



CHAPTER 2

BUILDING A BUSINESS CASE FOR VOIP

*To leap or to hide –
Trust evidence to decide;
Faith makes risky guide.*
—James Coggins

This chapter explains how to build a business case for VoIP. It points out some of the benefits that VoIP can provide and discusses how to analyze *return on investment* (ROI) for VoIP implementation and management.

A VoIP Business Case

A business case for investing in a VoIP implementation requires evaluation of the associated ROI. VoIP offers many potential benefits, including reduced costs, new features, and converged networks. However, some of these benefits may be more hype than reality.

Planning is important for a successful VoIP implementation. The planning involves evaluating the costs and benefits associated with the implementation and anticipating possible pitfalls. Understanding the most appropriate insertion points for VoIP within an organization also plays a critical role in how significant the ROI can be. The most important questions to think about during your planning include the following:

- What kind of return should you expect from an investment in VoIP?
- What are the key factors to consider when analyzing VoIP ROI?
- What deployment scenarios (greenfield, Centrex replacement, and so on) are most likely to provide a positive ROI?
- Because management of VoIP components—networks, servers, and phones—is critical to your VoIP investment, what ongoing management resources are necessary to ensure continued success after initial deployment?

The VoIP industry has matured rapidly. The technology has advanced in less than a decade from small pilot projects and test environments to large-scale deployments in many enterprises. As new technology is adopted, it goes through a predictable process, described by Geoffrey A. Moore in his book *Crossing the Chasm*¹ and shown in Figure 2-1. There is an initial period where pioneers tend to ignore ROI because they want to deploy the technology, which gives them a real or perceived technological advantage. For example, Cisco was an innovator and

early adopter of the VoIP technology that it produced. Inside Cisco, all employees have IP phones on their desks for everyday use.

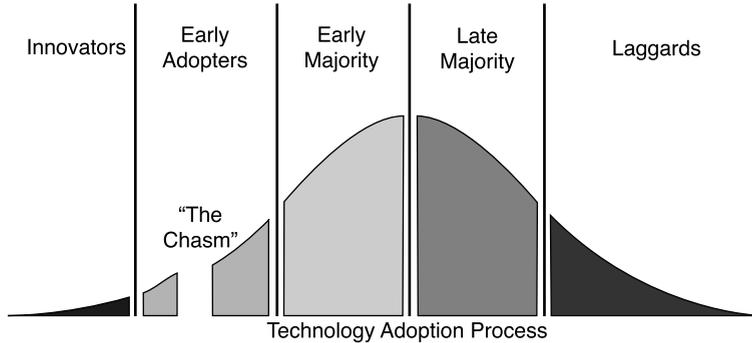


Figure 2-1 *Technology Adoption Process, from Moore's Book Crossing the Chasm*

VoIP appears to have “crossed the chasm,” moving past the Early Adopters phase and into the Early Majority phase. The question of VoIP adoption has shifted from if to when. A 2001 study found that “90% of enterprises with multiple locations will start switching to IP systems for voice over the next 5 years.”² Early Majority users are more cautious about expending capital on still-evolving technologies. They therefore prefer to wait until a technological innovation has a positive track record. In the Early Majority and all later phases of a new technology, it is difficult to ignore ROI and important to build a business case before making a purchase.

The benefits of VoIP can be measured in different ways. Bottom-line cost savings are fairly easy to quantify. Other VoIP benefits, such as productivity improvements, are more difficult to quantify in terms of ROI. These types of benefits sometimes require a leap of faith or intuition about potential results. The next section examines the potential benefits of VoIP in more detail.

VoIP Benefits and Obstacles

VoIP enthusiasts promise many benefits over the traditional PSTN. A great deal of industry excitement has been generated about the potential cost savings, the new calling features, and the reduced infrastructure of converged networks in a VoIP implementation.

There are two main types of benefits to VoIP—hard benefits and soft benefits. *Hard benefits* come with a clearly-defined cost savings. For example, replacing a PBX with a VoIP server may save a company a specific amount of money every year. On the other hand, *soft benefits* don't necessarily save money, or, if they do, they don't always save an easily calculated amount of money. But they have the potential to affect the bottom line in the future if, for example, your decision to innovate with unified messaging today means that your company is ready to make another technological leap in the future. Although both types of benefits are critical to the final ROI, most organizations focus more on the hard cost savings, because they are easier to quantify. Oftentimes it is appropriate to clearly differentiate between hard and soft benefits to improve the credibility of the business case with financial decision makers. The next section takes a closer look at three broad categories of VoIP benefits: cost savings, new features, and convergence.

Cost Savings

Expenses are almost always a driving factor in IT spending decisions. You or your boss has probably asked, “How can we do business more efficiently, with lower costs?” Cost is no less a factor if you are looking at a VoIP implementation. The cost of VoIP can be intimidating, with the need for plenty of new equipment (remember the components discussed in the introductory chapter?) and possible infrastructure upgrades. A large initial capital outlay can be cost prohibitive for some organizations.

However, these likely costs should not scare you away. Many companies are now offering equipment-leasing plans to reduce the initial capital outlay and let you spread the expense over several years. It is also a good idea to stage the deployment gradually as a means of easing the costs. Each organization generally

has a variety of sites. These sites could be small branches, regional offices, or global headquarters. They could be new facilities or existing facilities that require a replacement for their current PBX. The ROI for VoIP is often different across these different site types and deployment scenarios. Many successful VoIP implementations recognize these differences and use them to guide their insertion strategy for VoIP.

The best approach to a VoIP implementation is to view it as an investment; it is intended to provide returns in capital and productivity savings. The cost savings from VoIP are likely to occur in several areas. Figure 2-2 shows a good estimate of where you can expect to gain the savings.

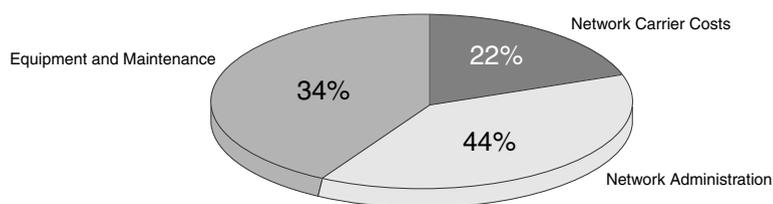


Figure 2-2 Contribution to VoIP Cost Savings

From “The Strategic and Financial Justifications for Convergence,” Cisco Systems white paper, June 1, 2001 (http://www.cisco.com/warp/public/cc/so/neso/vvda/iptl/cnvrng_wp.htm).

The following sections consider these cost savings as they apply to capital, expenses, and productivity.

Capital and Expense Savings

When VoIP technology first appeared, a major enticement was “free phone calls.” It has been said that there is no such thing as a “free lunch,” but is there indeed a “free VoIP phone call?” Sort of. In the PSTN, the network is owned by the telephone provider. When you make a call, you are billed for the usage of this network. Long-distance costs can vary depending on the distance called (location of caller and callee) and the time at which the call occurs. And long-distance telephone calls can be a major line item in an organization’s budget. In a VoIP

implementation, the network is an IP network, and calling distance does not matter. If you own the IP network or are already paying an *Internet service provider* (ISP) for bandwidth, then VoIP employs an infrastructure that is already paid for, so VoIP calls could be considered free.

Long-Distance Service Savings

Long-distance rates on the PSTN have decreased dramatically over the same years that VoIP has matured. Assessing the cost of long-distance service is complicated because different rate structures apply to different types of calls. If you call inside your local area, one rate may apply, whereas another rate may apply to calls beyond this area. Yet a third rate may apply to calls that cross national boundaries. Throw in the myriad wireless calling plans with free long distance, and the cost savings from VoIP may be difficult to gauge.

Consider interoffice calls. Nowadays, large corporations typically find themselves with offices or supply chains spread out over many geographical locations, in countries all over the world. What is the cost of telephone communications with these offices and suppliers? To calculate this cost, you need to know how many telephone lines or how much call bandwidth you have going in and out of each office, and your typical long-distance bill. Depending on the configuration of your network and the locations of the calls you need to make, your long-distance tolls could plummet after implementing VoIP. After all, there is no distinction to be made on a data network between an international link and a regional link.

Bypassing the PSTN and making telephone calls on an IP network is referred to as *toll bypass*. Toll bypass occurs when a PBX or an IP PBX is connected to a VoIP gateway, which is then connected to an IP network, as illustrated in Figure 2-3. The call traffic goes from the PBX to the VoIP gateway instead of from the PBX to a PSTN switch, thus avoiding the toll, or cost of using the PSTN. As a result of the PSTN toll rate structure, companies with a large number of

international sites are likely to see more cost savings from toll bypass than companies that make most of their calls within the United States.

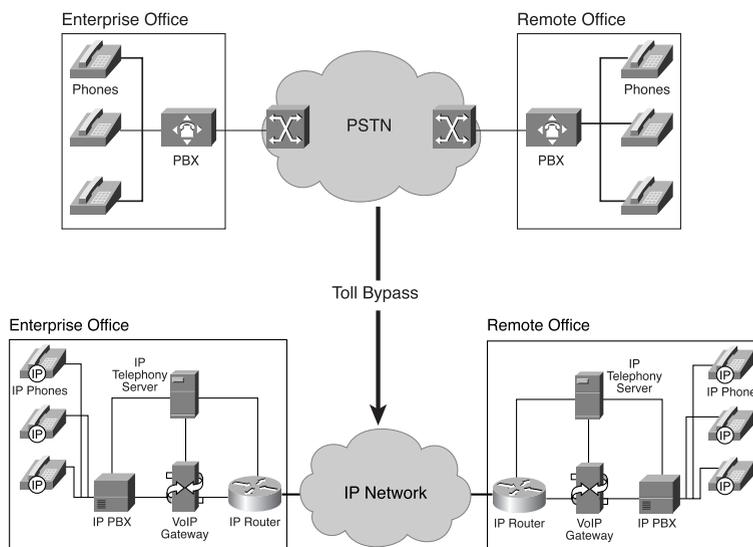


Figure 2-3 Toll Bypass

Savings may not be immediate or automatic, however. Many organizations should not convert to VoIP completely, or all at once. The PSTN lines may still be needed for some time during the migration phase, and some companies may want to keep the PSTN as a fallback network. But, in most cases, the long-distance costs associated with PSTN usage should decrease after a VoIP implementation.

Single Network Infrastructure Savings

The popular acronym KISS—*Keep It Simple, Stupid*—applies to your IT strategy. Maintaining separate network infrastructures is neither simple nor cheap. VoIP offers a single network infrastructure built on an IP network. How does this result in savings?

- A single network can lower the cost of network ownership. Instead of buying or leasing a PBX and network infrastructure for PSTN calls, you can spend the money on IP network infrastructure. Both voice and data traffic can take advantage of the enhancements. These savings allow VoIP to provide a lower total cost of network ownership.

- Similarly, VoIP can provide a reduced *incremental* cost of network ownership. For example, what is the current per-user cost for phone service? How does adding a new user affect this cost? Adding an additional user to a traditional PBX system may require upgrading to a new PBX with greater capacity, thus increasing the per-user cost of the system. By contrast, most campus LANs have nearly unlimited capacity, allowing a new VoIP user to be added at a reduced per-user cost. Incremental costs also extend to the addition of new corporate offices, which can often be easily and cheaply added to a VoIP-enabled data network.
- A single network is easier to expand and change. Consider this scenario: You have 10 T1 links for your PSTN traffic (supporting up to 240 calls) and a DS3 link for your data traffic. (As mentioned in Chapter 1, a DS0 link, with 64-kbps capacity, is a standard building block of the PSTN. A DS3 link has a 44.736 Mbps capacity.) The T1 links are operating at maximum capacity, but your DS3 link has plenty of bandwidth available. Your organization is growing. Instead of purchasing another T1 link for the increased call volume, moving to a VoIP implementation would let you use the available capacity on the DS3 link to carry additional voice traffic.
- A single network offers reduced wiring costs, especially in new construction. Instead of wiring for both data and voice, you pull one set of wiring. Wiring for both voice and data can be accomplished in many different ways, so proceed carefully. For example, you never want your IP phone and computer to share a hub; if you run a database query while you are on the phone, you could get reduced call quality. Such trade-offs are discussed in more detail in Chapter 5, “Quality of Service and Tuning.”
- A single network can easily incorporate wireless infrastructures. Wiring a home or office for a data network can be expensive, so many organizations are turning to wireless networks using 802.11 technology. These wireless LANs support IP network applications readily, making VoIP easy to implement in this type of environment, but there are trade-offs with regard to security and potential performance issues.

- Several VoIP manufacturers offer centralized call-processing architectures. Centralized call processing enables an organization to consolidate its core call-processing equipment in one or several sites and then extend voice services to each site within the organization. For many firms, this enables them to remove PBX and key systems from each site with the enterprise while providing similar and oftentimes superior features and functionality to the branch sites. Centralized call processing is a compelling method to reduce equipment, maintenance, and support costs. It also enables many organizations to standardize the voice services that they deliver to their employees. Instead of requiring internal or outsourced resources to manage each PBX or key system, a centralized team can now manage the entire organization's voice services from a single site.

Productivity Savings

Another set of quantifiable benefits in a VoIP implementation involves savings due to productivity improvements in your IT operations. When you are thinking about moving to VoIP, be sure to consider what the new demands will mean to your IT staff, who may already be overloaded. At first glance, it may seem to be a paradox—that rolling out VoIP could offer IT savings, both for capital and staff. However, a VoIP implementation can bring IT staff savings in several areas, as discussed in detail in the following list:

- **Management and support savings**—For a traditional PBX phone system, you need one staff to manage the telephony system and another staff to manage the data network. With a VoIP system, these jobs usually merge. The convergence of infrastructure may make it feasible to reduce the internal staff required for support and management of the two separate infrastructures. However, these savings may come with a high initial cost for training. Managing a converged network requires a consolidation of skills. VoIP thus requires significant training for the data-networking group learning telecom skills, or for the telephony group learning data-networking skills. One way to try to estimate the training costs associated with VoIP is to compare a VoIP deployment to the rollout of other business-critical technologies. For example, the move

from office memos and “snail mail” to an e-mail system was quite a leap technologically and required extensive training to deploy and manage. A VoIP deployment has similar characteristics.

- **Maintenance, upgrades, and additions**—Each time a new user is moved, changed, or added to the voice network, an organization incurs a cost. This cost can be as high as \$150 per move, add, or change. In one estimate, these actions accounted for as much as 14 percent of an IT budget. VoIP uses IP protocols such as *Dynamic Host Control Protocol* (DHCP) to allow IP phones to automatically reconfigure themselves when moved from one location to another. Employees can move their own phones, potentially saving thousands of dollars per year. In addition, adding and changing phones become simpler, because they can often be accomplished via a software application instead of a visit by a technician. An interesting development driven by the enhanced mobility of VoIP is that many organizations are now able to move their employees more frequently to better align them with the changing dynamics of the business.
- **Enhanced mobility**—Some vendors of VoIP offer number portability. This lets individuals log in to any phone within the organization and still have their extension number (and any applications or services they use) available to them even though they are away from their desk. This enhanced mobility lets many organizations institute more flexible work environments that allow them to reduce facilities and real estate costs, while increasing employee productivity and morale.
- **Reduced site preparation time**—The need to string only one set of wires has also allowed many organizations to reduce the time it takes for them to set up new sites. In certain industries, this new capability is driving significant cost savings and even revenue growth.

When analyzing the cost savings that a VoIP implementation can provide, consider this important reality: Because end users don’t see cost savings directly, they are less tolerant of reduced quality or reduced reliability. Employees in your sales department may not care that the company is saving two cents per minute on VoIP calls if their sales productivity is decreasing because of poor-quality calls or dropped calls.

New Features

New applications and features offer productivity improvements for both end users and IT staff. The benefits offered by new applications and features are not easily quantifiable, but arguably offer some of the most compelling reasons to consider a VoIP implementation.

VoIP technology vendors have been looking for the killer applications to drive the enablement and deployment of their products. Do new features imply new revenue for businesses that deploy VoIP? It is possible. Consider the following: VoIP allows for easier integration of voice with other applications. For example, web commerce applications offer voice as a means of helping customers place orders or talk to a customer service agent. Consider pithy business statistics like these: “A 5% improvement in customer loyalty can improve profitability by 40 to 95%”³ and “Cutting customer defections by just 5% has the effect of boosting profits between 25% and 95%.”⁵

Here are several examples of new applications and features that VoIP can enable:

- **Unified messaging**—This widely anticipated VoIP application is starting to pay dividends. Now that many vendors are offering voice mail, e-mail, and fax integration, users are beginning to take advantage of unified messaging systems. The ability to retrieve your messages anytime, anywhere, and in any way makes unified messaging systems an appealing productivity booster. A 2001 study found that unified messaging can provide 25 to 40 minutes of added employee productivity each day.⁴ Productivity improvements come as employees reduce the time they spend retrieving messages and faxes from the home office, as well as the sometimes-lengthy search for an Internet connection to check e-mail while on the road. With expanded options for working from home, employees who once had to face a tough choice when they needed to care for a sick child can now complete more of their work without being in the office.
- **Advanced call routing**—Communicating with employees and customers in an increasingly mobile workforce and global economy can be difficult. “Phone tag” is a common inconvenience, as are time zone disparities. Advanced call routing features can help eliminate phone tag and provide better support for a remote workforce. Now employees working at home can have their business calls routed to a home

telephone. And call routing can also include integration with *customer relationship management* (CRM) systems to look up customer information and route support calls to the appropriate technical support group.

- **Integration into business applications**—The ability to chat directly from one computer to another has widespread appeal, as statistics indicating the popularity of *instant messaging* (IM) applications reveal. Instant messaging provides some of the immediacy of a telephone conversation, an immediacy that is lacking in e-mail communications. *InformationWeek* found the following: “The total minutes U.S. workers spent using the top three instant-messaging applications—from AOL, MSN, and Yahoo—increased 110% from 2.3 billion minutes in September 2000 to 4.9 billion in September 2001.”⁶ It also noted: “The number of unique users of instant-messaging applications in the workplace also jumped 34%, from 10 million in September 2000 to 13.4 million in September 2001.”⁶ Microsoft Windows Messenger, which enables instant messaging, also has VoIP capabilities. The possibility is enticing: chatting with someone in an IM session, then clicking a button and calling that person with voice, video, and text communications all integrated into a single application.
- **Easier to add new features**—New features can be added to a VoIP implementation much more quickly and easily than to a traditional PBX. Traditional PBX systems, being proprietary in nature, tend to leave the addition of new features to the discretion of the PBX vendor. VoIP systems are built from common “off-the-shelf” subsystems. They can take advantage of client/server architecture, open development platforms, and well-known standards to speed deployment of new applications and features.

Many experts believe that more productivity applications are just around the corner. For example, Kevin Tolly of The Tolly Group, Inc. observes, “The infrastructure needs to be in place before software and application developers have any incentive to be inventive. Voice-over-IP application development will no doubt rise steeply as the number of converged networks increases.”⁷

Convergence

The consolidation of different types of application traffic on the same IP network is known as *convergence*. Putting voice, video, and data on the same network is a common example of convergence. Earlier in the chapter some of the tangible returns from convergence were examined—single network infrastructure and management savings. Does convergence offer any other benefits that are not as easily seen?

Convergence just makes too much sense not to happen. A single scalable network infrastructure that provides for all of your business communication needs offers cost and management savings. It is not going to happen overnight, but it is best to at least start thinking about it now. The question of convergence is no longer “if it will happen” but “when it will happen.” Within the next few years, look for a majority of enterprises to be in the middle of converged network projects. Figure 2-4 shows the percentage of companies that are implementing converged network projects.

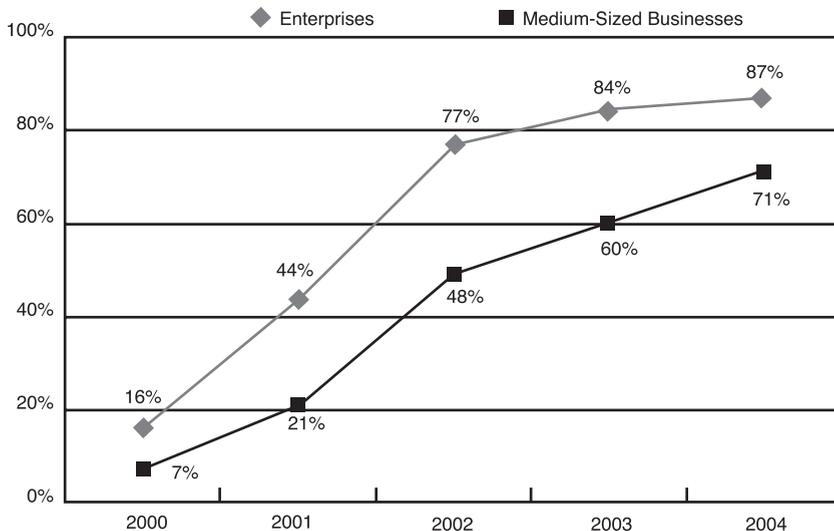


Figure 2-4 Percentage of Companies Implementing Converged Network IP Telephony Projects

From “The Strategic and Financial Justifications for Convergence,” Cisco Systems white paper, June 1, 2001 (http://www.cisco.com/warp/public/cc/so/neso/vvda/iptl/cnvrg_wp.htm).

Voice is the easiest step in convergence because of its relatively low bandwidth requirements. After a VoIP implementation, the next step toward convergence would be to put video on the network. In many corporations today, video represents a third network infrastructure beyond voice and data. This third network infrastructure consists of dedicated ISDN lines that link conference rooms together for videoconferencing. Video streaming is also growing in acceptance for uses such as corporate training and distance learning. Adding video traffic to an IP network can reduce the need for an additional video network infrastructure and provide further benefits in a converged network.

Obstacles

A discussion of VoIP benefits would not be complete without consideration of the downsides or potential obstacles in a VoIP implementation. The major downsides for VoIP are cost and business risk. As mentioned earlier, the cost has to be considered as an investment. And, as you see in this section, the business risk can be reduced with proper planning and good management.

Cost and Capital Investment

The initial cost of VoIP can be high, if you start with a large project. You have to buy new network equipment, servers, IP phones, management software, and diagnostic tools. In addition, a complex network infrastructure upgrade may be required, because your current network infrastructure may not be tuned to handle VoIP adequately. Good voice quality places strict requirements on the VoIP network traffic, in terms of latency, jitter, and number of lost packets. These topics are discussed in more detail in later chapters, but for now, you should recognize that a complex network infrastructure upgrade may be required to provide quality levels comparable to those of PSTN calls.

Training also has a cost, and VoIP requires extensive training for the IT staff and users. The necessary consolidation of skill sets between the telephony and data-networking groups has already been mentioned; staff may require a whole series of costly coursework. VoIP is a relatively new technology, and personnel with the skills required for successful deployment and management may be difficult to find and expensive to hire.

Business Risk

Quality and reliability pose potentially the biggest obstacles to VoIP. This book was written to help you find ways to reduce the risks, but quality and reliability have been a concern since the introduction of VoIP. With the PSTN, you rarely have to worry about these issues. You and the rest of your organization are used to “five nines” of reliability. A converged IP network consolidates voice and data traffic onto one complex subsystem (which probably includes PSTN fallback). Today, if your data network goes down, you can at least call the IT group and report the failure. Although it is unlikely that an entire network will fail, you need to consider what happens if elements of a converged network go down.

There is also the concern about stepping into the unknown. When you begin a VoIP implementation, you won’t necessarily have all the answers in place. To some extent, you will be learning as you go. However, VoIP implementations have been done thousands of times before. Although the specific details for your organization might not be known, established IT project principles, such as proper planning, assessment, and management, will carry you through. Treating VoIP as an IT project is discussed extensively in the next section.

Analyzing VoIP ROI

Managers considering VoIP in their organizations are often asked to “show their numbers.” What is the cost of successfully deploying VoIP, and what is the likely return on that investment?

Two examples of VoIP deployments and their positive ROIs were related by Cisco to *Unified Communications Alert*, which reports as follows:

- “H.B. Fuller Company, a worldwide manufacturer and marketer of specialty chemicals, expects to save approximately \$2 million over five years from a roll out of 3000 IP phones along with Cisco Unity unified messaging. H.B. Fuller says the primary ROI drivers are the reduction of \$60,000 in annual network administration and training costs, significant annual savings in inter office calling charges, a \$52,000 reduction in

wiring costs at one site alone, and the elimination of 85% of costs associated with PBX upgrades. In addition, H.B. Fuller expects to save \$37,000 annually in moves, adds and changes costs.”

- “[F]or Cray Inc., the global market leader in supercomputers, a deployment of 650 IP phones is said to have generated a seven-month payback on investment and a 33% productivity increase in network support. Cray says it was able to save \$30,000 in the first year in costs it would have absorbed due to moves, adds and changes with its previous PBX system. In addition, it is saving \$25,000 annually in inter-office calling costs now that it has converged voice onto its enterprise network. Cray notes that when it compared the cost of Cisco’s telephony and data gear to the cost of selecting a PBX, the up front costs were equal. But it was when factoring in additional operating costs and productivity benefits that Cray made the purchase decision to go with an IP/PBX.”⁸

A VoIP deployment should be addressed through the same decision-making process as any major IT project. The steps involved in putting together such a project are reviewed in this section. The final section of this chapter circles back to show you where to start your first VoIP projects—in situations where your ROI is likely to be good.

Treating VoIP as a Major IT Project

Consider a VoIP deployment a major IT project. Good IT managers are familiar with what is involved in pulling off a successful, staged IT project. Like any such project, VoIP involves rolling out a major new data-networking application, along with the hardware and infrastructure to support it. The project should be staged and budgeted throughout its life cycle.

IT project life cycles are typically illustrated using a PERT or Gantt chart. These charts are common in project scheduling; they show tasks and the resources assigned to the tasks over time. Every IT project goes through similar stages during its life cycle. The stages have different durations, different costs, and

probably use different tools and personnel. Figure 2-5 shows a high-level view of the chart for a major IT project.

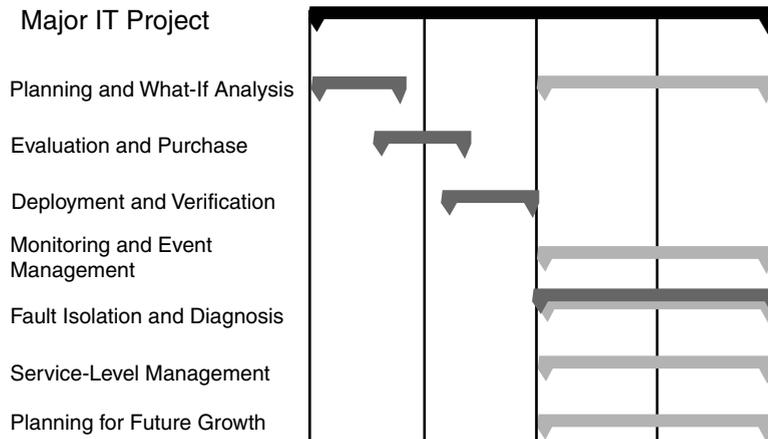


Figure 2-5 IT Project Life Cycle

To deliver and maintain excellent application service, you need to be involved from the beginning of the life cycle of a project. For each major project you undertake, you will likely find several different tasks that you need to address, tasks similar to the ones discussed in the following sections.

Getting It Going

The first steps in a major project entail upfront planning—deciding what you need and what you are going to buy to meet that need. Then it is time to get everything installed, running, and integrated.

- Planning and what-if analysis**—Any time you embark on a major project, it is important to know where you are starting from. That way, you will have a better idea of what is involved in reaching your target. And you don't want to make a change that will result in an overall reduction in the quality of the services you have been providing. With VoIP, you are probably deploying new software, using new network devices, and generating new network traffic. You should therefore

consider the following questions: Is the existing network ready? What might happen to the applications currently running on the network? How well will the VoIP traffic perform? What happens if the network goes down?

Before you get started, assess how ready your network is in its present state. That way, you have a better idea of what you have to purchase, and you know what to expect performance-wise when you have finished. And it is a good thing to be able to show your users and management what they can expect, along with the benefits they will receive from the new project.

- **Evaluation and purchase of equipment, software, and services**—This stage is sometimes known as the bake-off. When you are evaluating products from multiple vendors, it is vitally important to run consistent, repeatable tests—to compare apples to apples. Vendors often cite performance statistics using different metrics. For example, a network device’s throughput might be measured as the maximum data rate attainable with zero percent data loss, or as the average data rate realistically achieved by an application. When you are making purchasing decisions on which a significant portion of your budget is riding, testing is also vital to verify that each vendor’s products will interoperate in your network with your current equipment.
- **Deployment and verification**—A networking team that is familiar with transaction-oriented applications will be challenged as it deploys multimedia applications like VoIP. The team may discover that its IP routers are not configured properly only after verification testing points out slowdowns or failures. It may discover bandwidth limitations only after users complain. And it may discover impacts on other applications only after it has to field new help desk complaints. You’d like to replace this thankless firefighting with the kind of proactive management that leads to user satisfaction, right from the start of a staged roll out. Proactive management is discussed in the next section and in much more detail in Chapter 6, “Ongoing VoIP Management.”

Keeping It Running Well

VoIP management involves ensuring the reliability of telephone calls (how well you are reaching your “five nines” uptime target) and the quality of the telephone calls (whether phone calls sound as good over the IP network as they do when using the PSTN). The two goals may encompass hundreds or thousands of components, including the following:

- The contents of the data network along the path between the parties in a conversation, including routers, switches, *network interface cards* (NICs), and cabling
- The range of telephony components, including the VoIP servers and their hardware and software
- Whatever the users come in contact with, including IP phones, desktop computers, and their software and configuration

In the past, managing telephone systems has been relatively straightforward, compared to managing VoIP. Those in the telephony community are accustomed to managing costly, high-quality devices that use dedicated telephone wiring. Their management activities were more like expensive insurance—having a specialist to call if something ever went wrong, someone who visited the key hardware a few times a year to install the latest updates.

With VoIP, the management activities need to be proactive, as they must be with other IT applications. These management activities can be categorized as follows:

- **Monitoring and event management**—With the complexity of today’s applications and networks, many products let you monitor the performance of specific devices, LAN segments, or applications. Many of these products, however, cannot tell you the level of quality or performance your users are experiencing. For most enterprises, network performance is vital to the success of the business as a whole. And, of course, telephone service is perhaps the most vital application of them all.
- **Fault isolation and diagnosis**—When applications and networks consisted of terminals accessing mainframes, problem determination was much easier. Now, with a mix of protocols, applications, and dispersed intelligence, your job is much more difficult. If a user is unable to get a dial tone, is the server or the network at fault? You need to make this top-level decision quickly, because you often have different teams who specialize in either network or application troubleshooting.

- **Service-level management**—Users need to be as happy as you are with the level of service being offered. *Service-level agreements* (SLAs) provide a standard for the actual performance you are delivering.
- **Planning for future growth**—Establish trends showing the network behavior and performance over time, so you can tune your existing infrastructure and plan future investments. As you need to grow or change your existing system, you return to the top of the life cycle chart again, doing planning and analysis for the improvements.

To keep the VoIP system running well, you want to report on what is happening across the many components involved. You want to evaluate their performance and capacity, and see what the trends indicate. The trends can change quickly: Adding more users may result in many more calls on the network. A new business plan for your sales team also can change traffic patterns. The call volume during peak periods can rise dramatically, beyond original expectations. These kinds of changes drive the need to include good benchmarking and ongoing assessment as part of day-to-day VoIP management.

Project Dependencies

Your VoIP project may have dependencies on other IT projects. *Quality of service* (QoS) is a requirement for VoIP, and a network infrastructure upgrade to support QoS may be a prerequisite for a VoIP deployment. Different teams could be handling the network upgrade and the VoIP roll out. Careful planning and coordination will be a necessity to keep the projects on track.

Try to keep things simple. Take each high-level task in the project and break it down into subtasks. If you can reduce the dependencies, then do so. A VoIP deployment is complicated enough by itself.

Now that you have seen how to apply IT project principles to your VoIP project, it is time to discuss how to estimate the ROI for this project.

Estimating Investments and Returns

A return on investment is calculated by taking the expected returns from a project, subtracting the cost of implementing the project, and dividing by the amount of time required. The divisor is usually given in years, so that the resulting units are measured in annual ROI.

An economical way to begin calculating ROI is with a spreadsheet. Start by roughing in the costs and the expected returns. The savings and returns are often spread out over many months or years. Most fields contain “guesstimates” initially, but they give you a place to start and a set of questions to ask vendors and service providers. Figure 2-6 shows an initial spreadsheet for calculating ROI. The contents of the “Total Costs per Year” row are broken down in Figure 2-7; the “Total Returns Per Year” are described in Figure 2-10.

Accountants understand that money spent on a VoIP project might have been spent elsewhere, with a different potential return. The simple approach illustrated here does not itemize the time value of money; consider adding rows for it, as necessary.

	A	B	C	D	E
1	VoIP ROI Estimate	Year 1	Year 2	Year 3	
2	Total costs per year				
3	Total returns per year				
4					
5	Net return on investment, per year				
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Figure 2-6 A Basic ROI Model: Total Costs Subtracted from Total Savings, from Year to Year.

Don't assume that you are starting on your ROI estimate blindly. Draw on your past IT project experience. Look at other, similar IT projects where you have rolled out major applications. For example, look at your first staged e-mail deployments or review the implementation of your *customer relationship management* (CRM) system. The seven project stages discussed previously will have occurred during these previous projects. Using these past projects for guidance, do your ROI analysis with your own internal data. Be careful of drawing numbers from industry averages, because your company may be different.

Incidentally, depending on the vendors you are evaluating, there are mature software tools available to help you calculate VoIP ROI. For example, Cisco customers can work with their account representative to use the *Cisco Converged Network Investment Calculator* (CNIC).⁹ Customers of Infonet's *Global Multimedia Service* (GMS) have access to a similar tool.¹⁰

Investments

Recent literature on implementing VoIP often provides information about the savings, but rarely includes details on the associated costs. That is a symptom of being in the early stages of the technology-adoption process. VoIP has matured considerably, and the staging of a VoIP project is now well understood. Calculating costs is therefore amenable to a detailed breakdown that shows budgeted costs.

A first pass at such a breakdown might simply be to add up the costs of hardware, software, bandwidth, and personnel. That is the right idea, but those can be complex numbers to just type right into a calculator. Instead, construct a spreadsheet in which the rows represent the major stages of the project and the columns represent time periods. On the first page of the "Cost" section, show the time periods by years, as shown in Figure 2-7. On the underlying pages, which make up the individual cells, it is a good idea to show the breakdown by quarters, because that time frame may more closely correspond to your budgeting process.

The screenshot shows a Microsoft Excel spreadsheet titled "Microsoft Excel - Taking Charge of your VoIP Project.xls". The spreadsheet has a menu bar (File, Edit, View, Insert, Format, Tools, Data, Window, Help) and a toolbar with various icons. The active window is "VoIP Project Cost Estimate". The spreadsheet layout is as follows:

	A	B	C	D	E
1	VoIP Project Cost Estimate	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	
2	Planning and What-If Analysis				
3	Evaluation and Purchase				
4	Deployment and Verification				
5	Monitoring and Event Management				
6	Fault Isolation and Diagnosis				
7	Service Level Management				
8	Future Planning				
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Figure 2-7 First Step in Reviewing Costs of the VoIP Project Stages over Time

Behind each cell in Figure 2-7, you will have essentially another spreadsheet, broken down quarter by quarter. For example, consider the first row, the “Planning and What-If Analysis” stage. This is clearly the first set of items to consider.

What-if analysis first involves training the key members of your IT and telephony teams about the technology and implications of VoIP. Second, it involves decisions affecting the scope and additional costs of the project, including the questions “Where do you want to deploy VoIP?” and “What new features do you plan to take advantage of?” Third, it involves some testing and evaluation. For example, when you assess the current state of your data network, you need to determine what changes are necessary to accommodate VoIP traffic. Doing an assessment has a cost in terms of the time and material needed to do it. And you will have many meetings and many assignments for those attending the meetings; how is their time accounted for? Finally, this is probably a good time to get outside, expert assistance from folks who have done this before, so you need

to include a budget for consulting. An example of the costs for this first stage is shown in Figure 2-8.

	A	B	C	D	E	
	Planning & What-If Analysis	Year 1 Q1	Year 1 Q2	Year 1 Q3	Year 1 Q4	Y
1	Planning & What-If Analysis					
2	Personnel costs					
3	IT employee costs					
4	Training					
5	Capital expenditures					
6	Hardware					
7	Software, Licenses					
8	Other Capital					
9	Outsourcing expenses					
10	Consultants					
11	Systems Integrators					
12						
13						
14						
15						
16						
17						
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19						
20						

Figure 2-8 For Each Stage, Look at the Costs for Each Component per Quarter. Roll This Information Up into the Annual Costs

The next stage, after you have envisioned the outlines of your first VoIP deployment, is where you decide what equipment to acquire and how it might best be configured. Figure 2-9 shows the “Evaluation and Purchase” stage. In this stage, the budget for hardware and software will probably be considerably higher than for other IT projects. This is also the project stage where you initiate a small pilot deployment, which introduces training for end users and the help desk team. Again, you need to consider any pilot deployments in the budget.

The screenshot shows a Microsoft Excel spreadsheet titled "Microsoft Excel - Taking Charge of your VoIP Project.xls". The spreadsheet is set to the "Evaluation & Purchase" worksheet. The columns are labeled A through F, and the rows are numbered 1 through 20. The data is organized as follows:

	A	B	C	D	E	F
1	Evaluation & Purchase	Year 1 Q1	Year 1 Q2	Year 1 Q3	Year 1 Q4	Yes
2	Personnel costs					
3	IT employee costs					
4	IT staff training					
5	End-user pilot training					
6	Help Desk personnel training					
7	Capital expenditures					
8	Hardware					
9	Software, Licenses					
10	Other Capital					
11	Outsourcing expenses					
12	Consultants					
13	Systems Integrators					
14						
15						
16						
17						
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20						

Figure 2-9 *The “Evaluation and Purchase” Stage Probably Involves a Pilot Program, Which May Be the First Time End Users and the Help Desk Get Directly Involved*

Continue planning for these kinds of steps for each stage of the project. Following the “Deployment and Verification” stage, you will surely need some new tools to help you monitor, manage, and verify the health of your new system. You also need to invest in training your IT crew to use these new tools. But remember that some or all of these steps in your project may be completed by a systems integrator or VoIP consultant, and you need to understand their initial and ongoing costs.

Returns

On the other side of the ROI formula for VoIP are the returns you expect to realize. As discussed at the beginning of this chapter, these may well consist of

productivity improvements for your end users, improved profit due to improved customer satisfaction and increased sales, and expense reductions for the teams maintaining the telephony and data-networking infrastructure. Figure 2-10 shows the opening page of the “Returns” section of your spreadsheet.

	A	B	C	D
1	VoIP Project Returns Estimate	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
2	End-user productivity improvements			
3	Customer satisfaction and retention			
4	Expense reductions			
5	IT capital savings			
6	IT recurring costs			
7	IT staff productivity improvements			
8	Telephony capital savings			
9	Telephony recurring costs			
10				
11				
12				
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Figure 2-10 Returns from Investment in VoIP Are Found in Several Areas of Organization

Be sure to separate the returns experienced by the end users—who are actually conducting your business better or faster—from those experienced by the IT and telephony staffs—who are reducing their costs or supporting your end users better or faster.

End-user productivity improvements were discussed in detail in the “New Features” section of this chapter. These include the use of unified messaging or advanced call routing, the integration of telephony into end users’ day-to-day business applications, and the fact that end users can become more mobile more quickly.

A separate consideration is how your organization's end users might respond to your customers better. VoIP is often driven by a business unit wanting to improve levels of customer satisfaction. Plenty of evidence suggests that high customer retention positively influences profit. Strong, fast interconnection between the telephone system and the CRM, which VoIP can offer, positively influences customer retention. And any time customers find it easier to contact a representative, who may be on the road or working from home, they experience a more positive interaction with your company and your brand. VoIP's easy call-forwarding mechanisms can make a representative's physical location completely transparent to a customer.

Savings realized from improved productivity might be difficult to calculate in advance of a VoIP implementation. In that case, you might want to focus initially on cost savings, which are easier to predict. There are extensive savings to be achieved by the IT and telephony staff, as discussed in detail earlier in the "Cost Savings" section of this chapter. The savings relate to getting down to a single common infrastructure, constructed from low-cost, industry-standard components and managed by a single team.

Finally, consider how to factor in the advantage of taking the first step toward network convergence. Data networks serve the applications that use them. New applications are making the design and management of networks much more complex. More and more, the different kinds of traditional networks—in particular, telephone, radio, television, and computers—are converging onto packet-switched IP networks. The original networks arose because users and applications had very specific requirements. For example, two-way telephone conversations take little bandwidth but must have low latency, simulating face-to-face speech. By contrast, television requires a great deal of bandwidth, but because it is a one-way broadcast, it has no concerns about latency. These conflicting requirements must be honored in the new converged networks.

VoIP is probably the simplest step on the path to convergence. It brings with it the hard network-tuning lessons required by multimedia applications (such as low latency and low packet loss), but it has relatively meager bandwidth requirements. It is time to get started, and VoIP is the place to begin.

Getting a Good ROI

Implementing a VoIP system is not a “forklift upgrade,” meaning it is unlikely that you’ll come in with a forklift, remove all the old equipment, and replace it with shiny, new stuff. VoIP deployments are best done iteratively, picking some candidate sites or locations where the success is likely—places where the ROI will be good. You want to win big the first few times, and build on your successes.

Take advantage of the easy opportunities. Pick your battles. The following are some candidates where the ROI for your first steps toward a full implementation is likely to be good:

- **Outfitting new offices or sites**—Some say that remodeling an old house is three times the work of building similar rooms from scratch. Similarly, gutting an existing infrastructure, trying to fit new infrastructure into something for which it was not designed, is both difficult and expensive. A new branch office or a new wing of a building still in the planning stage is a good place to consider an early VoIP implementation. Spec it out right, planning for future growth, and make sure the new network equipment and wiring have suitable capacity.
- **Planning a data network upgrade**—A network upgrade means changing the network’s architecture and installing devices, such as IP routers and switches, with much higher capacity. Include VoIP requirements in the planning, and make sure the new devices support the VoIP characteristics you will use.
- **Sitting on excess capacity**—You may be in the enviable position of having significantly upgraded your data networks already. You have replaced the hubs in your LANs with high-speed switches and given your users fast computers with fast LAN cards. Your WAN backbones use high-capacity fiber and optical switches. Bandwidth truly has been in excess after the dot-com bubble. Go for it!
- **Reconsidering an expiring PBX lease or service contract**—Don’t consider a forklift upgrade when you are renegotiating your current PSTN contracts. However, this is a good time to bring in a secondary set of potential providers and to consider converting a portion of the organization to VoIP. You may get surprising negotiation leverage, and

your existing provider may be very interested in being on your short list of VoIP providers, thus giving you some great assistance in getting started with VoIP.

- **Upgrading the current voice network**—If your voice network is currently constrained, you know improvements are necessary, soon. This may mean an architectural reworking; does it make sense to convert some of your telephony backbone to VoIP, without changing end-user phones? As an alternative, if you are at the point where you need to add new phones, can they be VoIP phones, added a few at a time? Such an approach will help you to gain experience with VoIP in small steps while gathering feedback on user satisfaction with the new phones. Such feedback can help build momentum and gain a buy-in from those controlling your budget.
- **Supporting remote users with an excellent VPN**—VoIP can be an excellent way to provide telephone support to remote workers, such as those providing help desk support for your organization from their offices at home. The keys to making this work well are high-speed network connections to their remote locations and high-speed, high-capacity VPN support. These workers are good candidates for IP phones or softphones.
- **Converging technologies after a company merger or acquisition**—Mergers or acquisitions often bring together different network technologies and phone systems. In these situations, it often makes sense to begin the process of convergence. It may be the case that a company that you have acquired has already implemented VoIP. Leverage its experience and apply it within the new merged company. Or maybe you have implemented VoIP and have acquired a company with a traditional PBX system. Instead of trying to manage and merge both types of systems, consider extending your VoIP system to the acquired company.

Chapter Summary

This chapter looked at building a business case for VoIP and introduced the wide range of potential benefits, as well as the obstacles you may encounter during the project. It showed the elements of a simple spreadsheet, to help with the calculation of VoIP's return on investments. The last section discussed where to start—situations where your ROI is likely to be good.

The next chapter discusses how to start—what you should consider in the planning, analysis, and evaluation stages of a VoIP implementation:

- A roadmap for your VoIP deployment
- How to avoid common VoIP pitfalls through proper planning
- Why most networks are not ready for a VoIP deployment
- Pilot deployments: how big should you start, and when should you roll them out?
- The importance of a thorough testing plan
- Why VoIP management is critically important

End Notes

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