, or for whatever other reason will be unwilling to correct you, there's no point in asking him to check your math and reasoning. Also, you have to trust this person not to sabotage you—maybe as revenge for a previous disappointing review. Of course, this person also needs to be senior enough to trust with the information you're going to share. Go back to the last section of Chapter 1 and reread the discussion on sharing budget information.

Back to the desired purchases. This is the only category where "personal" appeals can come into play. For example, the argument, "The IT staff needs a pet project of their own to keep them from dwelling on how overworked they are," is not unreason-

able. A similar, more convincing argument is, "This will challenge the IT staff to learn new skills." Remember, management doesn't need to know it was the IT staff's own idea that they should learn the new skills. If you're asking to upgrade the "personal" systems the IT staff use, point out to management that the IT staff can provide better support if they have equipment similar to that of the users being supported.

An argument that is much harder to support but can sometimes be worth bringing into play is, "The IT staff has been suffering with old equipment and software for so long they're starting to get demoralized, and I'm worried they might be more inclined to leave if they get a job offer elsewhere." You can probably use this for only one item, but it's not wholly unreasonable in the proper context. Also, you should not expect this argument to prevail in successive years unless the whole infrastructure really needs to be replaced. If that's the case, prepare management by explaining that you're asking for project *a* this year, and postponing requests for projects *b, c,* and *d* to subsequent years, even though all four components are substandard. That way, your request is more likely to be perceived as demonstrating careful planning, instead of a "they gave me an inch, so I'll take a mile" mentality. If the company's doing well, you might be pleasantly surprised by being asked what the additional cost of project *b* would be.

"Bottom-Up" Versus "Top-Down" Budgets

This booklet focuses on "bottom-up" budgets; that is, you start by figuring out what you need to buy and how much it's going to cost, then ask management for that much money. Another typical way budgets are prepared is "top-down": Management tells you how much money you can spend, and it's up to you to figure out what to buy.

Typically, top-down budgeting assumes that you are only responsible for buying the items needed for your department or items shared by all departments (such as networking gear).

If you find yourself in this situation, I suggest you follow the procedures already outlined, with the exception that you (or your boss) approves the budget rather than senior management. That said, you will still have to discuss your budget with senior management, since they will almost certainly offer you less money than you need. At that point, you're back to a bottom-up budget. Well, not quite—but close enough that you can safely follow the advice in this booklet.

How to Reduce Your Budget

The next thing to consider is what to do if your budget is not approved.

In some cases, senior management will tell you to cut some amount of money from your budget; they will often do this without agreeing to cut projects. This approach is usually based on the idea that there's always "fat" in a budget which can be trimmed without hurting the key projects. As much as you may not want to hear (or believe) this, it's true: All of the items in your fourth category ("desired purchases") are less than essential to the functioning of the company or the IT group. If the amount of money

to be cut is no greater than the total cost of this category, your job is easy. It won't be pleasant, but think of it this way: First, it's better to make your own decisions about what to cut and what to keep; second, in the end, it's more important to get all of the items in the first three categories ("ongoing," "required," and "recommended") than any in the fourth.

In other cases, senior management will say that one or more projects have been cut and ask you to present a revised budget reflecting the cuts. If you've done your job well, this revision should be fairly straightforward. However, don't forget the cases where you've shared an item between two projects or have requested a central server to support multiple projects. You'll need to juggle the budget to reflect this change, or request a smaller server (or the same server with less disk), or explain why cutting one of the projects intended to share the resource doesn't reduce the cost of the resource.

Cutting money from a budget is never easy, but it's standard practice: It's rare to get all the money you ask for. (In fact, if that happens, you've probably overlooked something.) I said this earlier, but it bears repeating: Part of management's job is to balance the competing needs of the company in such as way as to keep the company in business. If you're asked to cut money from your budget, do so willingly, as it will get you credit for being a "team player." Cut decisively where you can and "trade" for the important stuff. Also, don't hesitate to say that you don't believe a project can survive without certain items, and put the ball back in management's court in letting them decide to cancel the project if they're not willing to fund it.

Other Budget Reductions

First and foremost, budgets are plans, and, as Robert Burns poetically noted, plans change.[1] The IT budget is part of the company's overall "business plan," which predicts how much money the business expects to take in each quarter. If income is lower than expected, purchases are often reduced or delayed; in extreme cases, employees are laid off. If this happens, you may find yourself having to go through a second approval process, often with a reduced budget for the remaining part of the year or with a budget that shows purchases spread out over a longer period of time than you had intended. You will probably have to recalculate the number of systems needed if fewer employees than planned are being hired or if employees are let go.

On the bright side, you'll already have been through the process once, and it gets easier every time. Also, you'll most likely get significant input from management on what projects will be cut or delayed and which will proceed as planned.

Padding Your Budget

Some people advocate padding your budget by about 10%, so that when management says, "Cut 10%," you're where you wanted to be in the first place.

1. "To a Mouse, on Turning Her Up in Her Nest with the Plough."

While this will often work, it's dishonest. It may get you what you want, but in the long run it hurts both the company and your credibility. Think about it: If every year management says, "Cut 10%," and you do so without difficulty, they're probably going to realize that you pad your budget. I think it's better to list all the items you want to buy, knowing that some of them aren't going to make it into the approved budget. If you do your background work, you'll at least be sure that budget cuts won't injure the company or impede the work of the IT department.

A typical reason cited for padding your budget is, "All the other departments are going to do it." That may be true, in which case your basic options include quitting (because you don't want to work with dishonest people), asking the other managers not to do it (on the grounds that cooperation is what's best for the company as a whole), standing your ground and living with the consequences, and padding your budget even though it's dishonest. Let your conscience and your professionalism be your guide.

Odd Bits

We'll finish this chapter with a collection of miscellaneous thoughts, ideas, and tips on various aspects of successful budgeting.

Remember to work with department managers throughout the budgeting process. That way, when it comes time to get the budget approved you can remind them that you based your budget on the numbers they gave you. Don't blame it on them if the costs are high; explain that if they want to revise their numbers you'll provide the corresponding reductions in the budget.

Be sure to work with the project leaders, and let them do as much of the work as possible to get items for the project approved. Management usually likes to see all costs for a project at once, and cutting whole projects is easier than cutting an item or two from every project.

The more items you can tie to specific projects, the smaller your budget will be—which usually makes it easier to get approved.

If numbers in the budget are based on growth, be ready to explain why a given reduction in proposed growth may not result in an equal reduction of proposed expenses (because items such as server size or number of switches must be specified in increments that may not match the incremental reduction in growth).

Don't hesitate to put a little "breathing room" in your budget, to allow for more growth than planned, inflation, or unanticipated expenses. Remember that it's not uncommon for an item to go out of production between when you write your budget and when you want to buy the item; the new model may well be more expensive. (Breathing room is different from padding, discussed above. You should allow breathing room in any budget, for the reasons just noted; padding is deliberate overstatement to deceive management.) Make sure you remember how much breathing room you've allowed, so that you don't cut into your necessary minimum totals when you're asked to reduce your budget.

Arguments for buying an item can include how it fits into the long-term picture and how it will affect the following year's recommendations. For example, you may be able to say that by purchasing a larger model now, you can avoid purchasing a second, smaller model again next year, and the larger one will be less expensive than two smaller ones. Even more convincing is the situation when two smaller items can't be combined, so if you buy a small one this year, you'll have to buy the larger one next year and put the smaller one into storage.

Another reason for buying a quantity is that it's cheaper in bulk. If you're going to use the items quickly enough, this may carry some weight.

When thinking about the bottom line, remember that your work can either generate revenue or reduce costs; IT departments usually do more of the latter than the former, but both help the company's overall financial picture.

6. Wrapping Up

A few final thoughts, mostly on why budgeting is a worthwhile activity.

First and foremost, if you don't prepare a budget, someone else will do it for (to?) you; you almost certainly won't like their budget as much as one you prepared, even if you have to make deep cuts in yours before the end. Also, the only way the projects you want to work on will happen is by having the funding for them approved.

Budgets are planning tools that force you to think about what you will be doing in the next year, and why. Thinking and then acting almost always succeeds better than reacting; budgets force you to think.

Budgets make the actual purchasing easier. When it comes time to get a particular purchase requisition approved, all you have to do is refer back to the budget for all justifications, specifications, and costs. If your manager or someone up the line balks at the purchase, you've got the budget to back you up. You may still have to discuss it again, but the only question should be whether circumstances or plans have changed since the budget was approved. Unless there's been a major change in the company's focus, the reason to purchase the item should still be valid. Whether management lets you restrict the discussion this way is something for which we can only hope.

About the Author

Adam Moskowitz has been a programmer, system administrator, technical lecturer, architect, manager of system administrators, and consultant for over 25 years. He has written or helped write budgets for thousands of dollars as well as for millions. His employers and clients include LION Bioscience Research, Genome Therapeutics, Interval Research Corporation, AT&T—Research, OSF Research Institute, BBN Communications, Microtouch Software, and Johns Hopkins Hospital. Although he tries to avoid being a manager whenever possible, he prefers to be involved in the budgeting process because "I'd rather do it myself than have someone else do it *to* me."

Adam has written various articles, book reviews, and in the far-distant past, a paper on the design of a sub-micron ion lithography system.

Adam lives near Boston, Massachusetts, and is a certified as a barbecue judge by the Kansas City Barbecue Society. He claims to work with computers only to support his cooking habit.