3

The Action (Project) Plan and Cost Justification of the Project

With the premigration assessment complete, it is time to develop what is typically called the project plan. A "project plan", however, seems to imply something sedentary, a document that sits on the shelf. Let's call it an action plan instead—after all, it must be active; it defines actions that must be accomplished. The action plan defines the scope and the participants in the design of the Windows 2000 enterprise and the migration from the existing environment.

Clearly, the value of an action plan is to put the project in order, make assignments for completing the tasks and subprojects, and provide a visible document that can be used to measure progress and success. By laying out all the tasks and responsibilities in document form, it is easy for design team members to ensure that all necessary parts are there and, most importantly, that they are in proper sequence. Recording comments, progress notes, and completion of tasks is also enabled by a formal plan.

Many possible tasks, projects, subprojects and organizational methods could make up the action plan. The intent here is to present possibilities that can be used, discarded, or expanded upon rather than to define a template to allow the design leader to just fill in the blanks. Although all companies will have commonalities with other implementers of Windows 2000, each will have many differences concerning political organization, geographical organization, security requirements, and applications.

In this chapter, the essential elements of the action plan are described, including these:

- **The design team**—Who should be on this team, what expertise the members should have, and what migration assignments should be made.

- **The purpose, objectives, and scope of the migration project—**How to define exactly what will be accomplished, and how to measure the project's success.
- **Cost justification—**Calculation of *return on investmen*t (ROI) and *total cost of ownership* (TCO) to gain financial support for the project through measurable results.

The Design Team

The design of the Windows 2000 environment involves many people from many organizations and disciplines. To make the migration successful, the designer must enlist their help and form a Windows 2000 design team to ensure that all issues have been addressed and to get people to buy in to the project. The design team should include people who can address the issues noted in this section and any others that may uniquely apply to your organization.

Involve more than one person in an area, if necessary, but try to keep the group small. While the areas of expertise described in this section are typical, the designer must decide whether those areas apply to his situation or whether other areas should be listed. In a manufacturing facility, for instance, engineering, production, and management staffers would need to be involved. A business organization, on the other hand, wouldn't have any of those functions. Likewise, a software engineering firm might not have (or need) any administration over the desktop, so two or three people would comprise the team. This list is intended to give direction and prompt ideas, not to serve as the final answer.

Design Team Members

I talked to one company about the makeup of its design team and learned that it was just made up of people who were interested in joining. I noticed, however, that the people who were interested also held key roles in the existing domain and network structure. The point here is that it is probably more important to find the right people from the right areas than just having those groups represented. These "right people" must have sufficient interest and enthusiasm (as well as time) for a Windows 2000 migration so that they are motivated to meet schedules and to do quality work that will ensure the project's success. Obviously, you need the right disciplines, such as networking and DNS, as well.

Table 3.1 identifies the job titles or functions of design team members from three companies that I worked with on Windows 2000 design reviews.

This list is intended to show the diversity as well as commonality of design team members in different enterprises. This should give the architect some ideas of who should make up the design team in an enterprise.

Table 3.1   Design Team Members for Sample Companies

Company A (Food Industry)	Company B (Financial Institution)	Company C (Computer Company)
Director of Business and Technical Services	Network and workstation support	RAS/tunneling
Team member of the Technical Planning Group (two attendees)	Workstation support	Desktop
Team member of the Workstation Planning Group	Microsoft consulting	Mail and messaging
Manager of the Technical Planning Group	TCO	Help desk
Manager of Client Services	Construction	Security
Team member of network management (telecom)	Network support	Information systems Management
Program director of Technical Services	Information technology	DNS/DHCP/WINS
Team member of Security Services	Information security	Tools
Manager of Workgroup Servers	LAN administration	IIS
Team member of Workgroup Servers		Applications Network (physical)

While the titles and functions of team members will vary, definite roles in the Windows 2000 migration plan must be filled. The following list identifies these roles. Note that this is a generic list that probably includes some areas that do not apply to your enterprise, or that might not include areas that you need. Use this as ideas to form your own team.

- Project lead (and documentation)
- Network infrastructure: DNS administration, routing protocols, and WAN administration
- Telecommunications
- Network administration
- Information technology
- Network security

- Messaging
- Domain administration
- Application development and support
- Workstation and desktop
- Technical support
- Appropriate levels of management
- Field office support
- Engineering
- Manufacturing and production
- Management sponsor
- Consultants
- Internal special projects
- Administrators of other OSs that will impact or be impacted by Windows 2000 (NetWare, Banyan Vines, and so on)

Windows 2000 Design Tasks

Windows 2000 design tasks don't exactly map to the titles, organizations, and responsibilities shown above. The members must be assigned to the Windows 2000 tasks listed here according to their expertise.

When the team is identified, the members must be assigned to specific tasks associated with the design, migration, and implementation of Windows 2000. The assignments usually are made by the project leader.

If you read five books on Windows 2000 deployment, you will have five different lists of Windows 2000 design topics. The three companies noted in the previous section all constructed their design teams similarly, but had some differences. For a base, let's list all the tasks that must be covered to accomplish the design. Note that some of the subtopics might not require a separate person to manage them; they are listed with the intent of defining important subtasks, and it is up to the project leader to determine the size of the assignment for each team member. Refer to Table 3.2 for a sample list of design assignments.

Table 3.2   Windows 2000 Design Assignments

Team	Assignments
Active Directory Design	Namespace design
	(Structure and administration for DNS and domain)
	Replication topology and site design
	Group Policy design and planning
Physical Network Analysis	Protocols
	DHCP, WINS
	Remote access
	Hardware
Security	
Migration	Planning and strategy
	Transition
	Interoperability (resource access and third-party operating systems)
Backup and Recovery	
Mail and Messaging	
Applications	
Tools	
Desktop Deployment	
Training	
Company-Specific Projects	Testing (performance and sizing)

Again, for comparison, Table 3.3 shows action plan task lists from two
actual companies for their Windows 2000 deployment plans.

Table 3.3   Action Plan Tasks for Actual Companies

Company D	Company E
Group policy design and planning	Project manager
Training	Program management
RAS and tunneling	Product manager
Security	Process project manager
DNS/DHCP/WINS	Consulting
Mail and messaging	Active Directory design
IIS	Security
Applications	Base operating system

Table 3.3   *continued*

Company D	Company E
Transition	Testing
Network	TCO
Tools	Networking
Backup	Application integration
Domain migration	Deployment
Directory monitoring	
Enterprise administrator	
Terminal server	
SMS	
Server monitoring	
Desktop	
IntelliMirror	
Client side caching	
Software distribution	
Wins9x dir svc client	
Migration planning	
User accounts	
Domains	
OU structure	
Policies/standards/ implementation	
Project plan review	

The difference is not only the approach these two example companies take in identifying the action plan tasks, but also in their internal organization, which is quite evident from these two lists. Both lists are valid because they work for their respective situations, and that is most important in a Windows 2000 design scenario. The plan must address not only the issues presented by the migration and the Windows 2000 technical features, but also the internal requirements of the company or business undertaking the migration.

Note that neither plan specifically lists a management sponsor. We can assume that the companies have upper management support for the project but did not list it in the plan. I'm a proponent of listing details and would recommend listing the management sponsor who can carry issues to upper management that need attention; the project manager can manage technical details.

Because Company E's list is considerably shorter than Company D's list, we can assume that Company E has subdivided these tasks to accomplish all the tasks noted in our original task list. Leave task subordination and project planning to the project manager.

The Design "Core" Team

It is likely that the design team will grow as you develop the plan and define design issues. Therefore, it is recommended that you select a core team from this group and secure a management sponsor. This is the initial group that will define the action plan and represent major components of the migration. The core team should include people assigned to DNS administration, network infrastructure, Active Directory design, security, application deployment, desktop deployment, and technical support. The core team has the authority to delegate tasks to others and can reassign tasks to respond to staff outages in order to keep on schedule. They also can represent key areas in the migration, or critical tasks. In addition, they are ultimately responsible for the project and for making decisions.

Perhaps the person with the biggest impact on the migration, and whose support of the migration is critical, is the DNS administrator. The corporate DNS administrator or a qualified representative should be a member of the Windows 2000 design team. Appointing someone else to act as the Windows 2000 DNS administrator will not accomplish the goal because Windows 2000 DNS must integrate well with the corporate DNS structure. Spending time converting this person to your project will pay huge dividends in the future and may be the cause of success or failure of the project.

In Chapter 4, "Namespace Design of the Windows 2000 Active Directory," you learn that DNS is at the heart of Windows 2000. The difficulty likely will lie in convincing the DNS administrator to let the Windows 2000 environment run on Microsoft DNS servers, and spending the time to make sure that Windows 2000 fits in to the corporate DNS structure. How DNS is organized and delegated directly affects the Windows 2000 domain naming scheme as well.

Table 3.4 is a sample form to identify the members of the design team. Note the distinction of core team members. You might want to add other people in responsible positions, specific to your company, to the core team.

Table 3.4*   *Core Design Team Assignment List

Project Task	Core Team	Assigned to
Project leader	Core	
Management sponsor	Core	
Active Directory design		
Namespace design: DNS	Core	
Namespace design: domain	Core	
Replication topology and site design	Core	
Group Policy design and planning	Core	
Physical network	Core	
Security	Core	
Migration	Core	
Planning and strategy		
Interoperability		
Backup and recovery		
Mail and messaging	Core *	
Applications	Core	
Tools		
Desktop deployment		
Project		
Training		

*Assumes use of Exchange 2000

The core team's initial responsibilities include the following:

- Establish the DNS design.
- Determine the domain namespace design.
- Review the network infrastructure to ensure that it will support Windows 2000.
- Design the Active Directory structure, including replication topology and site design, Group Policy implementation, Global Catalog server placement, and FSMO role planning.
- Design the security model.
- Ensure compliance with company standards.
- Certify applications for Windows 2000 deployment. This should include an analysis of the use of SMS versus Group Policy software deployment, design of MSI packages, and so on.

In Table 3.4, a Mail and Messaging representative is listed as a core member. This is assuming the use of Exchange 2000 for a mail system. With Exchange 2000 tightly integrated with Active Directory in Windows 2000, it is important to have the messaging people involved in all phases of the Windows 2000 implementation. If Exchange is not the mail system, this would likely not be a core assignment.

Purpose, Objectives, and Scope

Take a minute and define why you are doing the migration (purpose), what you expect to accomplish (objectives), and the limitations of the project (scope). It's a good idea to establish these parameters to keep the project focused. You certainly can update these sections of the action plan, but they need to be well defined. Of course, the key to keeping any project on track is establishing a timeline, which is also discussed in this section.

Defining the Purpose and Objectives

This section of the action plan should define why the company should undertake the migration. Include the advantages of Windows 2000 over the existing structure to show how the company would benefit in specific problem areas and how you can use Windows 2000 features to the company's advantage; also list expected achievements in these areas. Spend some time here, and be thorough. A good analysis of the benefits of Windows 2000 and how they apply to the enterprise will be invaluable later when calculating ROI, selling the project to management, and evaluating success and failure.

Don't forget to play devil's advocate and look for negatives—identify features of Windows 2000 that might have an adverse effect on the computing environment. For instance, one nice feature of Windows 2000 is the *Knowledge Consistency Checker* (KCC), which automatically checks topology and allows replication to work more efficiently. One company in Europe, however, determined this to be a negative feature because that company has slow 32K links between most sites and wants full manual control over every bit of data that traverses the wire. Recognizing this at the start, the company turned off the KCC for intersite replication and built its topology by hand for greater control.

Poking holes in your own proposal gives at least the appearance of objectivity and at the same time exposes flaws that must be addressed during implementation. This allows you to avoid pitfalls up front.

The designer who has done his homework and is familiar with the limitations and problems in the current computing environment (and who has

been trained and has performed a study of relevant white papers on the advantages of new Windows 2000 features) should be able to develop this part of the plan. Chapter 1, "Developing a Business Justification for Migrating to Windows 2000," enumerates many of the differences and advantages that Windows 2000 holds over Windows NT 4.0.

Scope of the Project

With the purpose and objectives clearly spelled out, the scope of the project can be defined. The design team should develop this cooperatively. The important point here is to identify obvious areas of success for Windows 2000 and then focus on those areas for initial migration. In one case, although the design team all wanted to migrate to Windows 2000, the individual responsible for the corporate servers had a glaring problem. He managed UNIX, NetWare, and Windows NT servers with many users accessing resources in all three environments. He felt that the single sign-on feature in Windows 2000, allowing a single logon to the Windows 2000 and UNIX machines, not only would make his job easier, but also would result in an immediate positive impact for the users.

That company decided to confine the initial scope of the migration to the corporate domain controllers, build the infrastructure, and then migrate first the file/print/application servers and then the users. The company realized an immediate benefit in time savings (and thus cost saving) with single sign-on. Team members then could point to this success to sell management on supporting later stages of the project.

In some cases, a single area of cost savings could justify the entire project. The section "Scalability," in Chapter 1, notes that Compaq reduced the number of servers needed for Windows 2000 by several hundred. The actual savings came in reduced administration, support, maintenance, and spare parts. This savings significantly helped justify the total migration.

You see many references throughout this book to the value of a phased approach. Defining the scope is the place to identify those phases. Migrate in small, prioritized, well-conceived steps.

Development of a Project Timeline

With the tasks of the migration defined, it is important to build a timeline for the completion of individual tasks and the project as a whole. This timeline should establish deadlines for achieving milestones in the project and ensuring that objectives are met along the way.

Figure 3.1 shows a sample timeline for the entire project. This simply shows the order in which major components should be addressed (a lot of overlap between tasks is likely), and should not be interpreted as defining

how long these tasks take. You will need to create your own milestones and timeline based on available resources, organizational and political constraints, and factors such as hardware availability. Create a detailed, realistic timeline with specific milestones and a "critical path," and keep it current. This is the responsibility of the project manager. A number of methods and techniques can help do this, such as Gantt charts. Select the method that suits your company, and use it.
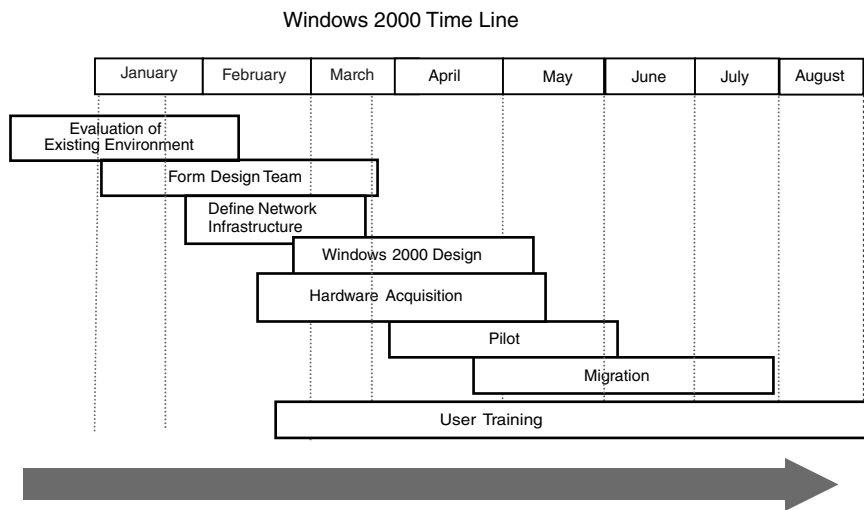
Windows 2000 Time Line

January	February	March	April	May	June	July	August

Evaluation of Existing Environment

Form Design Team

Define Network Infrastructure

Windows 2000 Design

Hardware Acquisition

Pilot

Migration

User Training

Figure 3.1   *Sample Windows 2000 migration timeline.*

The remainder of the action plan components are described in detail in the remaining chapters of this book. Turn your attention to an important and difficult aspect of the migration: that of developing a cost justification plan, usually referred to as return on investment. Companies are increasingly interested in determining the *total cost of ownership* (TCO) as well. The next section deals with these topics.

Cost Justification: Return on Investment and Total Cost of Ownership

Like any project of this magnitude, the Windows 2000 migration requires the completion of a cost justification. It is important to include in the team, at least at the beginning, someone capable of making such an analysis. You undoubtedly will find that there are increased costs with the Windows 2000 migration because of significantly greater hardware requirements and the purchase of Windows 2000 software, licensing, and any application software upgrades required for compatibility with Windows 2000. Other

costs include the time spent by the design team, application certification (a potentially a big expense), and actual migration costs, such as debugging installation procedures during the pilot, downtime while users are migrated, and expense incurred in network upgrades, if any.

Chapter 1 suggests that this is a good time to clean out all that old legacy hardware and to leverage the migration as a way of obtaining new hardware. Unfortunately, in many situations the purchase of new hardware is restricted or not feasible at all. Many companies are trying to keep their legacy hardware—486s especially—to stay within budget restraints. While Windows 2000 requires Pentium-grade processors and significantly more memory than NT 4.0, there are ways to get a little more life out of that old hardware. In fact, Terminal Server is included in the Windows 2000 operating system for the express purpose of allowing 486 machines to participate in the Windows 2000 domain as Terminal Server clients running applications. This is an attractive way to get the most out of budget funds.

Cost justification of Windows 2000 in the late stages of the beta was a much debated topic. In September 1999, The Gartner Group issued a report claiming that the migration cost of moving to Windows 2000 Professional on the desktop could take more than three years to realize a return on investment. The Gartner report claims that it cost between $1,250 and $2,050 per desktop to migrate from Windows NT Workstation 4.0 to Windows 2000 Professional, with the migration cost from Windows 9x to Windows 2000 being between $2,015 and $3,100 per machine. The report also claims that customers will not see a *return on investment* (ROI) for more than years. These figures apparently included only migration of the desktop, not the infrastructure. According to Microsoft's response, Gartner did not take into consideration installation tools, such as Remote Installation Service and unattended setup.

Unfortunately, I was never able to find the actual report, even from Gartner's Web site at `http://www.gartnergroup.com`. Microsoft's Web site has an article that refers to it and, of course, discredits it. However, Microsoft does reveal the figures Gartner came up with. The Microsoft article, "Gartner Group's Windows 2000 Professional Migration Model," is located at `http://www.microsoft.com/windows2000/news/bulletins/gartner.asp`.

The Arthur Andersen Report

As expected, Microsoft was not happy with the Gartner report: The company declared that the model was flawed, and responded to it on the Web site `http://www.microsoft.com/windows2000/guide/server/reviews/roi.asp` by quoting a report of its own, produced by Arthur Andersen.

By its own admission, the Andersen report, "Microsoft Windows 2000 Server: ROI Impacts for Corporate Customers," "makes generic high-level ROI observations about the impact of Windows 2000 Server…as a starting point in assessing the financial impact [of] Windows 2000 Server." The report does not use a case study to calculate the ROI to produce specific numbers like the Gartner report does. It simply makes observations without any hard data (none is presented, anyway). Still, the report contains excellent information and could be a good resource in your effort to get a handle on ROI calculation. This report compares Windows 2000 to only Windows NT 4.0, Service Pack 5; like the Gartner report, it analyzes only desktop migration, not infrastructure costs.

Because this report is a 107-page document, I have summarized some important points in the following sections.

ROI Methodology

Andersen used Microsoft's *Rapid Economic Justification* (REJ) Framework, available from the Microsoft Web site, as a framework for evaluating a potential ROI. Although the report notes that Andersen does not endorse this tool, it is impressive that they choose it. The REJ framework is very different than other ROI tools I found because it defines a framework for evaluating Windows 2000; it's not a number-cruncher. It definitely deserves evaluation for your ROI calculation.

Author's Note

The REJ tool and documentation are available at `http://www.microsoft.com/TCO/rejbrief.asp.` ◆

Test Scenarios

The test scenarios Andersen used for this study are interesting because they identify the areas in which Andersen felt the greatest savings could be found:

- Improved manageability
- High availability
- Scalability and performance
- Interoperability and security

Key Findings of the Andersen Report

The Andersen report made the following recommendations as a result of testing. Remember that this is a comparison of Windows 2000 to Windows NT 4.0 SP5:

- Windows 2000 is more scalable, reliable, and manageable.

- There is a significant learning curve in implementing Windows 2000. Use this against cost savings.
- Windows 2000 will have a significant positive impact on overall cost and control of IT assets.
- Windows 2000 features will have different value to different companies, based on size, complexity and business mission.
- Windows 2000 has sufficient benefits that it merits evaluation to see whether it will give value to your company.
- Benefits of Windows 2000 are fully realized only when Windows 2000 Professional is implemented.
- The greatest value of a Windows 2000 implementation is realized when integrating features with the operating system, resulting in improved reliability and scalability. It allows close integration of client and server.
- Larger organizations are likely to see a shorter ROI period than smaller businesses. Savings in IT management and administration alone might justify Windows 2000 migration for a large company. In addition, large organizations will more easily overcome training costs than small ones. This is not to infer that small organizations can't cost-justify the upgrade; just that the payback period will take longer.

Windows 2000's Most Critical Features

The Andersen report identified the following features as most critical to the organization, assuming implementation of Server and Professional products. The report also explains the benefits that are not detailed here. This is simply an overview to demonstrate what this report determined to be the most important features in calculating the ROI:

- Enhanced Distributed Services with Active Directory standards-based security, and centralized management tools.
- Enhanced reliability and availability via Dfs, Enhanced Clustering Services, and reduction in reboots.
- Enhanced scalability via symmetric multiprocessing, network load balancing, and Extended Memory Architecture.
- Enhanced application support via COM+.
- Enhanced interoperability (via X.500, LDAP).

Summary of ROI Reports

Neither the Gartner nor the Andersen report gives a template or a set of calculations that can be done to produce an ROI analysis for any given situation. The Gartner report points out some very disturbing figures in terms of desktop migration cost. The Andersen report, on the other hand, finds favorable reasons to migrate to Windows 2000 Professional and gives a list of ways to gain a favorable ROI, even though the report doesn't mention specific numbers.

The point here is to expose the designer to two differing opinions and calculation methods, and then allow him or her to examine the issues and learn how they might apply to a particular enterprise anticipating a migration. The designer then can identify any stumbling blocks in advance of the migration.

The Gartner Web site, at `http://gartner3.gartnerweb.com/public/static/win2000/win2000.html`, includes a number of excellent articles on Windows 2000 migration. There are three reports of particular note: "The Higher Licensing Cost of Upgrading to Windows 2000," "Windows 2000 in 2000: Cases for and Against Desktop Migration," and "Windows 2000 TCO and Migration." This third paper is particularly useful because it addresses ROI, migration costs, the process of creating a timeline, and Windows 2000 project teams (referred to in this chapter as the design team), and it provides some interesting numbers on staffing requirements for the migration. Unfortunately, it has more pretty pictures and icons than hard data, but it does have some good information and some useful data.

The Problem with IT ROI Calculation

The problem in calculating *information technology* (IT) ROI was described in the article "What's Your ROI," in the August 24, 1998, issue of *Information Week Online* (`http://www.informationweek.com/697/97iuroi.htm`). Author Jeff Sweat notes that although there is more pressure on IT managers to justify IT projects with a calculated ROI, few have figured out how to do it. He also asserts that the many tools built to automatically calculate ROI are unreliable. He further claims that the reason for this difficulty is that IT affects so many aspects of the business that it is difficult to tie IT upgrades to a cost reduction or productivity improvement.

Establishing a hard cash benefit of something that hasn't been implemented is difficult and, in some cases, suspect. For example, trying to predict that implementation of Active Directory will save money because advanced power management is more efficient (as one presenter tried to

prove), or because people can do their job faster, or because administration will be easier, is difficult. You have to be able to tie those results to actual costs and show that the new technology can reduce costs. You might show that administrators can handle more tasks and reduce the number of administrators, or that this will allow business expansion for some time without hiring any more administrators. Logon time to a catalog phone order specialist is critical because they are evaluated on the number of calls taken, and slow logon time can reduce the time they have to take orders.

At a Windows 2000 conference I attended, I witnessed a presentation on cost justification methods. The presenter had a slide claiming that improved power management would keep laptop batteries charged longer. He claimed that if it saved one minute a day, this could be extrapolated to a savings of $1.5 million, by multiplying that minute by the number of users with laptops, and by the number of days in the year. The attendees quickly pointed out that this is an immeasurable saving. This is an example of what I refer to as "soft money"—it doesn't really translate into savings that you could ever measure or validate. Besides, if you get into a contest of saving seconds for various operations, you might lose a few battles on tasks in which Windows 2000 might not be as efficient as another OS.

ROI Calculator Tools

I explored a few ROI calculators available on the Internet: All tend to be very specific to an industry or product, and they use numbers from surveys. For instance, if you want the ROI on implementing Lotus Notes in an organization of 10,000 users, a tool would find similar companies and see what they saved (via a survey), average them, and return information (assuming that you will be average).

Every company is different, though, and your ROI calculations will be specific to your business. It requires some time and effort to get an accurate ROI. Don't trust the success of the migration to a five-minute ROI calculation (as one vendor claims).

To calculate a believable ROI, you must have hard numbers. It is easier to not only accurately predict the ROI of the Windows 2000 upgrade, but also to gain support of upper management when you have a specific project that would benefit from the upgrade. A discussion on how to identify those hard costs appears later in this chapter in the section "Identifying 'Hard' Cost Savings."

You should keep two important points in mind when creating a valid ROI analysis. First, management typically isn't interested in all the technical goodies that we computer-types get excited about. So what if you have a hierarchical namespace? So what if Windows 2000 uses industry standards

like x.500, LDAP, and DNS? So what if this is closer to an enterprise oper-
ating system than NT ever had hopes of being? So what if administration is
much more granular than NT? Management wants to know how many
people it can lay off, how much more work can be done, how production of
a product can be increased, how the number of computers can be reduced,
or how other overhead can be reduced. Secondly, if you can find a particu-
lar area that you know will have an immediate benefit, use it and see how
far it takes you. This should be a visible, high-profile project whose success
is all but guaranteed. The scenario cited earlier in which Compaq reduced
the number of servers is a good example of this.

The same approach should be taken when cost-justifying a migration to
Windows 2000. Study and test the benefits of Windows 2000, and review
with the design team the area or areas of the company that could benefit
most from the upgrade. Chapter 1 discusses a number of features and bene-
fits and shows how they can be translated into cost savings or justification
of the upgrade. As more companies adopt Windows 2000, more accurate
data from other sources will become available.

Implementation Costs

This section lists areas associated with implementation of Windows 2000
that affect implementation costs. Rather than try to list individual costs, I
have listed areas that likely require additional funding. As the designer, you
must rely on the design team to try to predict actual costs so that no
surprises cause the project to run over budget. These are only representative
costs, and they may be more involved for your situation. Still, this should
give you a good start. Following are the areas that affect implementation
costs:

- Hardware: Workstations (new purchase and upgrade).
- Hardware: Servers (new purchase and upgrade).
- Training (staff).
- Training (end users).
- Network.

    Increase in capacity (new subnets, routes, wiring, and switches).

    Additional WAN costs (more service coverage, additional lines, and line
    upgrades).

    Downtime during testing.

    Increased bandwidth consumption during pilot.

- Interoperability. During the migration, when there is a mixture of Windows 2000 and NT Servers (and perhaps MAC, UNIX, and NetWare clients) and when users are trying to connect to resources, the potential for downtime is significant because resources may become unavailable.
- Applications.

  Purchase and licensing of new applications to replace legacy applications that are not Windows 2000-compliant.

  Modification of custom (in-house developed) applications to make them Windows 2000-compliant.

  Testing for Windows 2000 compatibility.
- Licensing of Windows 2000. See Microsoft's Web site, located at `http://www.microsoft.com/Windows/server/Overview/pricing/` `pricingwindows.asp`, for pricing information.
- Increased administrative costs.

  Security (more complex—more time to design, configure, administer).

  Ramp-up. In the long run, administrative costs will be reduced, but initially the administrators must get up to speed, and it will take time to get the process tuned.
- Time and salaries of the design team and other staff. What will it cost you to fund this team?
- Tool development, especially migration tools, custom administrative scripts, and so on.
- Increased number of users. Will more users be added than were in the previous environment? This could happen if a consolidation occurred, such as converting a group that was using NetWare to Windows 2000 in an effort to move to a single OS platform, thus increasing administration costs of supporting these new users. However, it might be possible to train the NetWare administrators and use existing resources to some degree.

TCO Calculation

Hand in hand with ROI calculation is the total cost of ownership calculation. An excellent description of TCO calculation is found in a report by the Gartner Group. The article, "TCO Best Practices Amplify IT Cost Reductions,"(`http://www.gartner.com/webletter/microsoft/article4/` `article4.html`) defines three areas of best practices in calculating TCO: technology, process, and people. The following lists categorize these:

- Technology best practices:
  Automated asset management: systems management and scalable architecture
  Fault tolerance: software inventory and automated software distribution
- Process best practices:
  Managed user environment
  Vendor standardization
  Service-level tracking and management
  Capacity planning
  Change management
- People best practices:
  User training
  IS training
  Stable IS organization

Especially intriguing about the report's findings are the graphs illustrating the different TCOs if all these practices are followed, versus the TCO if none or any two best practices are followed. Of course, the lowest TCO is realized, according to the report, if all the best practices are implemented. However, the factors contributing to the savings, in order of impact (highest impact listed first), are these:

1. Downtime
2. End user IS
3. Communications
4. Development
5. Support
6. Management
7. Hardware/software

Gartner concluded the study with the following comment:

> The deployment of technology carries with it both costs and value; poor implementation occurs when the costs outweigh the benefits, producing negative value. Technology itself is seldom to blame; most often the cause of negative value is a poorly scoped implementation or the failure of the organization to integrate technology into the process. Clearly, the correct combinations of technology, process, and people-related best practices have a substantial impact on lowering TCO.

This statement should serve as a warning to anyone planning a migration to Windows 2000. Just because you have planned it out on paper and have a positive bottom line financially doesn't necessarily ensure success or a cost analysis at the conclusion of the project. You must implement a realistically scoped plan properly, and employ technology-, process-, and people-related best practices.

Recommendations on Areas of Significant Cost Reduction

What now is to be made of all these recommendations, studies, and opinions? Let's summarize what has been presented to this point, from the business justification notes in Chapter 1, and the reports and experiences described in this section.

As noted in Chapter 1, excellent information is contained in Microsoft's *Windows 2000 Deployment Planning Guide* available from the Microsoft Web site at `http://www.microsoft.com/windows2000/library/resources/ reskit/dpg/default.asp`. This document has excellent figures on industry standard costs on downtime and other costs that can be reduced with Windows 2000 deployment.

To summarize Chapters 1 through 3, the most significant areas in which you will likely see cost savings by implementing Windows 2000 are listed in the following sections. Details are not discussed here because they already have been listed in Chapters 1 through 3 of this book.

Identifying "Hard" Cost Savings

I once made a presentation to the president of a small manufacturing company I worked for, as a proposal for installation of a network and other computer upgrades. I had done my homework and had calculated and nicely presented an ROI. After my presentation, he leaned forward, looked me in the eye and said, "If I give you this money, how many people can I lay off?" I wasn't prepared for this question, but after I thought for a minute, I replied, "None, but we can improve production on the Numerical Control Milling Machines by about 100%." He gave me the money.

In determining cost savings, it is important to use savings that are realistic, fairly conservative, and measurable. Management doesn't care about how flexible the domain model is; management wants to know how many people can be laid off—that's something measurable.

Here are some examples of what hard costs could include:

- Reduced help desk support through more verbose event messages
- PNP and improved hardware support (less time to install)
- Terminal Services, to allow the use of legacy hardware and extend hardware life a little longer

- Reduced administrative costs (already discussed in this chapter)
- Reduced number of servers (as noted earlier in this chapter)
- Reduced downtime via high availability
- Use of VPNs to extend or replace the WAN
- Single sign-on
- Reduced blue screen and required reboots
- Improved troubleshooting tools, including log files, verbose diagnostic logging, Replmon, and other command-line tools
- Improved installation options, including RIS, Sysprep, and ZAW, to speed desktop migration and make it more reliable

Determining Hard Cost Savings

The term "hard cost savings" refers, in this book, to costs that actually can be shown to produce a cash savings, such as reducing administration, hardware, support costs, and other tangible costs. The design team—and, in particular, the member assigned to cost justification—will be held accountable for proving the savings when the project is completed. If hard savings are used, this will be easy to prove.

> ### Business Advantage
>
> *This entire section contains information on establishing business advantages for the Windows 2000 migration. The details and examples cited here should be considered for use in the cost justification, depending on the configuration and needs of the enterprise.* ◆

The best way to find actual hard savings is to use this method:

1. Determine your current costs.
2. Estimate what savings can be expected with Windows 2000 features (use a percentage estimate).
3. Multiply the percentage savings by the current costs to determine the anticipated savings.

For instance, if your company spends $250,000 on help desk support, internally or externally, and you believe that Windows 2000 could cut that figure in half, you can anticipate a savings of $125,000.

Of course, the wild card here is step 2: the estimate. Still, Microsoft has produced a number of documents using actual experiences to help you in that estimate. If you can get detailed reports showing problems caused by blue screen crashes, such as 1,000 hours downtime, (in troubleshooting, for instance, because users couldn't connect), and Windows 2000 easily can cut that number in half, you have saved 500 hours times the cost of having

users sit idle. The cost can be calculated by estimating the average number of users affected and multiplying that by their average salaries (assuming that they are idle or not doing productive work). A few representative estimates are explored in the following sections.

Reduction in Downtime

Reduction in downtime is perhaps the most significant of any area in reduced costs. Keeping hardware available for users is perhaps the most important task of any IT group. If you can reduce downtime, you save money and make users and management alike happy.

Consider a catalog mail order business that I surveyed. A down server averages about an hour per incident during which orders must be taken by hand. After the computer comes back up, employees must enter the orders into the computer, call customers back to confirm that the items were in stock, and still handle new calls. For every hour the computer is down, about an hour per employee is spent in recovery. There are 125 employees on a shift, and this situation occurs about twice a month (that's two hours of downtime per month). The salary and benefits per employee is an average of $15.00 per hour. That means the annual downtime cost in lost productivity for the customer service reps would be:

250 man-hours/month × 12 months × $15.00 = $45,000

In addition, the downtime affects office staff and the warehouse staff. While these staff members can do other things, it makes them less productive, so we'll estimate that the lost labor cost there will be about 25%. Their average salaries and benefits are $25 per hour. There are 100 people in this category, so their downtime costs would be:

(200 man-hours/month × 25%) × 12 months × $25 = $15,000

Other costs include delayed shipments, hardware and software maintenance, and support contracts. However, the delayed shipments are difficult to affix a cost to. Hardware support is always needed, but if a lower level is purchased due to fewer incidents, it could save about $5,000 per year.

Analyzing the problems causing the computer to be down, we estimate that Windows 2000 features of fewer blue screen crashes, improved hardware support, and easier trouble diagnosis and resolution could reduce the computer downtime by about 40%, based on actual incident reports. So, 40% of the annual $60,000 in labor costs for downtime means that we could expect to save about $24,000 per year. Add the $5,000 reduction in hardware support costs, and the annual cost savings is about $29,000 per year.

It is important to be conservative in cost savings estimates so that, in case it doesn't work out as expected (as it rarely does), there is a cushion. It would be better to look for other cost savings. For instance, in this company, employees were using an antiquated DOS-based application for taking orders that was slow and difficult to use. Upgrading the application, wrapped in with the Windows 2000 upgrade, could increase productivity and provide a cost benefit. Obviously, a larger company would experience savings in other areas. For instance, a manufacturing facility with numerically controlled machines in the shop would experience a very high downtime cost because downtime could stop production lines, and those costs add up quickly.

Reduction in Number of Domains, Servers, and Administrators Required
If downtime is the most significant area of cost savings, reduction in the number of domains, servers, and administrators required is the next most significant area. What could be more appealing to upper management than good, old-fashioned reductions in overhead?

As noted in Chapter 1, some companies already have realized significant savings by reducing the number of servers required. They have found that Windows 2000 often significantly reduces the number of domains, thereby reducing the number of servers and administrators. For instance, Compaq realized a reduction of several hundred servers by migrating from NT 4.0 to Windows 2000, including implementation of Exchange Servers, which increased the Windows 2000 server requirement. This is a huge savings in administration, maintenance, support, and spare parts.

The point is that you need larger machines (disk, memory, and processor), but you need fewer of them. This means fewer to maintain, buy licenses for, and administer. This could even decrease downtime: If you have only 25 servers compared with 100 servers, you have mathematically reduced the probability of failure.

This is the easiest place to calculate savings: Get the servers and their maintenance off the books, or reallocate them, so that another department picks up the costs and saves money over buying new hardware. If the machines are leased, of course, those leases can be terminated and the costs can be recovered.

Business or Productivity Increases
Is there an area of your company's business or operations that could see immediate benefit of a Windows 2000 migration? Can you translate that into hard cost savings? This will have a big impact in many ways if a legitimate improvement can be realized.

For example, one company was maintaining two separate NT builds: one for the United States, Europe/Middle East/Africa, and Asia Pacific; and another for Japan, with a Japanese version of NT installed. Windows 2000 allows the company to use a single build of the operating system with appropriate *Multilanguage User Interface* (MUI) applied on a regional basis.

Author's Note

Note that only the English version allows other language packs to be applied, so you must start with English and add the other language packs. ◆

High Availability

Improved clustering support, as described in Chapter 1, is designed to increase server availability and resources. Windows 2000 clustering is much improved over Windows NT 4.0 in terms of ease of configuration and reliability.

In addition, other Windows 2000 features, such as Dfs Shares, reduce downtime and keep users connected to resources if a resource such as a server becomes unavailable. Even if you don't use clustering, Dfs can have a significant impact on resource availability.

Author's Note

Chapter 1 contains a good description of clustering and 64-bit architecture that defines high availability. ◆

Reduced Administration Costs

With centralized administration, Group Policy, better (and customizable) tools, Terminal Server access to computers, and granular administration to offload administrative duties to more administrators, Windows 2000 can reduce administration costs, although these savings will be greater as the system matures and more users are migrated to Windows 2000. Of course, this also reduces the number of administrators needed due to the reduction in domains.

Identify administrative tasks that can be automated and perhaps eliminated with Windows 2000 through scripting, and get time estimates for savings calculation. Don't forget the ability to use Terminal Server to log in to a remote computer to fix a problem on a server in a time zone where everyone is asleep (also known as "follow the sun support").

Reduced Support (Help Desk) Calls

A wider range of hardware support and better troubleshooting tools reduces administrative and help desk time required to get new devices working, to recover from crashes, and to solve access problems. Many of these options, such as safe mode boot, DS repair mode, and Recovery Console are noted in Chapter 1. However, subtle improvements also can reduce costs, such as improved diagnostic logging and more meaningful event messages. Figure 3.2 shows the text version of an actual event. Note that it not only describes the problem, but also gives a six-step procedure to correct it. With instructions accompanying many events, administrator likely will be able to resolve many issues quickly and without calling for support, thus reducing down time and potentially reducing support costs.
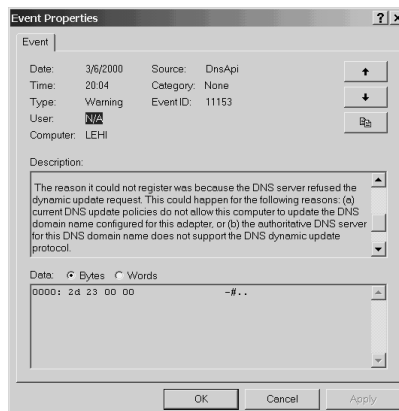

Figure 3.2 *Descriptive event message.*

Reduced WAN Costs Through VPN Implementation

Reduced WAN costs through VPN implementation could be significant, as noted in the Andersen study earlier in this chapter. However, this takes significant time to implement, so the savings are not immediate. VPN solutions are addressed in Chapter 4 and Chapter 7, "Active Directory Replication and Site Design," which discuss namespace and replication, respectively. Windows 2000 offers a significant improvement over Windows NT 4.0 VPN solutions in terms of security. The use of IPSec makes Windows 2000 VPN potentially very secure (depending on implementation). This is a serious problem for Windows NT.

For example, a company was spending nearly $1 million per month on phone line charges for a toll-free 800-number to allow employees to connect

to the RAS servers. An average of 15,000 employees connected via RAS per month. With a secure VPN solution as in Windows 2000, you could purchase an Internet account for each employee at about $30 per month and eliminate the RAS lines—and save more than $500,000 per year and have better connectivity.

Figure 3.3 demonstrates how a VPN solution can eliminate the WAN, or at least certain segments of the WAN, by having private networks connect to the Internet and then by making a tunnel connection to a tunnel server on the corporate backbone using the Internet for a WAN.
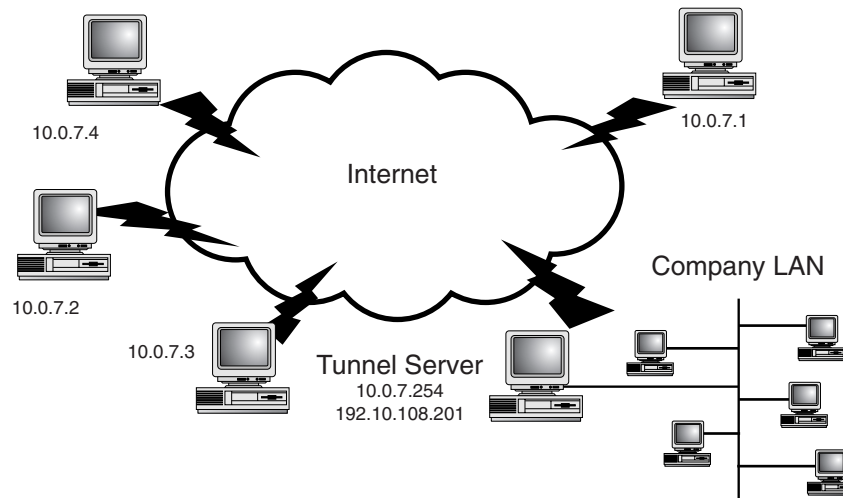

Figure 3.3 *The Internet can be used, in combination with a tunnel server on the corporate backbone, to eliminate or reduce traditional WAN infrastructures.*

Business Advantage

It is conceivable that a small or medium-sized company could use VPNs for an entire WAN. The technique for building a VPN strategy, including a step-by-step process for configuration, is described in the New Riders book, Windows 2000 Virtual Private Networking, *by Thaddeus Fortenberry. Fortenberry and I successfully configured a Windows 2000 forest in which every remote site was connected to the hub site by a VPN connection, including a 56K (modem) line, a cable modem line, a DSL line, and an ISDN line. This proved the basic concept that VPNs are powerful enough in Windows 2000 to represent a major cost savings in WAN architecture.* ◆

Reduced Installation Costs

Installation costs for deploying Windows 2000 to the desktop will be significant, as is the case for any operating system upgrade. However, Microsoft's *Remote Installation Service* (RIS), Sysprep, and improvements in unattended installation capabilities make a big difference in installing and upgrading both client machines and servers. These products and techniques probably have a greater impact during deployment than they will after migration is completed. Installation costs multiply when restaging a failed machine even after the migration. A number of products are being marketed by third-party companies to handle automated installation tasks, including Compaq's *Automated Installation Service* (AIS), which combines software tools and consulting to perform the installation.

Automated installation will be discussed in detail in Chapter 10, "Developing the Migration Plan," in the section "Client Installation and Upgrade Methods." This topic also is touched on in Chapter 11, "Implementation of the Migration Plan," and Chapter 12, "The Transition Period and Postmigration Tasks."

Determining "Soft Money" Savings

All the details for determining soft money savings are discussed in Chapter 1, where the business advantages for Windows 2000 are listed. Be careful not to start turning seconds of supposed time savings into millions of dollars per year of savings on something that you can never prove. Nevertheless, soft money savings are important. As pointed out in Chapter 1, there are numerous business reasons to migrate to Windows 2000 that will not translate into cash savings. Future enhancements, compatibility, and software and hardware support fall into this category.

Because most executives have become very dependant on their laptops, power management, client side caching, and data recovery will win points even though you can't calculate savings easily.

Other areas such as single sign on, distributed authentication, flexible domain structure (use of OUs), and the low-risk nature of the migration will add strength to your proposal for migration, even if these points can't stand on their own.

ROI and TCO Calculation

ROI and TCO calculations are required, and it is essential that you use hard numbers as much as possible. Do your homework, and note the points made previously in this chapter—especially in the Anderson report and the Gartner notes. Don't use figures that can't be validated later—for example, how can you prove that users can log in faster?

Work with your CIO and other financial people while developing the ROI. Find out if there is a procedure, a form, or a way that the management expects it to be done, and do it their way. If there are no current tools or processes in the company, examine the results of the Andersen and Gartner reports noted earlier in this chapter, in the section "Cost Justification: Return on Investment and Total Cost of Ownership." As was noted in that section, no magic tool that will do this, in my opinion. This is a process, and the information in those reports should be taken into account. You might consider the following steps in the process:

1. Determine implementation costs (noted in the earlier section "Implementation Costs"). Don't forget the learning curve that is required.

2. Andersen determined that the most significant cost savings could be found in improved manageability, high availability, scalability (fewer servers and domains), performance (reduced traffic, among others), and interoperability and security. Study the report, and see how Andersen defined these. Then see how they can apply to your situation, and determine any cost savings from them.

3. Examine any particular area of the migration or the existing infrastructure that will benefit from a Windows 2000 feature, such as single sign on, reduced number of servers, and reduced blue screens that have been exemplified in this chapter. Determine hard cost savings.

4. Determine benefits of Windows 2000 to lower the TCO (refer to the "TCO Calculation" section of this chapter). The Gartner Group identified 13 best practices in the areas of people, process, and technology, and claims that implementing all of these best practices will cut the TCO by half compared to not implementing any of them. The Gartner Group invented the TCO process, so its opinion should carry some weight. It would seem worthwhile to study this report, analyze its recommendations, and implement them where appropriate for your situation.

5. Investigate other resources. The Gartner Group Web site, noted earlier, at `http://gartner3.gartnerweb.com/public/static/win2000/win2000.html`, has some excellent articles, as does the Microsoft Web site, `http://www.microsoft.com/windows2000/library/resources/reskit/dpg/default.asp` in the *Deployment Planning Guide*. All this research will give differing ideas and opinions on how to determine deployment costs and return on investment. It is up to the architect, or whoever has this responsibility on the design team, to become educated regarding these recommendations, studies, and tests, and then to develop a plan that will fit the enterprise. Take advantage of the research and experience of others.

One size does not fit all. Your mileage may vary. There is no magic formula. These are all clichés that are appropriate here. You must do a thorough study and analysis. Resist the temptation to search for ROI tools on the Internet, plug a few numbers in, and voila—your ROI is calculated. It just isn't that easy, and your figures won't be accurate.

Windows 2000 ROI Planning Form

The Web site for this book, `http://www.newriders.com/1578702429`, contains a Windows 2000 ROI Planning form. This form lists major areas identified here and in Chapter 1, and has columns for estimated benefit, the Windows 2000 feature that provides that benefit (such as RIS), and the estimated savings. This is not an ROI form per se, but merely is a way to collect data into a simple form that is easy to work with. The items listed in the form as cost-saving areas are those described here and in Chapter 1 as those with the greatest potential to generate cost savings. However, it is a good idea to add additional cost benefit areas to the Business Advantage and Cost Benefit Checklist that you completed at the end of Chapter 1 (see Table 1.1). For example, if you believe that Windows 2000's improved hardware support will save you a lot of time in installation and configuration of existing PCs (because of past experience taking a long time to reconfigure or reinstall), simply add this area to the first column, and fill in the estimated cost savings. In addition, this book's Web site includes a complete ROI calculation including justifications, data, schedules, payback calculations, and other documentation. This will be helpful if you have never completed an ROI calculation.

What's Next?

We have evaluated the benefits of Windows 2000, analyzed the current environment, developed an action plan, and analyzed the expected costs and cost savings by developing an ROI and calculating the TCO. This completes the first section of this book. The next section of the book defines important design aspects of the Windows 2000 environment. Chapter 4 covers the first step in the Windows 2000 design process.