Chapter

1

Analyzing Business Models and Strategies

MICROSOFT EXAM OBJECTIVES COVERED IN THIS CHAPTER:

✓ **Analyze the existing and planned business models.**

- Analyze the company model and the geographical scope. Models include regional, national, international, subsidiary, and branch offices.

- Analyze company processes. Processes include information flow, communication flow, service and product life cycles, and decision-making.

✓ **Analyze factors that influence company strategies.**

- Identify company priorities.

- Identify the projected growth and growth strategy.

- Identify relevant laws and regulations.

- Identify the company's tolerance for risk.

- Identify the total cost of operations.

Windows 2000—its nuances, its changes from NT, its subtleties, and all of its associated add-on components (I speak here of Exchange 2000, SQL Server 2000, etc.)—is not what Windows used to be. You *thought* you knew all about the Windows network operating system. Now, suddenly, with Windows 2000, you really don't. You might have assumed that all would be the same—that Microsoft wouldn't change very much in its quest for an improved network operating system (NOS)—but the changes are vast, dynamic, and extremely time-consuming to learn. Presumably, you want to learn the changes, and that's one of the reasons why you have this book in your hand now.

Microsoft is requiring that you understand the ramifications of network design for your Windows 2000 design tests. No longer is it important to only know *what* the technology does, but you also need to understand *where* it's most appropriately used. The good news is, if you understand the what part, the where is usually fairly logical as well. Of course, making the right design decisions doesn't just depend on the technology—it depends on the company's physical and geographic layout as well. With this in mind, let's begin this book by examining business models and strategies.

Assessing Your Company

Before venturing into the deployment of Windows 2000 in your enterprise, you first need to take a hard look at your company and see what your company is about, in terms of its construction and how it conducts business. The exercise of digging in and examining a company's model and processes isn't just good for your Windows 2000 rollout and absolutely necessary to pass test 70-221; it's also good for you. After going through such an exercise,

you'll undoubtedly find that there were holes in your thinking about certain daily company processes. In some cases you'll be able to help find a better way to make these processes happen. In other situations, you might find that your own knowledge has increased and you've learned something about the way that others have solved a business problem. Certainly in many situations, a business process will be just what you expected it to be, and you can go on to the next one. But the point of this exercise is that the more knowledge you accumulate about how your company does its business, the better the fit you can create between Windows 2000 and your company.

> Microsoft wants all its MCSEs to be responsive to the needs of their businesses, and so has made these kinds of analytical skills a critical part of this exam.

Your first step is to analyze the company's business model and its geographic scope. Understanding how the company is set up and where it calls home can assist you in your Windows 2000 design. In fact, critical design decisions will be based entirely on this information.

> Please recognize that, at this stage, you would not even have *ordered* the equipment for your deployment yet. Right now you're simply in information-gathering mode; you are not yet ready to size the gear or write a purchase order. The only equipment you need for the first few chapters of this book is a clipboard and a pen.

Overall Company Model

You begin by examining the company's overall business model. What are the business models, and how will you recognize them as you start to drill in on this objective?

Microsoft ✓ *Exam Objective*	**Analyze the existing and planned business models.** ▪ Analyze the company model and the geographical scope. Models include regional, national, international, subsidiary, and branch offices.

Let's take a moment to outline the various company models and what they encompass:

Local   A *local* company is only in business within a city or a very localized surrounding area relative to a city. For example, suppose you work for a flower company that has retail stores in several suburban towns and cities close to its headquarters. None of the retail stores are out of state, and all are within a few miles of one another. This is an example of a local company.

Regional   A *regional* company operates in several widely geographically dispersed cities within a state or in several states or both. Suppose, for example, that you work for a company that operates a chain of restaurants localized within one large state, but with a presence in different cities within that state. This would be an example of a regional company. Another example would be an electrical utility that supplies power to customers in towns and cities in several different states; this kind of company can also be called regional.

National   A *national* company is one with a presence of some kind across its country of origin. In a U.S. example, this does not specifically imply that there is an office in every state or an office of great proportions, but it does imply that there is some presence in most states. The most common example is a company that requires a small office in each state to maintain a sales force local to that state. An office might comprise just a few people, but it would nonetheless be part of your company and make for interesting connectivity and computing planning. Most national companies have at least one head-quarters office where the bulk of the corporate decision-making goes on.

International   A company that has offices all over the world is said to have an *international* presence. Again, these offices don't necessarily have to be large to influence your evaluation and planning. A company might have a distributed environment with a headquarters office in, say, Chicago, another large one in the U.K. (perhaps a "mini-HQ"), and several smaller offices staffed predominantly with salespeople and support personnel in many other countries. The small international offices would report their work to the U.K. office, which would subsequently report its progress to the central office in Chicago. Sounds charming, doesn't it? Getting it to work well, that's another story. This model undoubtedly carries with it the most complexity. You may have to deal with language and cultural barriers, tariffs, and political issues.

Just because a company has an international presence does not necessarily indicate that it also has offices all across its home country. A company that specializes in imports wouldn't necessarily need a host of offices in its own country, but would require several strategically located international ones.

Subsidiary Offices   Some companies specialize in a certain venture and then find that they need something else to make their particular area of expertise more palatable to the public. So, rather than reinventing the wheel, they buy a company that's already doing whatever they need done. Microsoft is a really great example of this. Although Microsoft has lots of developers feverishly working overtime on its software, that doesn't mean Microsoft writes everything that it bundles on a CD. It also buys companies that have a certain software-writing expertise. A company that is purchased and yet retains its own identity is a *subsidiary*. If, for example, a nationally recognized dairy were to buy a farm machinery company, it's very possible that—for financial, patent, and other reasons—the newly purchased company would retain its own name, possibly its original staff, its location and buildings, and so forth. The parent company would certainly dictate and make changes, but the subsidiary could go on doing business as it has been doing all along. Subsidiaries present unique challenges to network designers and IT people because typically you inherit a legacy group of administrators who are accustomed to doing things their way and who may not necessarily be amenable to reinventing their lives in order to fit their new parent's mold.

Branch Offices   Some companies may maintain one central headquarters office but also have several branch offices that have some autonomy relative to HQ. Perhaps the most obvious examples are insurance companies. Since the insurance regulations are so different from state to state in the U.S., the central headquarters office may be forced to comply with certain regulations within one state that they don't have to obey in another. Size also dictates the need for a branch office. A bank that has substantial operations in one state may require a large investment in buildings and employees there, thus granting a certain autonomous status, of necessity, to the branch. That autonomy is, of course, relative to the stuffiness of headquarters. An interesting side effect of a branch office is that it may feed several satellite offices within a jurisdiction. For example, a nationally

known beverage company may have one or two large canning and bottling facilities in a state that, in turn, supply many downstream wholesalers and retailers. To make the branch office model run smoothly, you need to concentrate on what it takes for each branch to be successful.

🌐 Real World Scenario

The Frame-Hub-Spoke Concept

Think of a bicycle. Your company's main office is the bike's *frame.* You couldn't get anywhere without a frame to ride on, could you? The larger regional sites are like the *hubs* of the bicycle wheels. You can have multiple hubs, can't you? But the hubs are attached to the bicycle, and they turn where the driver says they'll turn. The smaller three-, four-, or five-person offices are called *spokes*. They're a part of the hub, and there's a layer between them and the bicycle frame. They're not as intrinsically important as the hubs or the frame (one spoke can break on a bicycle and you can limp along for a while until you get it fixed), but they're nonetheless part of the enterprise.

Most environments have enormous computing power located at the headquarters office. The hubs typically have moderate equipment needs, but not to anywhere near the degree that headquarters has. The spokes often have very low hardware requirements and may not even have their own server. Users at spoke sites typically log on to servers located at the hubs and are connected to the hubs by somewhat thin WAN connections.

Are there other network deployments apart from the frame-hub-spoke method? There are certainly differences in the methodology, but I think if you poke hard enough into figuring out your business design, you'll see that it fits this basic layout. There may be several frames, for example. Some companies may have a main office but also have many, many other offices that handle enormous amounts of workload and are essentially autonomous. A setup like this would be a frame/frame (or frame/frame/frame) deployment.

There are also hub/hub sites and spoke/spoke sites. Smaller companies that have specific goals for each site are representative of a hub/hub deployment. Autonomy is high, as is creativity, and there's no need for the "my way or the highway" ethic. Sites like this make it *very* difficult for network administrators because of the *laissez-faire* nature of the business model.

> Spoke/spoke sites are essentially composed of small units attempting to garner some sense of connectibility. If you're the owner of a small network consulting firm in Denver and you set up a small office in Salt Lake City, you want some method of getting files and e-mail to the remote office, but you're not necessarily interested in calling every shot on every sale. You want to grant some autonomy and yet assure yourself of connectivity at the same time.
>
> Frame/spoke sites are those with one massive central HQ and tons of spokes that may or may not be connected to each other. Almost every conceivable combination of a frame, hubs, and spokes is possible. You probably have a frame-hub-spoke layout of some sort at your workplace. It's easy to spot, easy to diagram. Get out your clipboard and see if you can diagram what your company looks like.

Geographical Boundaries and Scope

The geographical scope of a company really presents an interesting twist to the whole network design scenario. Suppose, for example, that you've drawn out your company's model in Visio or on a piece of paper. What does it look like? How many cities, counties, states, regions, or countries does it traverse? What economic, geographic, facilitation, and political issues do you face with a given connection? Are you comfortable with, or even *familiar* with, the costs involved to set up communications between two sites? If you have a frame/hub/spoke setup, from what you know now was it correctly designed?

Look at the ordinary accounting difficulties (for instance, one country charges a tariff for crossing boundaries while another does not) that your network presents. To a company of any size, costs are the one thing that must be managed. A company that can't manage its costs will at some point be forced to, or it'll go out of business. But there's a fine line between managing costs and digging too far into productivity—reducing costs so much that people can't effectively get their work done. Unfortunately, even though you may not have an accounting degree, as a network designer you're the one faced with the charge of managing that dilemma.

As an MCSE candidate, you have to understand these issues if you want to pass the exam. For example, should you design your Active Directory (AD) deployment so that the *organizational units (OUs)* you set up—the individual spokes or hubs as you define them—comprise logical geographic separations, business separations, or some iteration of both?

The Windows 2000 model consists of *forests*, *trees*, and *domains*. Domains that share a contiguous namespace within a single active directory make up a tree. Several trees make up a forest. Now think of the frame-hub-spoke model. Your entire organization is a domain; the central headquarters would probably be an OU within the domain. Out of it would come various geographic locations that are close together, or have some business function in common; these would also be OUs. Each subdivision at each geographic location would be a child OU within its respective parent OU. So you can apply the frame-hub-spoke model to the Windows 2000 forest model fairly easily.

> **NOTE** You can create multiple domains for one company, like you did in Windows NT if your network needed separation. However, with Windows 2000, Microsoft typically recommends keeping it simple and using one domain for your entire corporation.

> **NOTE** Details about sites, domains, trees, forests, and OUs are tested in more detail on the Active Directory tests than on the Network Infrastructure Design exam. However, in designing a network and/or preparing for the design exam, you do need to be familiar with how and when to use the various containers.

Location Makes the Difference

How is your company physically structured? Where are its locations? How many people are at each facility? What do employees at those locations do? The answers to these questions can make all the difference in your network infrastructure planning.

Consider, for example, a company with three physical locations within the same state. There is one central office and two branch offices. Personnel at the branch offices are required to submit weekly reports containing detailed sales figures. Is it critical for the branch offices to have a dedicated T1 line to headquarters? Probably not. However, if the employees need constant and updated access to information in your Oracle database located at headquarters, the story might be different. How many people are located at each branch? 5? 50? 500? The more the merrier, of course, but also the more you will likely need to pay for proper bandwidth. What about a *single point*

of failure (SPOF)? If the connection dies, how much of an impact will it have on your business?

The previous example is a simpler study than a large international corporation. First of all, you are likely to have many physical locations, some of them in countries outside of the United States. How are things going to be set up? Will the main IT office in the U.S. handle all major networking issues? Will there be a European hub and an American hub, each with spokes reporting to them? What about connectivity issues? Once again, how many people are at each location, and what do they do? How much traffic will need to go between locations? Is there enough bandwidth, or will there be a *bottleneck*? The larger your organization is, the more you need to worry about.

So in your network design, you now have two additional things to think about. The first is an economic issue: How much is it going to cost to connect one location to another? As you've seen, the answer to this question depends a great deal on how your company is organized and on its geographic scope. The second point asks the same "how much?" question, albeit from the other end: Based on the users and the scope of the work they do, what's the impact on the company if the connection goes down due to an SPOF or bottleneck? You won't answer these questions by yourself; a host of people have to participate. Microsoft recognizes this point in the case studies on the exam by giving you the perspective of employees from all levels of a fictional enterprise. To determine the best solution, you'll have to take all these perspectives into account.

🌐 Real World Scenario

Understanding Business Models

You just got hired at a company that has two large campuses, Campus A in the suburbs and Campus B within the city. The campuses are about 10 miles from one another, but because of the navigational problems of big-city driving, it takes about 30 minutes to drive from one location to another. The campuses are currently connected to one another by a T1 line provided by a regional phone company. At each place, there are about 500 users and an older Cisco 1000 router connected to a patch panel that has wiring to the servers and users. Your first day on the job, you realize that this is the classic local company model.

There are mid-level managers at both locations, some reporting only to one location, others with offices in both locations. Campus A houses the executives and, though there is moderate autonomy, the ultimate directional goals come from those executives. Just before your three-month review, management purchases eight small entrepreneurial organizations that they'd like to connect to. These small facilities are composed of only a few people each. Two locations are within 30 miles of the city, two others are in different cities within 100 miles of the main headquarters, and four others are in small towns in the same state. Your boss asks you to start thinking about some of the issues related to this proposed new setup.

First off, you quickly figure out that your company has expanded to a regional model. With these new sites, there might be some problems with rooted-in autonomy; they have been running their own network for some time and may not be receptive to proposed changes to their network. This calls for serious communication by you—rapid and explicit relationship-building with these new stakeholders.

You also quickly grasp the importance of the SPOFs that you're likely to set up; you want to think long and hard about possibilities for reducing bottle-necks and providing fault tolerance and redundancy wherever possible.

Your design goal involves high-speed data links provided by your phone company. The phone company will provide the routers, so you've been assured that they'll be the latest and greatest that can be had. You get this agreement in writing. Redundant circuits are quite out of reason for these small groups, so you opt for a Remote Access Service (RAS) setup on the local servers, just in case. Finally, you put your foot down and insist on good quality server gear at these locations, over-engineered by 20%–50%. Having visited each location, you're underwhelmed by the caliber of gear they've provided themselves, and you decide that you want to make their connectivity experience pleasurable and their impression of you quite professional.

In some situations, you'll need to visit all locations to see what the layout is. In others, you can simply discuss strategy with the local administrators. In either case, you need to understand what is currently in place and where the network needs to go in order to make a good design.

Examining Your Company's Processes

Analyzing your company's business model and geographic setup can lead to questions that worker bees—employees who don't hold power positions—don't often ask. What *does* my business do and how does it go about doing it? For example, why *do* we have a site in the Netherlands? Why is the engineering group based out of Detroit? Why do we have a sales team in Altoona? Who's the network administrator in Kuala Lumpur?

Microsoft
✓ *Exam*
Objective

Analyze the existing and planned business models.

- Analyze company processes. Processes include information flow, communication flow, service and product life cycles, and decision-making.

Do you know why your company does what it does? Maybe you don't agree with the decision-making that went into a particular decision, but somebody must have put some thought into why the company acted in a certain way or established a certain geographic presence. Even if it makes no sense to you why the network is the way it is, you always have to be objective and nonemotional. Remind yourself that no matter how lame, there must have been some thought and decision-making effort put into placing a given office and putting certain people to work at a given task. It's not up to you to question the whys; it's up to you to figure out the hows.

NOTE This is especially important relative to Windows 2000 deployments, because now it's all about what your Active Directory design is like and how the forests, domains, sites, and OUs are set up.

I can hear you arguing that your company employs 30,000 people, you have offices all over the world, and you're only responsible for one small part of its overall operation. You may well be only a small fish in a big pond, but you nevertheless have to communicate with other entities or agencies in your company. It's critical that you know how your company functions relative to how other companies function.

Consider the following example: If the software developers need to use Linux computers and Unix servers, but you're planning a Windows 2000 deployment and need to maintain regular file transfers with them, how will you do this? IT people get in trouble when they don't know or don't understand what it is that their business does. Integration, interoperation, and interchange are keys to the enterprise administrator/network designer's world. Understanding business process is a worthwhile—no, paramount—investment of your time.

Understanding Your Company's Information Flow

How does your company get information from one point to another? Do you use Lotus Notes and have developers who have created collaborative frameworks within Notes for information transfer? Do you use public folders on the Exchange servers? Do you have a mainframe? Is there an intranet? Who are the people that maintain these systems? Where do these systems live, what servers are they on, and what buildings are they in?

Here's the best question of all: *Are* there systems? Some companies do quite a bit of their information interplay with paper or word of mouth, not thinking that computer systems can accomplish the same goal.

If your company wants to say something new—to go where no one has gone before—how does it accomplish that? How does your company get information from one point to another? That's the one of the elements you're looking to discover when you do your network design and diagramming.

Many companies have successful information-flow procedures. The question is, how did they get that way? Did it just happen by accident? Probably not. Successful information flow—getting the data into the company in a timely manner and getting it back out in a useful form—takes planning and training.

How is the information input in your company? Do people have to fill out paper forms, and other workers key it in? There may be a way you could simplify the process by creating electronic forms. What about mobile workers? One solution may be to provide them with laptops and a cellular connection to the central network. For every networking difficulty there is a solution, and your job is to find it.

Understanding Your Company's Communication Flow

How do people communicate with one another in your company? This question can actually be approached from two different perspectives, both equally

important in terms of network design. Not only are we talking about inter-company communications such as e-mail, intranet, and virtual meetings, we're also talking about the communications ethos that has been set up where you work. Let's talk about the easier topic first—the hardware/software component—and then tackle the more abstract component.

How Companies Use Hardware and Software to Communicate

This is where you sit down and take a physical inventory of how your company handles its communications. For example, what's your phone system like? Does one centralized set of Lucent Difinity switches handle the core business or does every geographically separate site have its own system? Are you in the midst of trying to accomplish a voice over IP (VoIP) goal using software or routers? If you are, how's it going?

Moreover, are the majority of intra-company communications voice-based, or do you work for a more e-mail-centric company? As companies migrate more and more to network-based communications, e-mail has become the central method of communicating. Some people prefer e-mail. Others, especially salespeople, are lost without a phone, so it's all relative. That's the judgment call you have to make relative to your network design.

Why is it so important that you understand your company's physical communications component? Here's one example that might serve as a launching point in your mind to bring about several other reasons. If your company is predominantly e-mail-centric, it is incumbent on you as a network designer to make sure that the e-mail system is protected and highly fault-tolerant. How will you design your Windows 2000 deployment in such a way as to make your e-mail systems more fault-tolerant, more readily available, and more intelligent in how they work? My guess is that you'll go with Exchange 2000 because of its integration into the Windows 2000 Active Directory, but that's your design decision to make. If your company cannot communicate with customers for any reason, you will lose significant amounts of revenue. That, in turn, does not reflect well on the IT department and staff.

How People Communicate

Much more nebulous in its nature is how people interact in their daily business dealings. Can you assess how managers communicate to their direct reports? Can you readily determine how the worker bees get their requests up to management? Once again, it's not up to you to question why, but to understand how. Knowing how the chain of command (and information flow) works will allow you to create a better network design.

As a network designer, you need to understand how interpersonal communication at your company works before you start interrogating people about their technical and business needs. If you don't adapt your approach to the company culture, then your message will never get across. Above all, be patient and forgiving with people. Not everybody knows what you know about computers and Windows 2000. If you're in a stakeholders' meeting where you're trying to convince some computer-illiterate people to part with $500,000 for your upgrade, then you need to put yourself in their shoes and answer their questions (as best as you can) from a nontechnical, nonthreatening position. Instead of making them worry about throwing money away, show them how the money they spend is an investment and can increase company profits over the long term.

> **NOTE** On the exam, you'll be asked to design a solution based, in part, on the needs of various individuals within an organization. If you don't take note of what each person tells you, you won't create an effective solution and you won't pass the test! Also be keenly aware of company pecking order. If the CEO tells you that automating the coffee machines is the most critical priority but the accountants want a database that works, it looks like it's time to bring on the decaf.

While understanding your company's communications culture is important, you also need to be keenly aware of what you are communicating. If you present your ideas aggressively and continually make demands, you are less likely to get your way. It's a good idea to approach meetings with the decision-makers with a bit more diplomacy. You may have heard the phrase, "It's not what you say, but how you say it." This is especially true when dealing with people who have less knowledge about a subject (computer networking) than you do.

As an example, in order to pull your Windows 2000 upgrade off, you're going to have to convince a lot of people *why* the upgrade needs to happen. Prepare documents that lend credibility to your argument. Answer all of the questions that people pose you. Prove your case, or you won't get a nickel to venture forward into an unproven new technology. You've got to get rid of the noise and professionally introduce your recommendations. You know that you need to do the upgrade. The hard part is convincing others to see the same thing.

Understanding Product and Service Life Cycles

Not that long ago, WordPerfect 5.1 for DOS was the premium word-processing product available. There were *10* tests to attain the WordPerfect 5.1

for DOS certification! And it was a pretty big deal at the time. There was a WordPerfect magazine. WordPerfect, at that time based out of Orem, Utah, was riding a high crest. Where is WordPerfect today? Well, it's hidden in a perfectly good product, Corel Office, but it's not nearly the power software player that it was back in the early 1990s. So what happened?

The product life cycle caught up with WordPerfect, and I suspect that some poor management decisions were made relative to its continued growth and improvement. It's as simple as that. Products ride a life cycle where they increase in popularity, hit their apex, and eventually fade out of sight. In today's market, it seems that the pace is accelerated. New and improved versions of a product are always available, and the old products ride off into the sunset.

Service life cycles consist of roughly the same concepts. The hardware works well for a while, but then eventually becomes outdated. Once it's outdated, it will be supported for a while, but eventually the manufacturer will drop all support. Those 386 machines you have in the office have worked well (well, relatively), but what happens when some of the RAM goes bad? Are you going to be able to find any 30-pin SIMMs?

The service life cycle applies not only to hardware, but to software. Microsoft recently dropped their Windows for Workgroups 3.11 test from the MCSE program. Why? The product has reached the end of its practical life cycle, and so the service life cycle should cease also.

The service life cycle lasts only somewhat longer than the product life cycle. The most likely reason for this is that some people tenaciously hang onto a proven thing rather than upgrade to an unknown entity. Sometimes this is a good position to take, but most times it's not.

In any case, you have to consider both the product and service life cycles when performing your network design assessments and recommendations. For example, if you drive out to your site in Hoboken and find that they're on a shared-10MB hub that's covered with an inch of dust, I'd advise you to jot it down as a target for replacement before Windows 2000 rolls out to this office. Ideally, you'll be able to get replacement hardware that is not only current, but will last you well into the foreseeable future. But remember, you've got a budget to meet too.

Identifying the Decision-Making Processes

This is probably the most complicated part of your network design segment to try to figure out: Who makes the decisions? Does the CIO listen to input that is generated from her managers (whom, we can only hope, get their

input from people like you) and then funnel it upstairs to the vice presidents? Or does the CEO read about a new product or software methodology in a business journal and order it implemented? Some companies have an "emerging technologies" department that's charged with the research and recommendation of new technologies. Other companies use the "architect" concept—people who have tons of everyday experience in the industry and are now equipped to make corporate decisions regarding technical direction.

Does money drive the majority of the decisions at your company? In your Windows 2000 network design and upgrade proposal, you need to highlight the dollars issue. Be prepared to tell the financial chieftains who can approve or deny the project how much it's going to cost. This is *after* you wow them with obvious need and the benefits to be attained from going forward with this project.

Why is it important for you to understand the decision-making process? Because you need to know the political climate in order to make good decisions. You need to know who makes what decisions, both technologically and financially. If you're able to address their concerns, your project will run a lot smoother. Also be aware of decision-making timetables. At some companies, you can dream up a plan and roll it out in a few weeks. Other organizations are notoriously slow when it comes to making decisions. Have realistic expectations of when things will get done and save yourself a lot of stress.

Identifying Plans for the Future

Finally, let's talk about a fascinating aspect of network design and upgrade recommendations: *strategic planning*. Technical people spend lots of time reading about the latest and greatest, but they seldom look out beyond today's pages to see what lies beyond. Strategic thinking—getting out the crystal ball, tea leaves, and chicken bones in an effort to forecast what's on the horizon—is not an easy thing, but it's a necessary exercise to go through.

Strategic thinking will affect you in two ways within your company:

- What is your company planning for its future?

- Where will the software and hardware that you're recommending be in the future? Are you over- or under-engineering?

You may think that we're asking you to be psychic and predict the future. Well, in a way, we are. It might not be as hard as you think, though. Oftentimes there are strong indicators about your company's future. Layoffs or acquisitions are good opposing examples. It helps to keep a watchful eye on your company's movements.

Strategically Planning in Heady Corporate Times

You need to have a clear perception, if at all possible, of where your company is heading, what it's about, where it has been, and where it doesn't want to go. If you can't get your arms around these notions, how can you adequately plan a Windows 2000 deployment? For example, suppose that you work for a high-tech company of just a few hundred employees. You've gone through your IPO, and money is (thankfully) not the object it was back when the firm was you, the CFO, and a developer or two. You and your cohorts feel that you're on the verge of a breakthrough in the new software you're releasing. The release of this new breakthrough software could generate a tremendous growth surge in your company.

Why should this matter to you? Because when you were originally setting up your Windows 2000 network, you didn't see the need for multiple domains in a forest. You had a domain with just a few hundred users, and everything was cool. Now, in strategically thinking about the impact of a sudden, large growth spurt in your company, you realize that any new acquisitions or additions to the current network user list might affect your network design. Windows 2000 can handle this impact much more handily than the old Windows NT 4 trust relationship paradigm; but nonetheless, it's up to you to think about and plan for these eventualities in your network design.

Strategically Planning Your Software and Hardware Future

What's out there on the horizon? Where are you going to turn? They're looking at you to make that decision. You're the IT guru, you're the one who knows this stuff—what's the hot thing for the next 5, 10, even 20 years?

There are two places you can go for these kinds of answers:

- Read every technical journal you can get your hands on.

- Talk with those in the industry who are driving technology's future by going to shows, attending chat rooms, and asking people who work at the forefront companies.

The point is that you cannot simply turn in a 100-page document stipulating why your network should be upgraded to Windows 2000 today. You need to include information in there about what the future looks like and why it's good for you to implement Windows 2000 now as a segue to the future. For example, you've been reading about Exchange 2000's ability to use Active Directory. With the organization that you're in, spanning multiple geographic boundaries, coupled with the problematic communications methods you currently use, you can see that this combination of Windows 2000 and Exchange 2000 provides a one-two punch for your network problems. But you can also see that this not an easy deployment to accomplish; you see it as several steps. Now you need to strategically devise a method with which to first deploy Windows 2000, then Exchange 2000, all the while retaining current network connectivity without any computing loss to the users. You see this as a yearlong expedition into the future.

Seeing the future and somehow integrating it into the present is *the* hardest part of developing a network design and upgrade document.

If your stakeholders don't ask you what the future of computing is and how your recommendations interface with that projected future, shame on them! But it's still up to you to have that information ready and to bring it forward as part of the overall planning conversation.

⊕ Real World Scenario

Avoiding Communication Pitfalls

"Jake the Brake" is his name, your CEO, that is. What a tough old son of a gun he is! Nothing gets by old Jake—there is no approval process that takes place without his input or acceptance. The problem is, the company has grown from the time when it was just him, his wife, and one or two friends working out of a crummy, old downtown office to the 8,000 employees he has nestled all over the world today.

And you: You joined the company when it was several years into the gestation phase, when there were a few hundred employees. You've seen phenomenal growth at Widgets, Inc., haven't you? You started out as their primary network administrator and, through attrition and experience, you now find yourself in the position of NT architect. This is a very good thing (especially in terms of salary), but it's not so good because you've lost touch with the company's overall networking makeup, especially in light of its phenomenal growth.

You run Exchange Server 5.5 for your e-mail system. All users use Exchange with Outlook as their client. You also have a highly evolved intranet and, in fact, have a full-time team of intranet developers on staff. The majority of your business processes are homegrown client/server applications running against Oracle databases.

Near as you can tell, you've got a frame/hub/spoke model in place, with the central headquarters where you work being the frame, several geographically distant sites acting as hubs, and lots of small sales offices working as spokes.

The NT administration team asks you to begin looking into Windows 2000 and come up with a deployment design document so that you can roll out Windows 2000 in the third quarter. You have to make some decisions fast.

You begin by analyzing your company's current communications processes. The more you think about it, the more you realize that you're in a highly autocratic environment, where the orders will come from the top and when Jake says "jump!" everybody asks, "how high?" This merits a lot of investigation into exactly how the communications processes work so that you can effectively negotiate the yea/nay terrain.

You realize that a strategic decision point would be to move users off of the Exchange 5.5 servers and onto Exchange 2000. But you also realize that there's a long commitment to the design goal involved as you bring up the new server plan and begin to segue users from one scenario to another.

This presents you with the next obstacle: What do you think is the best way to communicate this information? With only the barest of details in these few paragraphs, it still appears evident that you need to first formulate a solid, detailed plan on how you're going to accomplish this goal; then meet with the stakeholders to make a presentation to them on the "problem" and your solution; and finally, after getting buy-in from them, approach Jake for final adoption say-so. The biggest problem here is that Jake, still in the small entrepreneurial frame of mind, might not see the big picture. Your communications should be set up such that he understands today's large-scale environment and tomorrow's even bigger base.

Assessing Company Strategies

Every company has a strategy. Some are good; others are not so good. The companies that are successful generally have good strategies. I know that sounds obvious, but have you ever taken the time to sit down and figure out what your company's strategy for success is?

Understanding your company's plans, both long- and short-term, can be a trying process. Coming up with a good strategy is even more difficult. But whether you are guiding your company to the top of your industry or simply trying to figure out what your company is doing, there are some basic premises you should be aware of. They include establishing company priorities, looking toward growth, assessing risk, identifying relevant laws and regulations, and calculating total cost of ownership. Sounds like a lot to keep track of, doesn't it? It is, but keeping abreast of company strategies is a strategy in its own right.

Identifying Company Priorities

Every company has priorities, and they're not universal, or even obvious. You need to seek out what your firm finds important.

Why is it important to have a feel for your company's priorities? Most companies are in the business to make money. But have you ever considered why and how a company got started? How did so-and-so ever get into the casket business, for example? Some companies are so big that it's difficult to picture what goes on the minds of the corporate heads who live in the ivory towers. Maybe they don't even have a grasp of the original priorities that the company was founded on, but the concern is the present. What is your company in business for today?

Microsoft ✓ ***Exam Objective***

Analyze factors that influence company strategies.

- Identify company priorities.

By identifying a company's priorities and goals, you'll be able to drill in on how computing technology will help the company to meet those goals. Then, as a matter of course, if you don't have that computing technology in place,

you'll need to design it in and provide it. For example, suppose that you know one of your company's priorities to be in-sourcing their call-center activities for their product's technical support, thus getting away from expensive out-sourcing. You might have very definite plans about call-routing scenarios and computing gear that meets those needs. Next question: Does this gear and soft-ware work with Windows 2000? That's the concept behind knowing com-pany priorities, then somehow translating them into IT priorities.

People who work for government and not-for-profit organizations will have a much easier time identifying these priorities than corporate workers will. Nevertheless, the exercise is yours to accomplish, no matter who you work for.

Although it may seem like your company has no priorities, nearly every com-pany does. Of course, a major motivator for many organizations is money. Profit indeed drives business. However, some companies have nobler or more obscure pursuits. For example, your company may be focused on improving environmental conditions, or your CEO may be overjoyed by making a school-child smile every day because of something his company did. It's your responsi-bility to find out what your company's priorities are and design the network with those goals in mind.

Let's start with some ways that you can begin to identify your company's priorities. There are lots of places where you can begin to look for clues as to what your company's leaders are concerned with:

- Does your company publish an annual report? Most publicly held companies produce an annual report and usually, somewhere near the front, you'll find the company's mission statement. If your company has an intranet or newsletter, you'll probably also find the mission statement posted there.

- Did you attend an orientation when you went to work for this com-pany? If so, the presenters undoubtedly gave you a clue about what the company considers important somewhere along the line.

- Do you have all-company meetings in which the CEO gets absolutely *everybody* together to discuss issues? If so, that's very good! If you listen closely, you'll probably hear some priorities coming out.

- Are your company's priorities clearly reflected in the communications that managers send down to their employees? If the company's big enough, the answer is probably not, but it's still important to see whether you can hear it in your manager's communications to you.

- What do people stress in team meetings? What consistently comes up as the most crucial part of any project? Often you get the clearest sense of what a company's priorities are by listening to employees at the grass-roots level—that's where the burden of a company's goals usually falls.

- If you work for a not-for-profit organization, do you know the mission of your organization? Here, more than in any other organization, mission statements are important, highly utilized, and fundamental to the organization's operation.

- If you work for a government entity, do you know why the legislature spun that entity into motion? Or has the entity spun so far off of its orbit that the initial mission isn't recognizable anymore?

Think about your company. What are your company's actual priorities? Certainly making money is the obvious one, but what I mean here is, how does your company go about making money? Do your company's leaders take the market into consideration when they make a decision? Are they fast-paced and quick to act, or are they stodgy about the decisions they make? Some companies have gotten into trouble when they stayed with the "tried and true," only to find that the market was outpacing them; I think IBM is a good example of this kind of thinking. They started out with the PS/2 and its proprietary Micro Channel Architecture (MCA), thinking that since they were king of the hill and everybody would jump on the MCA bandwagon. And they stuck stubbornly by their guns, even while the clone makers were coming up with alternatives that didn't have all the baggage associated with the PS/2. It took IBM a while to realize what was happening in the marketplace and make a change in its priorities.

One thing, I think, is very clear. In the first decade of the 2000s, change is the operating word of the day, and companies and technical personnel that understand this are the ones that will succeed in the long term. Slow, stodgy companies that don't get the new high-paced environment aren't going to be able to hang on.

When performing your analysis on the existing network and planning for the future, keep a careful list of everything people mention as possible

upgrades. Obviously, some will be ridiculous and canned right away. For the ones that make sense, prioritize. The higher the priority, the greater the need to implement. If some of the lower priority items take a year or two to implement, that may be okay, depending on your company's timetable.

Real World Scenario

The High-Tech Startup Company

You work for a startup company, funded completely by venture capital and governmental research grants. The goal of the company is a cool one—to perfect the concept of using scanning tunneling microscopes (STMs) to place individual atoms on other atoms, thus customizing new atomic compounds. What could someone do with such technology? The two founders of the company, both fundamental-particle physicists, think that the sky's the limit. Builders could forge new building materials that are stronger, lighter, and more malleable than any known presently. Biologists could perfect new organic compounds that might fight disease very efficiently.

But physicists, as you might be aware, are stuck in the awesomeness of the universe and essentially have no practical sense about business. So the marketing guy's frustrated because he can't get the founders out of the clouds, the sales guys have nothing to sell yet, and the mission of the company is not really clear. *But,* for all of the problems with trying to put a product together with a technique, there's incredible energy in this company. Everybody's on the same page in terms of what the capability to synthesize new atomic compounds can do. The founders have published numerous articles, and there are always research fellows, pharmaceutical company brass, governmental types, and commercial alloy researchers walking through the door.

It's just that, well, you don't feel like you *connect* with anything in the real world. It's almost like you're selling air. You're selling a concept and you're curious as to how much a concept is worth. How can you identify your priorities relative to this company's priorities? Will you find it hard to support the technological needs of a company such as this if you don't feel it's going anywhere or that it's just in the business of gaining grants and not really going forward with its research?

Assessing Company Growth and Growth Strategy

Managers, especially entrepreneurial types, can sometimes be very cautious about a company's growth and rightly so. Too much growth too soon can kill a company, or at the very least stifle its capabilities for years to come. Too little growth can keep a company from seizing opportunities that might propel it to a new, higher level. It takes skill and thought to make the right decisions that position a company's future in such a way as to obtain a strategically planned kind of growth.

Microsoft ✓ *Exam Objective*

Analyze factors that influence company strategies.

- Identify the projected growth and growth strategy.

Your Windows 2000 rollout has to include the planning and forethought that you bundle in as a result of taking a look at these prospects. For example, growth will have a definite impact on your design of the Active Directory (and its future growth), not to mention the adequate provision of services such as DNS and Dfs. Being able to look out into the future and determine how the company will grow allows you to plan for that kind of momentum. This kind of planning will most likely find its way into over-engineering infrastructures and computers that aren't being used to their fullest potential today but will be tomorrow.

The Windows 2000 test will assess your ability to formulate valid judgments about a company's growth and its growth strategy. But what kinds of factors are involved in company growth patterns? On the test, case studies will provide a lot of clues as to the expected growth of the company, and therefore your requirements for possible network expansion. In real life, the clues aren't always so obvious.

Not very long ago, some computer enthusiasts in San Francisco were inventing a new computer technology—virtual reality (VR). You'd use computer code to design a building before it was ever built, then put on some gloves and a mask and go inside the computer for a virtual visit of the building. VR was touted in its day as a highly relevant science that would enormously

assist engineers in their quest to build a better mousetrap without having to assemble tons of prototypes. To some degree, the techniques of VR have been assimilated and are truly being used in engineering applications, but to nothing like the radical degree that VR proponents would like to have seen.

Suppose that you worked for a company that thought VR was going to be the biggest thing since the invention of the laser printer. They invested tons of time and money perfecting both the code that's needed to generate VR images and the accoutrements that a person would need to wear to view the VR images in the computer. But then, VR never catches on, dies a big death, and the company went out of business. How could that company have capitalized on its product, its technique, and its future, and not gone out of business?

Thinking about it another way, what's the difference between a WordPerfect and a Microsoft Word? WordPerfect was an awesome product. Why is it now on its fourth or fifth owner and yet Word just keeps chugging along? In this case, it's not the technology that's dead, so what the heck happened?

How about a company that has a highly mature product like an automobile? How do you take an ordinary thing like a car and turn it into an extraordinary thing that people will clamor for? Where is the company in the maturity life cycle of its product?

What are the leaders at the company like? Often a leader who refuses to spend money on new projects kills the company with their practicality. "Nope, nope, nope. Gotta think about the bottom line!" Yes, but then there won't *be* a bottom line if the product line doesn't match what's being released by the competition.

Does the company stand on its laurels? "We've been Acme Insurance for 110 years! Solid, reliable, no-nonsense insurance you can trust." Yeah, so can you advise me on mutual funds? Can you convert my term policy to a whole life account? What perks are you offering that your competition just offered me?

The business of doing business is a very interesting thing. Some people think of it as a game. You put the players here, make the strategic move there, force this battle over there, and so forth. Is your company playing the game? Are the leaders expert players? Are the decisions that are being made relevant to the rest of the competition? Is your company the one that aces out the competition all the time? Are you the idea guys? Are you sitting on a cash cow product and just raking in the bucks, not concentrating on the next step? What's your company's future? You have to consider all these factors as you design a network. If you fail to do so in real life, your design will suffer. If you fail to do so on the exam, your grade will suffer!

Real World Scenario

Truly, What Is the Best Fit?

You begin to work a new job for a civil engineering firm, one that builds the cloverleafs and bridges and other highway elements that are needed for safe travel.

The engineers, you begin to find, are a humorous bunch with a large intelligence quotient and tons of ideas. They're easy to get along with. Until you try to mess around with their computer systems, that is. Then they get really riled.

For example, some of their favorite software is based on VAX/VMS, ancient as the sands of the Gobi, and you really think they could better themselves by checking into something with a little more chutzpah.

Your company uses Windows NT for the majority of its networking needs. You have a couple of Exchange Servers, the financials are kept in Oracle on some Unix boxes, your admin staff uses the standard office support tools, and, all in all, the whole place sails smoothly, except for this antiquated software that you can't see any reason why the engineers keep.

You begin to do some checking around. You'd like to implement a thorough Windows 2000 upgrade, and you'd really enjoy proposing a design that would include bringing the latest in engineering software to their desktops. You think you can make the case for things like a reduced cost of operations, because the engineers won't have to work so hard to do what they do, payroll time will be reduced, and software resources will be consolidated.

After your presentation, you find that the engineers are quite amenable to your suggestion. So much so that, instead of you, they appoint one of their gurus to go out and research the newest, latest, and greatest in the field.

You're disappointed to think that your growth plans still won't include the engineers' software. Why? Because the solution the guru found is based on, you guessed it, Linux. Now you have only one of two options on your hands. You can try to argue with the engineers that Linux is not the solution for your network (possibly even getting forceful with them in the process—something you'll learn that engineers will never stand for), or you can submit to their desires.

What's the call? How would you design this network? A couple of thoughts here might help you out. While your intentions are wonderful, realize that you already have Oracle sitting on Unix servers. It's unlikely that you'll convince people to move software they're *totally* reliant on. I'm not convinced you'd want to make that move, not unless you're a glutton for punishment. So Linux isn't all that big a stretch for the environment anyway. Second, engineering apps are highly specialized. It's quite possible that the best fit isn't on an NT platform. You like Ford, another likes Chevy, still another likes Dodge. Which is best? That's up to the person using the vehicle, isn't it? Finally, note that Windows 2000's tight Unix integration, while not a marriage made in heaven, doesn't rule out the systems cohabiting. All is not lost—it's merely integrated!

Assessing Risk

Risk is the business concept that you're placing some critical aspect of your company, maybe even the whole company, into jeopardy by going forward with an idea you firmly believe in, one that you think will forge new ground for you and for your customers. Some companies are risk averse. Others are like tightrope walkers, willing to take that step out onto the taut line.

Microsoft
✓ *Exam*
Objective

Analyze factors that influence company strategies.

▪ Identify the company's tolerance for risk.

The first thing a good manager should look at when pondering a company's potential for growth is the risk-management aspect of it. How much can this company grow before it's in a danger zone and you've gone too far with it? How little do you want it to grow? When should you stop growing the company so that it stays manageable? The answers to these questions are as far reaching as the managers that are asking them.

Suppose that you're an entrepreneurial restaurant manager. Business is good, customers are flocking to the door, and your reviews in the newspaper are sterling. Would you consider building another restaurant? Probably so. But how far, realistically, could you take such an operation by yourself? You

probably wouldn't grow your restaurant "chain" much larger than the point at which quality began to drop, because you couldn't keep up with the demands of attending to each restaurant.

But then, consider a restaurant chain like Denny's or the Olive Garden. How do companies like those maintain the quality of their food while growing out over thousands of restaurants in many different countries?

The secret is in the planning for growth: planning for the capitalization of the growth, training the managers, and preparing a special one way that things are to be done. You have to have plenty of capital to pull off such a venture. It's a risky thing and you have to plan for the inevitable failure of a restaurant or two. The entrepreneur doesn't have that luxury.

So there's risk associated with both kinds of endeavors, but the risk for the ambitious entrepreneur is far greater than for the corporation that's starting up its 1,000th restaurant.

In the IT world, the planning that's needed is identifying risks and eliminating or at least reducing them. For example, it's a risky thing for an IT shop to maintain their own external DNS and all of the ramifications associated with installing and maintaining the service. The risk is that computers won't resolve names correctly; users will take longer finding computers than they used to. The mitigation of the risk is to learn everything you can about DNS, apply what you've learned in a small setting such as a lab, then go forward with the rollout. You still won't be home free—you'll have some cuts and bruises to show for the risk you took—but the patient will indeed live.

Maybe it's that way where you work. You want to roll out a Windows 2000 solution. You've got plenty of managerial backing, the financing is there, and you have people who can help you with the rollout—people who are anxious to get the experience. You'll prepare a project plan and go slowly. The risks are not that great because if you fail, you'll only have failed in one tiny segment of your rollout. You can back it out and see what fix is needed. On the other hand, the administrator who works by himself with a handful of servers—the kind who troubleshoots user problems by day and only has the luxury of configuring Windows 2000 rollouts at night—is in much greater danger of failure.

How much risk you can take should always be at the front of your mind when planning *any* network change. Of course, everything should be backed up before you begin. But if your company can only handle zero downtime, your planning will take a different route than if you could bring the network down for a few hours during the middle of a day.

So risk assessment, both of how you think your company's going to grow and of how risky your rollout is, plays a big part in how you'll handle the design and deployment of your new Windows 2000 environment.

Targeting Laws and Regulations Affecting the Company

Today's wild ride in the corporate world means that you never know what to expect regarding the laws and regulations that are set down before a company. Some of the world's largest mergers have taken place just within the last couple of years. Consider, for example, the merger of Time Warner and America Online (and now EMI music in Britain). Here you have an absolutely enormous media conglomerate that owns everything from books to magazines to movies to TV studios (CNN included) and now to the Internet and the Beatles' catalog of songs! Are they a monopoly? What about Microsoft? How is each going to be regulated by the government?

Microsoft ✓ *Exam Objective*

Analyze factors that influence company strategies.

- Identify relevant laws and regulations.

As a network designer, you may feel that you're far removed from these considerations, but you're not. When you create a network design, you have to take into account how government regulations affect the way your company does business. Are there any trust-busting law enforcement agents looming on the horizon? What about environmental protection officials with emissions detectors?

How about setting up networks in other countries, where the rules are different, the networking standards are far removed from your own, the security standards may or may not be enforced, and even the language set that you install on the computer is different from your own? There are lots of rules to learn and understand, especially in multinational enterprise environments.

The bottom line is that companies have so many places to look for potential trouble spots as they grow that once they hit a certain size, it's worth their while to keep a full-time cadre of legal experts on retainer just for the times when their opinions are needed in cases such as a multinational environment. Imagine, for example, being in the gas and oil business. You're heavily regulated,

both in the way that you run your company and in the manner that you deliver your products to market. On top of that, you always have the whims of OPEC on your mind. What will tomorrow's oil be worth? Then there's how potentially dangerous refineries can be and the constant oversight that occupational safety authorities maintain at such a facility. Top that all off with environmental concerns, with the difficulty of finding good people, and struggles with unions. So why does anyone go into the oil business? Because it's profitable, that's why.

But what if you're an upstart, entrepreneurial oil company, or is there such a thing today? How do you break into competition with players like Mobil, Shell, and Conoco? What if you head up Conoco and you see the recent mega-merger between Mobil and Exxon forming the largest oil company on earth? Are you jealous? Is there a way that you could merge with another big oil company too and become even larger? Just how large is too large? What would the Justice Department, the SEC, the United Arab Emirates, and a host of others have to say about it? How long would it take your lawyers to talk to their lawyers to get the whole thing nailed together? What if you were slapped with a lawsuit? No! You can't do that! This is the kind of thing that keeps CEOs up nights: worrying about how they're going to pull off such a huge growth spurt.

Be careful to mind what your legal team says. Of course, they will have their priorities for the new network as well, but if something can't be done for legal reasons, pay attention.

The Plethora of Laws and Regulations

There is hardly a business in the world today that isn't regulated in some way. It seems like it's almost a fourth law of physics: For every business endeavor, there's an equal but opposite legal reaction. For example, take the recent Y2K brouhaha. There was actually talk of the lawyers making oodles of money because they would sue large corporations for not seeing to their duty of providing a computing environment free of capricious bugs. It was outrageous, but for all of its outrageousness, lots of people were totally serious.

So, what kinds of legal ramifications can a company face in its decision-making efforts, especially relative to a Windows 2000 rollout? Let's enumerate some. There's no doubt that you can personally augment this list tenfold. But the point here is to get you thinking about what sorts of laws and regulations you might have to work with and how they might impact you in your efforts.

Medical Regulations   Not only are clinics, hospitals, and doctors involved here, so are the medical equipment manufacturers and pharmaceutical companies. If patient information were to become public or if someone died because of a computer failure, there could be severe backlash.

Commerce Regulations   Trucking and shipping companies are at the forefront of this category. What are the interstate shipping guidelines? If you ship internationally, what about tariffs? Are you going to try to ship to an embargoed nation? That could get ugly. Other issues like sales tax and Internet shopping also apply here.

Government Agencies   This one almost doesn't need explanation. What rules is your agency bound by? Are you doing your best to spend the taxpayer's dollars in their best interests? Federal, state, and local governments all have different guidelines by which they operate. Be familiar with your boundaries.

Once again, consult your legal team. You are getting paid to make sure that the network is the best that it can be. They get paid to cover the legalities. Work together and most problems should be eliminated before they even happen.

🌐 Real World Scenario

The Government Contractor

Suppose that you work for a big company whose mission is to act as a contractor to the U.S. government. A lot of what the company does is highly classified. The most mission-critical component of your company is its ability to maintain its work according to the various layers of classification that are imposed on it by its government contracts.

You currently use a variety of NOS platforms: Novell NetWare, Unix, and even some OS/2 Warp servers, plus, of course, Windows NT 4. Your management is considering consolidating everything onto one NOS, a big, tough, expensive, and gutsy move. The leading contender, of course, is Unix for the servers, Linux for the desktops. You're asked, as one of the NT designers, what Windows 2000 would have to offer that Unix could not.

After nobody laughs at your line about how hard it would be to find Microsoft Office for Linux, you then begin to talk about the security features of Windows 2000 that Unix does not have. Specifically, you mention the triple Kerberos security paradigm. You talk about Active Directory and how its use of Kerberos makes for a one-time, secure logon anywhere in the plant. You talk about how AD can segment the rather large operation into meaningful entities, regardless of how small or large they need to be. Forests can be created, as can trees and groups. You can have universal groups, domain global groups, and local groups.

You mention that the telecommuting factor, a strong one at this company, has been highly updated in terms of its security. RADIUS can now be used on the RAS servers. There is support for highly secure VPNs.

You also mention that Windows 2000 Professional workstations are highly secure and even more "user-proof" than they were before due to the Windows Installer. All in all, there is little convincing evidence that would make a company migrate from Windows to a complete Unix environment and much more evidence to support the opposite move.

Identifying the Total Cost of Operations

The *total cost of operations (TCO)*—the costs incurred by procuring, installing, and maintaining a specific system—is another factor in how a manager chooses to grow the business. There are many factors in the TCO question, many considerations and details to think about. For example, what if you make garden equipment and you'd like to begin offering motorized equipment that could be used for mowing lawns, trimming shrubs, mulching, and the like? You set up your new business branch and purchase the small engines that go inside lawnmowers and weed trimmers. You personally manufacture the chassis, frames, and so forth that are used in the devices. As time goes by and your new motorized tool division gains some steam, you begin to look at the books and realize how much it costs you to purchase the crates full of engines that you need for your business. What if you could find a company making small engines and merge with them? You could effectively cut down your TCO and grow the company at the same time!

Microsoft ✓ *Exam Objective*

Analyze factors that influence company strategies.

- Identify the total cost of operations.

NOTE You may be more familiar with the term "Total Cost of Ownership" as TCO. Although Microsoft calls it *operations*, the concept is the same.

But what risks would there be in such an undertaking? Probably capitalizing the merger would be the single biggest problem: How are you going to pay for it? What kinds of other issues might you face in such a venture? What if you purchase a company with problems that are cleverly hidden, and you inherit a mess? Would you reduce your total cost of operations, or would you actually see an increase in the total cost? It's highly possible that even though a company thinks they're leveraging themselves in such a way as to make a huge dent in the marketplace, they actually make a mess of their company and wind up with less than they had to start with.

This is what it's like to take stock of the growth of a company and make sure that growth is managed well. As a network designer, your job will probably not be to make financial decisions, but it will be to *understand* financial decisions. Furthermore, it's up to you to present a network design in the best possible financial light and then to objectively compare and confirm whether a decision to go forward with a design is the financially most amenable approach. You'll have to detach your technological thinking and think about things purely in dollars and cents.

You may or may not have a specified budget for your network upgrade. If not, consider yourself lucky! Other times, you may be given the ambiguous ultimatum to "make it work, but watch costs." It's then your job to, as they said, make it work. But at the same time, don't go crazy with purchases. Sure, it would be nice to run fiber to everyone's desktops, but is it worth it?

The Decentralization of the Windows Network

Probably the most fundamental accounting talk you should have with yourself, before you talk to the financial folks at your company, is how you're going to set up your server farm. In fact, you'll have to pay pretty close attention to where

you're going to place things. The day and age of having every single application running on one or two servers, even in small shops, is now officially over. As soon as you implement Windows 2000, you are no longer going to be able to run your entire shop on one box and meet network user performance or uptime requirements. It's as simple as that.
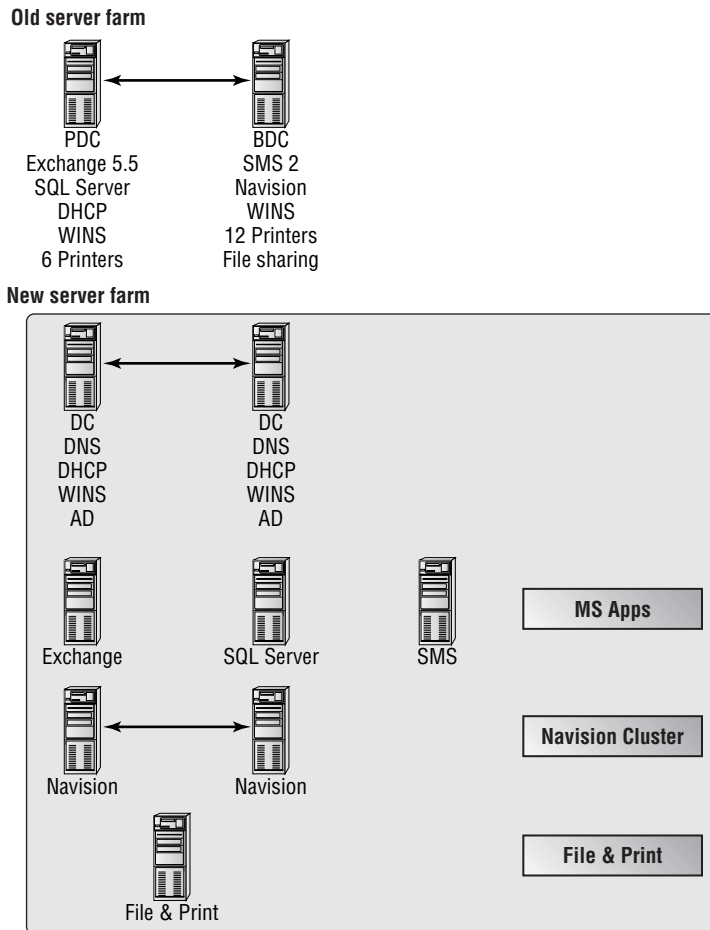
You need to examine ways that you can decentralize the server software components of your network. What I mean by that is look at the jobs the various servers are involved in. If you run into a server that's involved in several dissimilar duties—for example, the server is doing WINS and DHCP, is print serving, hosts an application or two, plus acts as a file server for some users—you're going to want to split that duty out. Why? Your server simply won't have the bandwidth for all the activity that's going to be placed upon it by Windows 2000 and your users.

The centralized concept is not a good design point, and it's one you must jettison as you go forward into your new upgrade design. There's one little exception: It's fine to have one or two servers acting as domain controllers and hosting your DHCP/WINS/DNS environment. That's all they do, validate users and keep TCP/IP happy. In a centralized fashion, this particular design will work fine. But then, once your centralization of your domain controllers is done, don't go loading Exchange or SMS or any of the hundreds of other NT-based apps on them! Place applications on servers that are engineered and built specifically for hosting applications. File and print-sharing boxes have the heft needed for multiple simultaneous user accesses. And so on.

Figure 1.1 shows a small network design that goes from being highly centralized to highly decentralized. In this diagram, the old network only had two computers. Even in the Windows NT 4 environment and with a small shop of only 25 to 50 users, they were undoubtedly highly overworked computers. You had tons of things happening on each computer: SQL, Exchange, file and print, plus the everyday, garden-variety user validation.

In a Windows 2000 design, you won't get away with this. For starters, the computers would have to be so large that this design wouldn't be cost-effective. But more importantly, it's just not a good design. The key to stability in the Windows environment is to not introduce numerous variables into any one system. The new server farm shows that you've had to purchase six more computers! (And probably beef up the two you already have.) But you've wisely decentralized your computing environment so that disparate computers are handling dissimilar apps. You've opted to put Navision, your Windows 2000–certified financials software, on a cluster so that it has higher fault tolerance than even one native Windows 2000 box can provide.

FIGURE 1.1   Decentralizing your server farm

Old server farm

PDC
Exchange 5.5
SQL Server
DHCP
WINS
6 Printers

BDC
SMS 2
Navision
WINS
12 Printers
File sharing

New server farm

DC
DNS
DHCP
WINS
AD

DC
DNS
DHCP
WINS
AD

Exchange

SQL Server

SMS

MS Apps

Navision

Navision

Navision Cluster

File & Print

File & Print

All of these design issues, of course, mean that you're going to meet with the financial folks and ask for way more computing equipment so that you can accomplish your design. Do you have buy-in from the stakeholders and managers on going forward into Windows 2000? If so, you shouldn't have a problem obtaining the funding for the new equipment. If you don't have initial buy-in for the project or they won't fund the new gear, my advice would be to not go into Windows 2000 until you can do so.

⊕ **Real World Scenario**

Breaking the Bank

You have a small network, you're interested in going to Windows 2000, and you've come up with a solid design plan. The chief financial officer has told you that you cannot purchase the extra six computers you need; he doesn't see the need for all those computers. But you can purchase three, provided you can get a good price for them. He has told you that you can spend $10,000 on your total computer hardware budget.

You've looked at the existing domain controllers, and you know you'll have to upgrade them from their current 64MB of RAM apiece to a minimum of 256MB. The disks look OK; there's quite a bit of space on them and they're both using hardware RAID controllers. You estimate that the new memory going to cost you $2,100, so you've officially cut your budget down to $7,900.

The computers you need to buy must be fairly sophisticated. They must have enough RAM in them to make the applications and the NOS happy. You'd like to have lots of disk space for your file and print servers, and you'd prefer to put everything on hardware RAID controllers for optimum speed, disk efficiency, and fault tolerance.

There are now two design issues. The first is this: Can you redesign your server farm in such a way that you can adequately host the apps on three additional servers? The second question follows: Can you purchase the computing power you need with this limited budget?

Summary

You begin your Windows 2000 design journey by assessing your company's model; types of models include local, regional, national, international, subsidiary, and branch. Identifying the model that your company fits will assist you in determining the Active Directory makeup of your new Windows 2000 framework. For example, should domains and organizational units be designed around geographic or business boundaries or both?

Next, you examine your company's processes to determine the method in which communications are made and in which business decisions are implemented. This is a much more subtle perspective to try to assess, but it has the same kind of importance, in terms of your Windows 2000 deployment, as

determining the model of your company. Strategic planning—making a best-guess decision about what your future network looks like—plays a critical part in your overall design as well.

What are the company's priorities? Asking this simple question can alert you to whether a new design is appropriate or not; if the company's priorities are not IT-oriented, then what's the point? But more appropriately, the company's priorities will show you what your design should ultimately look like and will act as a guide for you as you formulate your Windows 2000 network.

Next, you identify your company's growth and growth strategies. Will this company grow? If so, how much? Can you pinpoint the company's growth strategy? Does your company intend to grow itself as large as possible, do its managers see themselves as not growing very much, or are they somewhere else along this spectrum? Windows 2000 networks are scalable and highly amenable to growth, but your network design still needs to take into account the potential for growth.

Make sure to think about the importance of relevant laws and regulations that your company has to take into consideration when going through a network design. Many companies have to obey strict rules in everything they do, and your design might have to take those rules under advisement.

Finally, consider your company's total cost of operations. IT and commensurate operations account for a large percentage of a company's investment in its future, so the money that is spent to upgrade the IT area must be wisely spent and provide the most bang for the buck. What kind of return on investment will your Windows 2000 network design provide?

Exam Essentials

Know what type of business model your company falls under.   This is one of the first keys to understanding how to set up a new network depending on your business model. Smaller companies generally have fewer networking issues that you need to be aware of. If you are an international organization, the networking issues may be far-reaching and complex.

Understand the decision-making process at your company.   Knowing who makes the decisions is critical. You need to listen to various managers at your company, and then decide what needs to be done first. Prioritize events for your future rollout. Know what kind of a time schedule you are working with.

Know what the company priorities are.   Obviously, money is a good first choice. But in terms of the network, who wants what? Listen to everybody involved. Prioritize options based on the importance of the input.

Be able to predict the future.   When listening to managers and executives, listen to what they say about the future of the company. Design the network so that it will be able to accommodate the expected growth.

Understand all relevant laws and regulations affecting your company. Invariably, if the laws or regulations affect the company, they will affect your network. How to design remote access, configure security, and set up remote locations are some of the things you'll need to be concerned with.

Know how much risk your company can tolerate.   If your network can't handle any downtime, it's best you don't perform any risky procedures during business hours. Know what the expectations are for the upgrade. Carefully plan when, where, and how it will be performed before you begin any of the actual work.

Key Terms

Before you take the exam, be sure you are familiar with the following terms:

bottleneck	risk
international	single point of failure (SPOF)
local	strategic planning
national	subsidiary
organizational units (OUs)	total cost of operations (TCO)
regional	

Review Questions

1. Your company has purchased another company that specializes in creating some hardware you need to bundle with your newest product. The other company will retain its original name and really not integrate into the framework of your company. What kind of model is this?

   A. Branch office

   B. Subsidiary

   C. Wholly owned IPO

   D. Spin-off

2. The company you work for has been involved for years in the business of writing tax return software for businesses. Now you hear a rumor that they're talking about possibly getting out of that business and venturing into the e-commerce business of filing electronically on behalf of businesses. In other words, a business that had at one time used their software would now simply do all their updates online to your company and you would handle the filing. What areas do you think will produce problems, should this rumor prove to be true? Choose all that apply.

   A. Priorities

   B. Laws and regulations

   C. Risk

   D. Growth

   E. Total cost of operations

3. You work for a state government agency. You have a dozen small locations with 10–30 users each, spread out across your state. They are unconnected, but new state legislation is going to require that you interconnect all locations in order to accomplish the business goal this legislation mandates. Specifically, you'll require some method of transferring data back and forth between Windows 2000 servers at each site. What are the two steps that you should include in your business plan to accomplish the legislation goals?

   A. Arrange for a high-speed data circuit leading from your central location to each of the outlying locations. The circuit should be as high-speed as you can afford, up to a full T1.

   B. Provide training to your outlying users.

   C. Set up Windows 2000 servers in each location, connecting all to the same domain.

   D. Install an Exchange Server at each location.

4. You are an administrator for a technical consulting firm that specializes in marketing Asian, Indian, and Pakistani software developers to the U.S. and Europe. You have a main office in Sydney and two other offices, one in Beijing and the other in New Delhi. What is your company's model?

   A. Regional

   B. National

   C. International

   D. Transoceanic

5. You work for a large pharmaceutical company. You're considering a Windows 2000 rollout. What one item do you particularly need to have in mind relative to the design and commensurate rollout?

   A. Priorities

   B. Growth and growth strategies

   C. Laws and regulations

   D. Risk

   E. Total cost of operations

6. You would like to go forward with a Windows 2000 rollout. The company you work for, an electronics engineering and design firm, is right in the middle of designing a revolutionary new product. Your managers are hesitant to allow the upgrade to go forward for the time being and want you to wait. What item is at the top of their mind regarding this suggested rollout?

   A. Priorities

   B. Growth and growth strategies

   C. Laws and regulations

   D. Risk

   E. Total cost of operations

7. You're a network design consultant who has been called in to render counsel and advice in the design of a new Windows 2000 network that a large restaurant supply company would like to implement. The company is thinking that updating their technology will help increase their efficiency and hence their bottom line. When you visit the company, though you're no MBA, you can see lots of disarray in terms of how the company is organized, who reports to whom, and other subtle nuances that hint to you of a much larger problem than a technical one. While you don't want to turn down the design and rollout job, you have some concerns that you want to bring to management. Around which item do these concerns revolve?

   A. Priorities

   B. Growth and growth strategies

   C. Laws and regulations

   D. Risk

   E. Total cost of operations

8. Your CIO can see merit in your Windows 2000 upgrade suggestion. Now she wants to know how you would improve the current situation where you have only a few computers and the users are complaining about the slowness. What actions should you recommend? Choose all that apply.

  A. Put enterprise apps onto one dedicated server per application.

  B. Reduce the number of domain controllers and consolidate the TCP/IP portion of networking (WINS, DHCP, DNS) to the domain controllers.

  C. Upgrade the tape backup software.

  D. Purchase dedicated network-based RAS servers, taking the RAS job away from Windows.

9. Your company, a sporting goods manufacturer, desperately needs two separate improvements, but only has the funds for one. They need a new set of assembly-line devices to allow them to make their sporting goods equipment faster and cheaper. They also need to totally revisit their IT infrastructure, upgrade accordingly, and move to a Windows 2000 environment. The IT upgrade would allow them to complete the billing, invoicing, and materials-handling cycles on a much more timely basis. What would be your suggestion as to which one to do first?

  A. Manufacturing equipment upgrade—impacts company's bottom line.

  B. Computing environment upgrade—impacts company's bottom line.

  C. Neither. Sounds like the company is close to bankruptcy.

  D. Both, but use a phased approach that would allow you to handle both things at once, just more slowly than projected.

10. Your company started out as a "Ma and Pa" outfit with only a couple of employees 15 years ago. Today, the company has thousands of employees spread out over several countries, and it continues to grow at startling rate. You've suggested that the company look at launching a Windows 2000 deployment and switching from their current Windows NT 4 implementation of 20 separate domains and hundreds of servers. In context of what was discussed in this chapter, what might be one of your main concerns relative to this rollout?

    A. Priorities

    B. Growth and growth strategies

    C. Laws and regulations

    D. Risk

    E. Total cost of operations

Answers to Review Questions

1. **B.** Subsidiaries are often the lifeblood of a company. Why reinvent the wheel when some other company out there is doing exactly what you need done? Perhaps they need a helping hand staying in business, while you need a hand making your business better.

2. **A, B, C.** Well, first of all, never ever give credence to the rumor mill until you hear the same thing from the horse's mouth. But that being said, given the little bit that you know right now, it appears that there may be a priority issue. Why abandon a perfectly good cash cow? You'll undoubtedly run into lots of legal issues with this prospective new angle, and there is definitely risk associated with anything related to e-commerce.

3. **A, C.** You're not told that e-mail is a priority, so D, while a nice thing to have, doesn't solve the business need. Also, though you will certainly need to train the users at some point, this objective does not solve the business need either. Answers A and C are the first bullet points that should go on your planning document.

4. **C.** The answer is C. But this is an interesting model because you're really *not* doing anything in Sydney, or in greater Australia at all, are you? All of your work is focused in other countries. You're truly international in your business makeup.

5. **C.** A heavily regulated industry like a pharmaceuticals firm has to consider the legal and regulatory impacts of any upgrades it makes to its computing environment.

6. **D.** They're thinking that they should let sleeping dogs lie until the new product is ready and shipping. Then, when things have settled down, you might be able to reconsider the design and rollout. This is good advice—listen to it. While priorities are always on the minds of managers, hopefully you have their ear. If you say that you think Windows 2000 would be a go, and they sense that you have the personal bandwidth for such a project, then priorities might not be the leading fear. My sense is that risk probably brings more to this table than priorities.

7. A.   It sounds like the company is going the wrong direction—thinking that technology will fix managerial problems. While the technological aspect of your job is wonderful and you'd like to go ahead, management needs to know that you spot other issues here. This is a highly risky consulting proposition because you're being brought in as a technology consultant, not a management consultant. Nevertheless, it might be beneficial to point out that you see inefficiencies elsewhere in the business cycle that technology will not improve.

8. A, B.   The top two answers are the best ones. Segmenting your heavily used enterprise apps onto dedicated servers will increase their performance and decrease the likelihood that they'll crash (or interrupt other network processes if they do crash). Consolidating domain controller activity is a very good idea—one you can implement without benefit of Windows 2000, but one that will work with Windows 2000. Items C and D might be practical, but they have little relevance to the Windows 2000 upgrade apart from the question as to whether your old tape backup software will work with Windows 2000 or not. Dedicated hardware-based RAS servers are great things, but not really necessary in the Windows 2000 environment. Windows 2000 addresses many RAS-related issues.

9. A.   See, it's a question of priorities. The company can get along with the current computing environment. All right, so they work slowly, but at least they work. But the manufacturing thing, well, that's the company's bread and butter. If they can't compete in terms of being able to manufacture the latest and greatest in fine sporting gear, they might as well go bankrupt because the competition will quickly overrun them.

10. B.   Not so much growth as growth strategies. You already know the company's capable of rapid growth. What you should really be concerned about is management's viewpoint on continued growth. It'll be tough for you to plan a network based on growth if you don't know *how* the firm is going to grow.

CASE STUDY

The Billing Company

You should give yourself 10 minutes to review this case study, diagram as needed, and complete the questions for this testlet.

Background

You work for a company that performs billing and receiving of bill payments for other companies. Companies that don't want to go to the added expense of billing and maintaining the payments of their own accounts, or who can't really afford to set up such an operation at this particular juncture in their growth, will outsource the work to your company. Your company is responsible for the timely preparation and submission of bills to the clients of the companies that you represent and for processing the payments of those bills. You don't handle the collections part for bills that aren't paid on time—your client companies do that. You have a Windows NT 4 network that is working fine. Your company has 475 employees, the majority of whom work on remittance-processing machinery. The remittance-processing machines are hooked to the network so that regular reports and accountability functions can be run.

Current System

You have 10 Windows NT 4 servers connected to a standard 100Base-T Ethernet network. Everybody that is not a remittance-processing operator logs on to the Windows NT network. You run Exchange Server, a financials package, and some other applications, and you have a BRI ISDN web connection that's hooked to a Proxy Server. The remittance-processing machines (your company calls them "the line") can talk to the network but require no logon of their own. The supervisors who head up the remittance-processing personnel can log on to the equipment and maintain it as needed. They have the ability to run reports that provide system uptime and other status updates. It is critical that the remittance-processing devices be able to talk to the network at all times so that the supervisors have an idea of how much is being processed through the systems, thus giving everybody an idea of how on track the company is with that day's processing cycle.

Envisioned System

Overview   You want to upgrade the entire network to Windows 2000, including bringing all of your users up to Windows 2000 Professional. There is no need to update the remittance-processing devices because they were updated last year at this time.

Your Supervisor   You've taken your project notes to your supervisor and presented your vision and goals to her. She says, "This is a fine idea. I'm all for it as long as you can control costs and assure us that the line can continue to talk to the network."

Remittance-Processing Manager   "I really don't care what you run on your network as long as these remittance-processing machines continue to run and process the bills. Downtime on this line means lost revenue to the company!"

Security

You are responsible for the security of your network. Your supervisor says, "From a security standpoint, I'm not concerned about a Windows 2000 upgrade. I just want to make sure that the line can continue to talk to the network."

Availability

Overview   Your business is a standard 40-hour-a-week environment. Very little overtime is worked. Uptime is critical, though; the servers need to be up when the line is up.

Your Supervisor   "Remember that when the line is up, the servers need to be working. Can you provide me with a statement that tells me what benefits this upgrade will bring about for the network? For example, will this upgrade make the network run faster?"

Maintainability

One of the things you're excited about with a Windows 2000 rollout is your ability to maintain copies of installed software on the network and then use a Group Policy Object (GPO) to download the apps to users, whereupon client

software in the form of Windows Installer sees to it that the software is installed and correctly configured. Then, when a user breaks an app—which happens more frequently than you'd care to admit—it's automatically repaired. You think this will help make your life much easier.

Performance

Overview   The 100Base-T infrastructure is well designed and runs fine. You have some concerns about servers. You're wondering if maybe you should move the reporting app that the remittance-processing team uses from the server it's currently on—actually nothing more than a desktop that had a server installed on it—to an actual dedicated server of its own.

Your Supervisor   "You don't have to sell me on this idea. The desktop acting as a server situation isn't a good one and keeps me up nights wondering when it's going to crash. Thank goodness we haven't had all that many problems with it."

Remittance-Processing Manager   "I don't mind if you upgrade the computer, especially since you're telling me that it'll improve the reporting performance. Be aware that you'll have to replace it on a weekend, and you'll have to guarantee that it's operational by Monday!"

Questions

1. What is the business's main concern?

   A. Money

   B. The line

   C. Their customers

   D. Timely billing processes

2. In the following chart, move tasks from the right column into the left column in the order that you should begin working on this project. (Note: These tasks are certainly not all-inclusive. In a real deployment you'd have many more tasks than this!)

Tasks	Tasks
	Assess what brand and model of computer you will buy for the reporting server replacement.
	Prepare the business need documents for distribution to the managers. Obtain managerial buy-in.
	Prepare a presentation detailing the business need.
	Prepare the budget forecast.
	Meet with the stakeholders.
	Identify the Windows 2000 licensing costs.
	Prepare the overall project plan and identify the project phases, milestones, and resources.
	Arrange to test your Windows 2000 deployment in a lab with a spare remittance-processing device.
	Prepare the reporting server.
	Cut the reporting server from desktop to new server.

3. What's the biggest risk associated with this project?

A. Windows 2000 won't work with the line.

B. The reporting server won't be any better than before.

C. There's a steep learning curve from Windows NT to Windows 2000.

D. You don't have enough time to get project accomplished.

4. In your project planning, what will be your biggest priority to assure the project's success?

  A. Assuring that the reporting server works as advertised.

  B. Assuring that the remittance-processing devices can continue to talk to the network.

  C. Making sure the servers have increased reliability.

  D. Assuring that Exchange stays up.

5. None of the people you talked to indicated that there were any laws or regulations involved that might hinder your work. Nevertheless, can you think of any laws or regulations might be involved as you go about your Windows 2000 upgrade planning?

  A. Your company has a fiduciary responsibility for the companies they're representing. Inaccurate billing representation could result in a lawsuit for your company.

  B. SEC regulations control companies such as yours.

  C. The Accounting and Finance Act of 1980 applies to your company.

  D. You could be held liable for all of your client company's torts.

6. Looking at the following table, list the people or groups from the right column in the left column, in the order of their bearing on the success of this project (from most important to least).

Person or Group	Person or Group
	You
	Your supervisor
	Remittance-processing supervisors
	Remittance-processing managers
	Client companies
	CFO
	Remittance-processing users
	Reporting server users

Answers

1. **B.**   If you haven't gathered that the line is everything, you haven't been listening! The line is everything; it's the company's money stream, the reason they have customers, and the reason for their existence. Take care of the line! Priorities, priorities!

2. See the following chart:

Tasks
Prepare the business need documents for distribution to the managers. Obtain managerial buy-in.
Identify the Windows 2000 licensing costs.
Prepare the budget forecast.
Prepare a presentation explaining the business need.
Meet with the stakeholders.
Prepare the overall project plan and identify the project phases, milestones, and resources.
Assess what brand and model of computer you will buy for the reporting server replacement.
Arrange to test your Windows 2000 deployment in a lab with a spare remittance-processing device.
Prepare the reporting server.
Cut the reporting server from desktop to new server.

3. **A.**   Without a doubt, the biggest risk in this project is the line. They've made it very clear that you must not hinder the operation of the line.

4. **B.**   The most important piece of this puzzle, the one with the biggest priority associated with it, is the assurance that once you cut over to Windows 2000, the remittance-processing boxes will continue to talk to the network. The second-biggest priority will be to make sure that the reporting server can see what the line is doing and accurately report on its progress. The two are pretty close priorities, almost head to head.

5. A. You have no other information other than the fact that you know your company is acting on *behalf* of other companies and as such, you're a representative of them. This implies that if something went wrong with your network design and billings were inaccurate, untimely, or in some other way incorrect, your company could be in a lot of trouble.

6. See the following chart:

Person or Group
You
Remittance-processing users
Remittance-processing supervisors
Your supervisor
Reporting server users
Remittance-processing managers
CFO
Client companies

Unfortunately, in this case you are by far the biggest factor on the success of this project. And, from the sounds of what you were told in the interviews, you have no breathing room in terms of making sure the network works with the line. Here is where the concept and the need for a lab environment can really pay big dividends. If you could thoroughly test your concepts in the lab before you deploy, you'd be able to sleep better. Unfortunately, it may not be possible to free up one of the big remittance-processing boxes just for some lab work. The next best thing is to take up a serious dialogue with the makers of the remittance-processing gear, alert them of your intentions, and see if you can get any feedback on how well this will work in a production setting.