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The Shortcut Guide™ To

PC Restoration and Disaster Recovery

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Chapter 2: PC Life Cycle Management

In the first chapter, the PC desktop was defined as the ecosystem of hardware, firmware, OS, applications, data files, and configurations that the user thinks of as his or her computer. Although users may think of the tower sitting under their desk or the laptop they tote on the airplane as their computer, it is only one of the components that contributes to their computing experience.

For most organizations, the investment in personal computer hardware is extensive. It is often a target for budget cuts. A carefully thought-out plan can help produce the greatest yield from that investment. The more productive use that workers get from the desktops, the greater is the return from that hardware investment.

Hardware changes and replacement are the central theme of this chapter. Hardware changes are closely linked to desktop restoration because the required capabilities of the desktop restoration system are intimately linked to various types of hardware changes. Conversely, the ability to quickly and effectively manage hardware changes can be strongly improved by a robust, scripted desktop restoration system. Understanding the hardware life cycle changes most organizations encounter will help develop a desktop restoration system that makes the most effective use of that hardware.

This chapter will consider the role that hardware plays in providing a desktop for the user. It will examine the reasons hardware changes and the appropriate steps to take to restore the desktop to full operation once the hardware changes—whether it be small incremental changes or migration to a completely different platform. The chapter is organized into four sections:

- Planning a hardware life cycle—Hardware goes through a cycle of changes. This chapter addresses the reasons that hardware changes, compares different approaches for planning hardware replacement, and the process of projecting hardware changes. A desktop restoration system than is designed for these changes will best meet the needs of the organization.
- Extending the life of the platform—Organizations have a great deal invested in hardware. This chapter discusses troubleshooting hardware component failure and using upgrades to get more life out of systems without leaving users stranded without a usable work system. The desktop restoration system can help make changing hardware incrementally cost effective and help to mitigate risks.
- Desktop re-platforming—Computers all become obsolete. This chapter examines moving the desktop to a completely new hardware platform. It addresses changes such as upgrading from 32- to 64-bit or moving to a laptop from a desktop personal computer. The right desktop restoration system will minimize downtime and protect the assets of the desktop.
- Managing the hardware life cycle—Working with hardware is a process, integrating policies, people, processes, and products. This chapter treats managing the changes in hardware and the policies and procedures used to keep user desktops operating on the right systems.

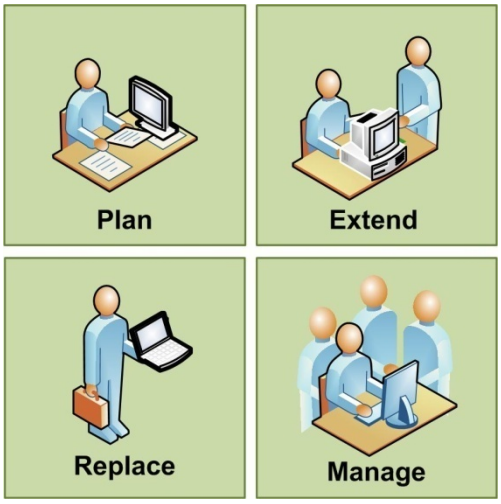

Figure 2.1: The desktop restoration process can help to optimize investments in the organization's hardware.

Planning the Hardware Life Cycle

Personal computer hardware has a tendency to become obsolete long before it wears out. The effect of Moore's Law on hardware is that it typically becomes obsolete within a year or two of manufacturing. The hardware works fine, but it lacks capabilities of the newer computers available in the marketplace.

> 🕮 For more information about Moore's Law, see http://en.wikipedia.org/wiki/Moore%27s_Law.

This leaves companies in an uncomfortable place. They have an installed base of functioning hardware that serves their employees. Replacing that hardware could improve productivity, but determining how much it would improve and assigning a dollar value to that improvement is difficult and often inaccurate.

The process is not trivial. It is a common belief that a 5-year-old computer with a 500MHz processor and 128MB of RAM running Microsoft Windows 98 and Office 97 is all the common office worker really needs to do their job. Yet it is currently difficult to find a computer that has less than a 1.5 GHZ processor and 512MB of RAM. Microsoft XP would not run well on that older piece of hardware, and one can no longer keep Windows 98 or Office 97 secure against malicious programmers. Microsoft has spent billions of dollars making their new OSs more productive and secure, but quantifying the value of those enhancements is challenging.

The life of a particular hardware platform can be extended by upgrading components. A portion of the cost that must be considered when repairing, upgrading, or enhancing hardware is the time and expense involved in changes to the desktop environment. From a desktop restoration standpoint, the time and expense of getting a working computer to employees when hardware is repaired, upgraded, enhanced, or replaced is a critical part of determining the cost of the enhancements.

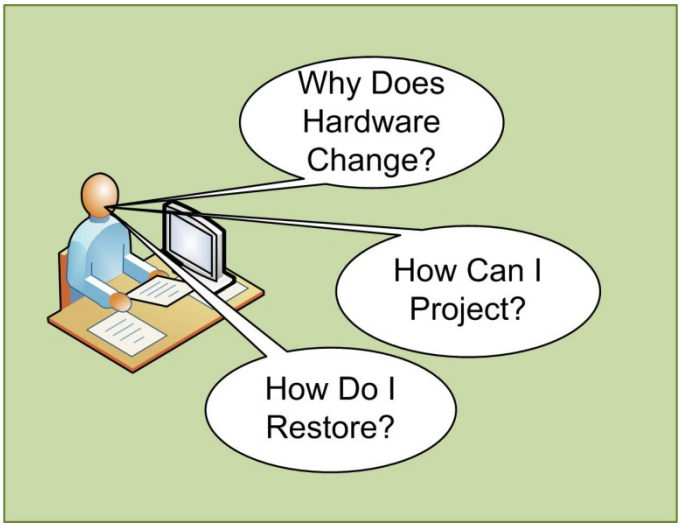

Figure 2.2: Planning for hardware change can help optimize the process of restoring desktops when the change occurs.

Why Do Desktop Hardware Platforms Change?

There are a variety of reasons that drive hardware change. By understanding these factors, it becomes easier to plan for the changes and to be prepared. Think about the reasons that a user might need to change or replace their hardware.

- A change in position requires different applications with different hardware support. It may mean a more advanced graphics card, faster CPU, enhanced networking or communications hardware, and so on.
- A user may move to a different office or physical location. They still need their desktop but it may be difficult or impractical to move the hardware.
- Users may become dissatisfied with the performance of their computer and be granted a more performant machine.
- Security requirements may change. Installation of hard drive encryption devices, smart card readers, or bio-identification devices, such as fingerprint readers, may trigger a corporate-wide change in hardware.
- A user may need to move from a standard PC to a notebook PC.
- An older component, such as a graphics card or network adapter may fail. This can often lead to replacing the component with an upgrade.
- Older hardware may not support required security patches and necessitate a refresh to support the current desktop requirements.
- New applications may be deployed, requiring additional computer resources and greater storage.
- Users may overrun the storage they have and require additional space to keep their individual data.

The reasons for change vary from organization to organization. One organization may feel that faster CPUs are simply a waste of money while another organization runs software that taxes their computers and looks to provide more responsive platforms. If all employees have mobile computers, relocation to a new location will not play a role. Some companies must provide computers to employees in multiple countries, so shipping a PC to a new location is a long and expensive proposition. Each company should brainstorm the reasons hardware switches in their organization and use that list as the starting point for their analysis.

Simple recordkeeping for the reasons for hardware change—from component replace to upgrade to entire computer replacement—will provide the basis of determining this pattern. Knowing why hardware changed and categorizing that information can expose trends that can change the way a business thinks of hardware modification.

It is easy to allow the changes to occur without recording them. By setting processes in place to capture this data and providing personnel with tools to simplify capturing and analyzing the data, the reasons for change can be easily defined. The reasons for change touch desktop restoration directly. Knowing the reasons for change can help define the correct desktop restoration solution and define the policies, processes, personnel, and products required to implement that solution.

Projecting Hardware Change

If you understand how things have changed in the past, it becomes much easier to predict how things will occur in the future. The process is much less intimidating that it appears at first blush. There are two areas of concern: quantitative change and qualitative change.

For quantitative change, the process is simply a matter of noting the type of changes that occur and at what frequency. To simplify analysis, break down changes into simple categories. The categories will be determined by the needs of the organization. A common approach is to track by component type. Tracking the number of replacements over time will allow the changes to be graphed. Most spreadsheets have a built-in capability to project a trend once baseline data is graphed. Simple recordkeeping and a few minutes in a spreadsheet can provide IT with the data they need to project hardware changes into the future. Figure 2.3 illustrates such an approach.

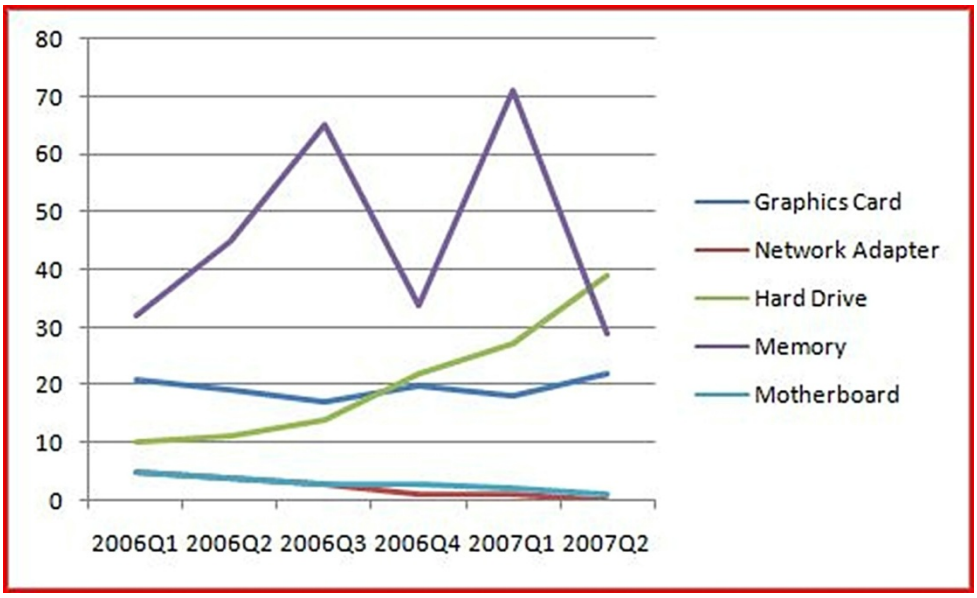

Figure 2.3: Tracking hardware changes can provide a basis for predicting and budgeting change.

The graph can show what items are consistent, what items are increasing, and what items are too unpredictable to project. All this information can help to develop budgets and planning contingencies.

For qualitative planning, the reason for the change becomes central. If the reasons for change can be identified, these drivers can be tracked and used to project changes. For instance, if an application was deployed to accounting and required 50 percent of the computers to replace their hard drives, rolling out the same application to inventory management may well have the same result. A defective component can be identified. If a network adapter starts failing at a 50 percent rate, the adapters currently in use are at risk and will likely require replacement.

The results may not be perfect but simple steps to analyze these trends and use it to project future activity can produce surprising results. The tools used to backup PC desktops frequently provide inventories of what those computers contain. A little recordkeeping and some simple analysis can provide the basis for determining the direction in which an organization is headed.

The trends in hardware change, and a project of the time required to complete these changes, often become the basis of the budget for a desktop restoration system. In addition to the costs of the hardware change itself, many factors should be considered:

- Lost productivity while PCs are unavailable
- Time spent implementing the changes
- Capacity planning for desktop restoration solutions
- Costs of solutions compared with losses incurred during downtime and restoration

Restoring Desktops on New or Changed Hardware

All this analysis may seem like overkill if the only real question you have is, "How do I get the desktop restored?" Every solution for desktop restoration has a cost. Every approach will consume some type of corporate IT resources. The cost of that system must be the balance for the costs and risks of losing desktop PCs.

> In the rest of this chapter, restoration is meant to be the process of getting a desktop back into functional status. A restoration could be as drastic as replacing all the data on the hard drive, or it could be installing selected pieces of the OS, such as drivers or support utilities, to accommodate changes in the system. The desktop restoration solution used will determine how flexible it can be in making the restoration. It can mean saving time, cost, resources, and much frustration to have a flexible restoration solution at the disposal of the IT staff.

Understanding the types of changes that are required help define the requirement of the desktop restoration solution. Consider the following scenarios:

- A user migrates from a standard PC to a laptop. A manual approach to moving the applications, configurations, and data may take 8 business hours. Twelve hours when the user cannot use his/her computer (either desktop or laptop) and 8 hours during which a technician is tied to the project. If this occurs two or three times a quarter, this might be an acceptable approach. If it occurs two or three times a day, a system that automates the processes and reduces the migration time to less than 30 minutes is in order.
- A department has been outfitted with 20GB hard drives. A new document-scanning solution requires the documents to be stored locally. The units do not have room for a second hard drive, so the only realistic solution is to change the existing hard drive. A desktop restoration system that can replace the image of the old hard drive 20 minutes after the new hard drive is installed is clearly worthwhile. If a second hard drive could be installed on the computer with minimal change to the application, a desktop restoration may not be required at all.
- A department is re-located to another office. In addition to new furniture, the department members are getting new computers. They still want their existing desktops—application, configurations, and personal data. A system that can re-install the desktops on the new hardware in the new location becomes very valuable.
- A corporation decides that Microsoft Vista Enterprise will become the new corporate standard. The new requirement calls for each computer to contain at last 512MB of RAM (according to the box) and a display adapter with 128MB of RAM. Two-hundred and twenty-five computers require hardware upgrades to meet the new standard. New video drivers must be installed with the new display adapters.

> A desktop restoration solution that maintains a hardware inventory can be a great boon to this type of assessment. It can identify the computers that meet the current need and those that will require upgrade. Although not strictly part of desktop restoration, it can help in the planning of the corporate hardware life cycle.

- A budget excess allows a department to replace the PCs for their 38 users. The desktop environment for each employee must be moved to the new hardware with a minimum of disruption.

These are examples of how understanding the areas that drive PC change can be used to specify the correct solution and determine the budget that makes sense for the specific needs of an organization. By projecting the expected changes and estimating the costs those changes represent, an organization can lay the foundation for a budget. Pricing the cost of differing backup and restoration solutions can determine the best value for that organization.

Extending the Life of the Platform

As defined earlier, a desktop is an environment combining hardware, OS, software, personal data, and configurations. Any of the components in the ecosphere can be changed, including part or all of the hardware.

If hardware can be modified, it can enjoy a much longer useful life. From a desktop restoration standpoint, these changes to the underlying hardware can be supported, or greatly hindered, by the solutions put into place to protect the desktop.

This section will explore using the desktop restoration system to support modification of the desktop platform to help get the most life out of the hardware. It examines the common hardware modification tasks—repair, upgrade, enhancement, and re-tasking—and explores how the restoration can be used to make this process smoother and more efficacious.

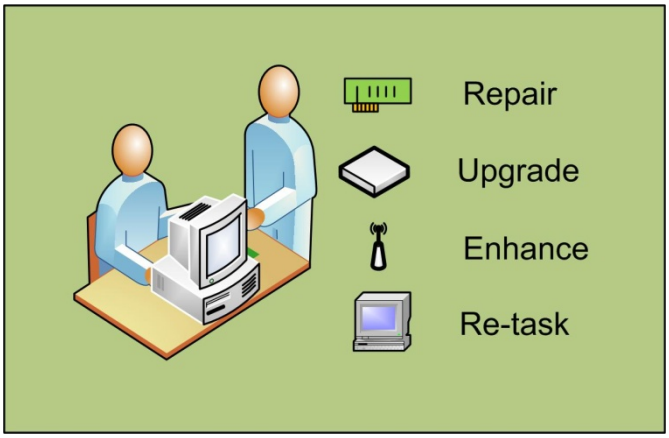

Figure 2.4: The desktop restoration can make it easier to extend the life of existing hardware.

Repairing Component Failure

Although computers are quite reliable, most users have had a computer stop working. Component failure is inevitable. Hard drives have moving parts, so the safest approach is to plan for *when* the hard drive fails rather than *if* the hard drive will fail.

It is very comforting to know that a personal computer has been backed up. Knowing that the personal data files, configurations, applications, and other elements that comprise the desktop ecosphere can be moved wholesale to another hardware platform can preserve the productivity of the PC owner. A reliable desktop restoration system can provide such assurances and comfort. It is even possible that a technician could come with a replacement PC in tow, unplug the defective unit, drop off a fully functional replacement, and get the user back to work in minutes rather than waiting for days.

Once the technician takes possession of the defective PC, they begin by troubleshooting the problem. If the computer is at all operable, the component can be tested. A very common approach is to replace the component device driver or even upgrade the driver. The difficulty for the technician is to know what device driver to use and where to find it. If the desktop restoration solution can inventory the device drivers and make them readily available, it helps accelerate this process. Many of the more comprehensive solutions provide this service. It is also convenient to know what version of the driver is currently installed and whether an upgrade is available.

A desktop restoration solution that is aware of the hardware installed on a given system and one that can distribute the appropriate drivers and support software to a system based on its actual hardware configuration can make the process of hardware changes much faster and more reliable.

Simple Component Replacement

If a component needs to be replaced, the type of component will determine how the PC restoration system can be employed. Simple component swaps replacing one component for another of the same type and model are the simplest, and rarely require restoration. That is providing the component is not the hard drive or motherboard.

Often an exact component replacement is not available. Components frequently change and become obsolete. Some components have a common device driver that can be shared across many versions of the component. Display adapters often follow this model. Other devices change device drivers based on the revision level of the hardware within the same model (a common issue found with network adapters).

The device driver often needs to match the firmware level of the component. A component can have updated firmware and use an updated device driver. If a “new” component is substituted, it will not work properly until the new component’s firmware matches that of the replaced component.

If a different component must be substituted, the driver will need to be replaced. Again, unless a motherboard or hard drive is replaced, the need for desktop restoration is unlikely. However, access to the new device driver can be a great assistance to the technician performing the repair.

Another approach to the problem may be to keep a small number of replacement computers on hand. A desktop can be restored on the reserve hardware and gotten quickly to the users. The defective unit can be returned for repair. Once the hardware issue is addressed, the user’s desktop can once again be restored and the desktop returned to the user or the repaired unit can be placed in reserve for the next user who requires a replacement.

Motherboard Replacement

The trend to integrate more and more functionality into the motherboard means that the exact model of the motherboard determines many of the device drivers used by the system. Also, as more components are integrated into the motherboard, the more likely it is that a repair will require a motherboard replacement. It is quite common to have the display adapter, network interface, drive controllers, and all other major subsystems integrated into this single circuit board.

A motherboard replacement, if it is an exact match for the defective unit, requires no changes to the system. The issue is that motherboards change quite rapidly. A visit to the support site for many of the major PC suppliers shows that any given motherboard can have a host of options that requires the selection of the proper drivers. Some of the options are driven by the purchaser; others occur as the PC manufacturer modifies the board to lower costs or enhance the product within the bounds of a given model.

Sometimes a motherboard can be replaced and the OS will detect the changes and help the technician through the process of updating the device drivers. More recent versions of the Microsoft Windows OS—such as XP and Vista—are better at this than older versions. There are dangers to this approach, however. The OS may miss a component/driver mismatch. This may lead to poor performance that is difficult to detect. And the further the motherboard replacement is from the original makes this process less and less reliable.

The alternative is re-installation. The hard drive can be cleared and a new desktop built, component by component. In this process, the desktop restoration can make a major contribution. If the backup of the desktop is configured to layer the data back onto the target computer, changes can be made during the re-build to accommodate the revised hardware. Re-application of the personal data and configurations will quickly restore the desktop to full functionality. If a drive image is used to preserve the data, the process may be a bit more cumbersome. The personal data must be extracted from the image and reapplied. Configuration data is often stored in the image in such a manner that it cannot be individually re-applied (separate from other computer state information that should not be reapplied on the repaired platform).

Hard Drive Replacement

The greatest fear for any user is that they lose their hard drive. A PC backup/restoration solution can allay many of these fears. The data is as current as the last backup. A proactive process of monitoring backups to ensure that they remain current will allow the solution to protect against this loss.

If the only component that failed is the hard drive, a new hard drive can be installed. An image restoration will provide the fastest and simplest restoration of the desktop in this type of repair. If a more sophisticated system that re-builds the PC layer-by-layer is implemented, an additional benefit will be realized as a result of the restoration. Most PCs accrue unwanted software over time: everything from expired demo software to Internet Explorer add-ins to spyware and malware that got through the antivirus and anti-spyware barriers. Things are installed and uninstalled, leaving remnants scattered on the hard drive and in the registry. A re-installation will not replace many of these old vestigial artifacts. After re-installation, many PCs run faster.

Upgrading to Improve Performance

Often, a hardware platform has room for improvement through installation of advanced components. For instance, most computers can host more RAM than is currently installed. They can support a larger hard drive or more hard drives. Many can operate with a faster CPU or may entertain upgrading to a multi-core version of the CPU.

Many performance upgrades will not require a desktop restoration nor will the solution play a direct role. Upgrading memory, adding hard drives, and even upgrading the CPU seldom requires a change of driver. The hardware is installed and used immediately by the OS. It is wise, however, to back up data prior to the upgrade. A bent pin on a CPU can easily destroy a motherboard, changing an upgrade to a repair.

Many component upgrades do require new drivers. New display adapters, network cards, and human interface devices (mice, trackballs, tablets, and so on). Although the restoration system will not play a direct role, many of the solutions help provide a catalog of device drivers and simplify their distribution.

A motherboard upgrade would require re-installation of the OS. Most organization would replace the entire system unit rather than just the motherboard if they were attempting to improve performance.

📖 The next section of this chapter provides more information about moving desktops to new computers.

If the primary hard drive is replaced with a larger drive, a desktop restoration will be indicated. A simple drive image transfer will be effective for this, although the aforementioned re-installation will provide a cleaner system after the restoration is completed. Once the upgrade is performed, it is important to back up the refreshed desktop. This is important to capture changes to device drivers and configuration settings. Also, if additional drives are installed, backup of the new drives may need to be configured.

Enhancing with New Components

Often a hardware platform lacks a particular piece of hardware to serve in the capacity for which it is tasked. This may be simply adding an external peripheral, such as a scanner, printer, or other device. It may require the installation of an internal component, such as a tape backup device; a USB, Firewire, or Bluetooth adapter; or some other form of new or specialized hardware.

Enhancements differ from upgrades in that they often involve the installation of drivers and software that will utilize the new hardware. If a DVD burner is installed, DVD burning software will be required in the desktop to fully utilize it. The change will require distribution of new drivers and software. The hardware and software will require configuration. This information should all be backed up by the desktop restoration system once it is completed and tested.

If the enhancement is applied to larger numbers of computers, many desktop restoration systems will provide facilities to help in the distribution and installation of the new drivers and software. These systems also help track the enhancements. This data can be analyzed and used in planning to help budget and determine policies and processes.

Recycling Hardware for New Users

Eventually, people move from one platform to another. A user receives a more powerful computer or needs to move to a desktop. Users move from one physical location to another. They leave the organization to pursue other opportunities. IT then inherits a piece of hardware that has no desktop to house. The hardware is often in good shape. Most organizations will simply wipe the old desktop from the drive, install a fresh version of the OS, and issue it to the next user who requires a desktop. Sometimes, they do not even delete the old data and configurations.

A robust desktop restoration system makes pressing this recycled hardware platform back into service smoother and much more flexible. If an organization has the ability to move a desktop from one hardware platform to another quickly and reliably, then re-allocation becomes much more realistic.

Image restorations allow desktops to be moved quickly and easily between equivalent platforms. If a person moves between physical locations, their desktop can be restored at a computer at the destination if it is equivalent. An image of a generic, un-personalized desktop can also be quickly placed on a new or recently recycled platform. The user can then begin the process of customizing the desktop to their individual needs and tastes.

If a scripted restoration system is employed, there is much more flexibility in re-locating desktops. If a recycled piece of hardware becomes available, any user can be moved to it in an automated manner. This allows computers to be pressed into service more quickly.

Also, right-sizing hardware becomes more practical. If a user's needs change, the user can be moved to a more powerful or less powerful hardware platform with minimal cost or loss of productivity. Often, new employees get new computers. The new computers are often more powerful and the new user gets that more powerful hardware simply because of the difficulty of moving a more senior employee (with greater needs) to a new piece of equipment A system that facilitates the movement of a desktop to a different computer helps IT get the right computer into service for the right employee efficiently.

The aforementioned concept of placing a desktop on a reserve PC also becomes more practical if desktops can be easily placed on different hardware. A small pool of reserve computers can help keep users working while repair technicians work on the defective hardware.

Desktop Re-Platforming

As mentioned in the previous section, it can be very effective to move desktops smoothly from one computer to another. Whether replacing a damaged computer, the obsolescence of old platforms, migration to a new form factor, or just getting a different box in a different place, the need to move a desktop from one computer to another is inevitable. An organization that plans properly can leverage this need into an ability to keep all their desktops secure and preserve many hours of lost productivity (not to mention reducing user frustration).

The process for moving a desktop should include several steps that will ensure the desired outcome:

- Understand the needs of the user—Attempt to quantify the hardware requirements of the desktop and match that to the hardware supplied.
- Analyze the new features available in the new platform—Determine how they can best integrate into the desktop without compromising the user experience.
- Manage the process of migration so that the user experiences as little loss as possible.
- Learn from each migration—Use these lessons to refine and improve the desktop migration policies, procedures, personnel, and products.

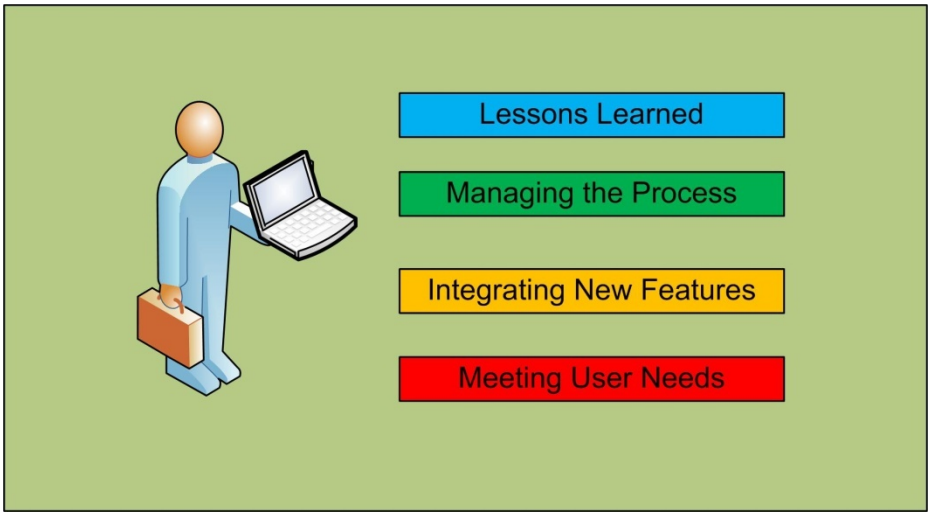

Figure 2.5: Several simple steps help keep the desktop re-platforming process at peak efficiency.

Meeting User Needs

The first step in a success platform migration is delivering a hardware system that will do what the user requires it to do. As simple as that sounds, it can be a challenge. The performance of a system is very difficult to quantify. A successful IT department will try to compose a repeatable way of determining the true requirements of the system.

Start with a relatively simple process. Almost all software lists the minimum and recommended requirements for operation. By compiling the minimum requirements for each application, a baseline "bare bones" system can be defined. This bare bones system is not realistic for deployment; it just forms a foundation for the specification for the system. The recommended hardware is often a better choice for setting the bar for minimum hardware. Figure 2.6 shows a spreadsheet that offers a sample of building this baseline:

	A	B	C	D	E	F	G
1	**Resource**	**OS**	**Office**	**Acrobat**	**Accounting**	**Doc Mgmt**	**Req Platform**
2	CPU	P4, 800 MHz	P4, 500 MHz	P3, 600 MHz	P3, 500 MHz	P3, 500 MHz	P4, 800 MHz
3	MEMORY	1000 MB	256 MB	128 MB	128 MB	128 MB	1000 MB
4	DISK SPACE	40 GB		100 MB	120 MB	20 GB	40 GB
5	OPTICAL DRIVE	DVD	CD/DVD		CD/DVD	CD/DVD	DVD
6	VIDEO	128 MB	1024 X 768	1024 x 768	1024 X 768	800 X 600	128 MB

Figure 2.6: Building a minimum hardware platform requirement.

The baseline may run the software one application at a time, but as multiple applications are opened simultaneously and applications are added, the system can become overtaxed. For most organizations, a healthy amount of reserve capacity is defined to ensure a performant system.

Systems can be overtaxed, so the question becomes how to quantify that fact. Users often base their ideas of the performance of their machines on opinion or mood. Just because it takes 3 minutes to get Dilbert to open at 9:00 in the morning (when 2.5 million other people are trying to open it as well) does not mean the user needs an x64 dual-core machine with 4GB of RAM. However, if it take 3 minutes to open a Word document file because the computer has only 128MB of RAM and the hard drive has less than 50MB left for the paging file, it may be time to address the issue.

Microsoft Windows has a comprehensive set of system counters to measure the utilization of system resources. It can periodically sample key subsystems and record how they are exercised over time. This can be used to determine whether a user (or more likely a group of users) truly has a system that that requires more, or less, of a given resource. This data can be used to project the real needs of users and accurately map the systems they need to the system they use based on their actual demonstrated requirements.

The most common resource to become overrun is RAM. Fortunately, it is one of the easiest to upgrade and does not require any system configuration or driver to increase. However, an increase in RAM will also require more space on the hard drive for paging. Excessive paging will add load to the CPU and make it appear overtaxed. The interpretation of performance counters requires careful consideration of the interrelated causes.

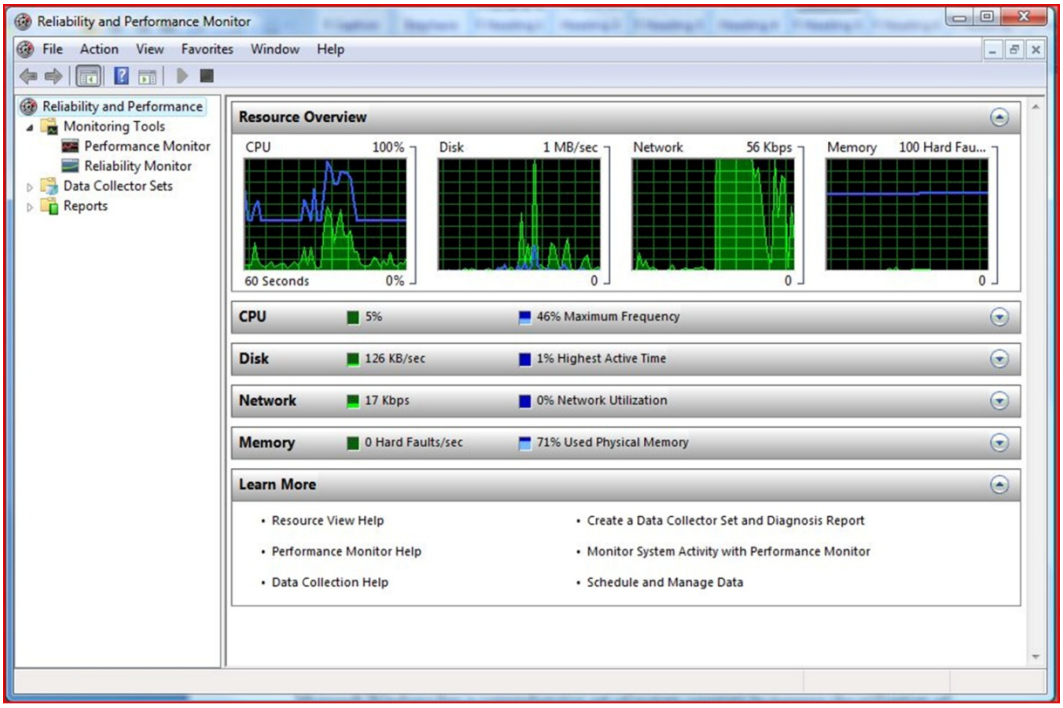

Figure 2.7: Performance monitoring can help validate demonstratable user needs for computer power.

Of course, real need and perceived need are often at variance with one another. Although the department may have a need for 512MB or RAM, several users may feel that unless they have 2GB of RAM, their system will not perform. They often feel their system runs slower than every other machine in the department.

Part of the balance in meeting user need is balancing perceived need against real, demonstratable need. It also involves helping users understand the diligence that has been expended to ensure that they have the system they need to perform their work. A solid desktop restoration solution will allow a company to flexibly move their users to the hardware that best suits their needs. Image restoration can be used to move personal data between machines. A restoration process that re-installs can help ready the machine and then replace the configuration and personalization setting on the new platform. This can help optimize the utilization of hardware and help foster a feeling among users that they are being carefully supported.

Integrating New Features and Capabilities

With new hardware come new capabilities. Most hardware comes with a plethora of pre-installed OSs and utilities that support the latest features offered by the new hardware. They come with applications and automatic diagnostics and other devices to help ingratiate the user to the new hardware and its manufacturer. The question for the IT department becomes which of these new features they intend to support and which ones they want to disable. The problem differs depending on the platform shift.

Moving From One Standard Desktop Computer to Another

When a person moves from one desktop to another, there is often little in the way of new hardware feature with which to deal. From one standard desktop PC to another, the platform may have new features internally, but they do not often affect the user or their perception of their personal desktop workspace.

> This does not mean that there are not significant differences internally that must be addressed. For instance, the advent of Serial Advanced Technology Attachment (SATA) interfaces means that Microsoft Windows does not automatically detect the attached hard drives unless a special driver is included during the installation. This has a major impact on the desktop restoration. If moving from a computer that used a standard ATA or IDE drive, a reinstallation of the OS will be required. If a drive image is restored on this type of system change, the SATA driver will be lost as the backup image replaces the data on the drive. Upon reboot, the OS will not be able to communicate with the SATA drive and the reboot will fail. A scripted solution that allows on-the-fly modification of the installation components is preferable in this circumstance.

Most other changes are not so dramatic. Often they involve new drivers, like adding a Bluetooth adapter or wireless network connectivity. These components are not central to the operation of the desktop, so the only point of contention is the New Hardware Detected message. The hardware can be implemented by installing the correct drivers and software as part of the restoration or it can be disabled.

Although disabling hardware might seem wasteful and even draconian, not all hardware is safe or good to operate. For instance, if an organization does not implement wireless connectivity, allowing computers to activate their wireless adapters can invite them to connect to computers and even networks outside corporate control. These spurious connections can become backdoors into the corporate network. They can expose client PCs to viruses and malware and allow malicious attacks on the resources in the network. This is just one example of hardware that, while available, may not be advisable to enable.

Desktop restoration can help with this issue. A restored desktop will not necessarily install the required software or configurations to activate unsupported hardware. A restoration that only re-installs approved corporate software will effectively remove unauthorized software that may activate the unsupported hardware features.

Once the move is validated, the revised system should be backed up. This will secure the system once the move has been completed and speed restoration should an incident occur quickly after re-installation. For most systems, if a hardware failure is to occur, it will occur soon after a system is pressed into service. The brand-new components are tested as they are put under real load for the first time.

Moving to a New Form Factor

There is a definite trend to move users to portable computers. This can often improve the flexibility and availability of workers. The move from a standard desktop to a laptop or notebook computer, however, brings a set of challenges.

Much of the hardware found in notebook computers is specialized for use in mobile devices. It is smaller, more rugged, and often more power efficient to help conserver battery power. All this means that it requires a different set of drivers than its standard desktop computer counterparts.

Notebooks often include specialized hardware to support their unique form factor. It is becoming common to integrate fingerprint readers into notebook computers; this hardware enhancement is often pleasantly received and can, in a small way, improve productivity (particularly for the typing and memory challenged). Software to secure hard drives for travel, support the special keys on the notebook keyboard, and monitor and extend battery life make a good deal of sense to embrace.

A desktop restoration that allows installation of software and drivers particular to a specific piece of hardware yet preserves the applications and configurations specific to a particular user can prove very useful in these moves. If drive images are preserved, the notebook can be installed and configured (or left as delivered from the manufacturer) and the personalized data can be restored. Some configurations and options may need to be reapplied manually.

As with standard desktops, the final product should be carefully tested and then backed up. It can be a challenge to get mobile users to keep their desktops secured with timely system backups. A proactive system for monitoring the frequency (and delinquency) of such backups can protect against disappointment later. Mobile computers are at higher risk for loss, theft, or damage than their stationary counterparts. This makes the data they carry more at risk, and regular backups even more prudent. Furthermore, portable computers connect more frequently to unprotected networks, so they are exposed to more viruses and malware. Data backups can sometimes save data that might otherwise be lost to malicious software attacks suffered outside the protection of the corporate Local Area Network (LAN).

Managing the Process

The ability to move a user desktop from one piece of hardware to another with a minimum or time, expense, and risk depends on a well-defined and well-managed process. There are keys to ensuring that the process flows well and provides the results demanded by the organization.

Recent, Reliable Backups

The only data available to restore is the data that was backed up. Most users do not plan for a catastrophic failure of their hardware, but if it occurs, all data not collected at the last backup is at risk. This risk can be managed by proactively monitoring the backup process. Missing a single backup can be a risk, but it is seldom disastrous. Problems come when users habitually miss backups. These patterns must be monitored and detected. Once identified, the cause of the problem can be investigated and a solution resolved before a major data loss occurs. This can be difficult because a data backup is like an insurance premium. Everyone pays to be safe and hopes they never need it. Many users begrudge the time required to perform the backup because they have never suffered the loss of data.

Standard desktop users are the easiest to manage because the process can be managed to run automatically while they are not using their computers. Most desktop backup solutions include some form of scheduling. If the computer is shared among workers, it may be more challenging to find a schedule that minimizes the impact of the backup on the computer.

Mobile users can be more difficult. It can be difficult to find a time when they are connected to the corporate LAN and are willing to allow the process to occur (and complete). Most backup solutions will only back up the changes (although some make a full drive image backup) and this can take some time. A suitable arrangement must be made so that the mobile computer is backed up and the user is not too inconvenienced. Virtual Private Network (VPN) connections can connect users from remote connections and allow backups to occur. They often run slower, but if the backup can occur overnight, it will have less impact on the user.

Determining Desktop Restoration Needs

If a computer is being repaired, upgraded, or enhanced, contingency plans should be made depending on components changed and the risks involved. If a system is functional enough to execute a backup, it is always prudent to capture the most recent data before attempting any hardware change.

If the move is due to change in the user's status, a new job, work location, new software, and so on, the appropriate hardware must be identified. Corporate standards for the types of hardware used for different job roles or software suites can simplify this process and prevent inequitable distribution of resources throughout the organization.

Executing the Restoration

For changes that require no or minimal changes to drivers, the only real requirement is to have a fresh backup. If major changes, such as new motherboards or hard drives are required, the process should be well defined. There will be a re-installation of the OS and applications. Then the personal data and configurations of the user will be re-applied. The restoration system in place will determine the process required to effect the re-application of the personal data as well as what settings and configuration may be lost.

For a hardware re-platforming, the IT staff needs to know the appropriate hardware to provide the users. IT may be using new hardware or may be re-tasking a system for a user. If the system provides new hardware, the process must direct whether to enable or disable the new hardware. There should also be a process to introduce the user to new features found in the hardware and how the user should employ those features.

Tracking the Process

As stated at the beginning, simple recording of what happened during a hardware change can provide an invaluable basis for planning. If the restoration system provides for recoding of activity, time, parts used, and so on, the staff has an ideal place to collect and analyze this data. If not, spreadsheets or simple databases can be configured to keep track of the activity.

Lessons Learned

In haste to complete the process, it may be easy to forget the obstacle encountered and overcome during the repair, enhancement, or replacement of hardware and subsequent desktop restoration—yet this data is the most valuable that the organization can accrue. Veteran employees are valuable because of the experiences they have gained and the lessons that years at the job has taught them. Helping to capture this information can help improve the restoration system make the process more cost effective and reliable. This process of refinement will improve the outcome, regardless of the tools and techniques used to perform the restorations.

Create a Knowledge Base

Record the reasons for a change, any difficulties encountered, workarounds discovered, or things that should be done differently next time. Keep this in a central repository where all the technicians can access it. Microsoft's System Center products allow technicians to add to the knowledge packs by entering their own observations, discoveries, and solutions. Using this type of approach can reduce time used to perform operations and help proactively avoid common pitfalls.

Analyze the Process

Processes should never be static. If a user desktop is lost and the backup is old and valuable data is lost, investigate to determine what went wrong. An isolated error cannot be remedied by this approach, but patterns can be uncovered and overcome. By leaving a forensic trail of the events that occurred and quantifying those events, the top issues with the process can be exposed and steps can be taken to overcome them.

Work with the Products

In haste to implement something new, many people will master a subset of the features of the product. Once that subset is mastered and the immediate problem is solved, people tend to move on. They do not explore the full capability of the product they have and do not leverage the complete range of its capabilities. Not every feature of every product is the right solution for all companies, but it can be quite frustrating to struggle with an issue that the product solves just because one is ignorant of said solution.

Working with others who use the product can help you understand the full range of its capabilities. Most vendors are eager to serve their clients, so they listen to their frustrations and enhance their tools to mitigate those frustrations. It can be very helpful to cooperate with vendors by supplying feedback. Also, examine upgrades. They often supply new solutions to common issues and may help improve an organization's management of the desktop restoration solution.

Managing the Hardware Life Cycle

The hardware life cycle and desktop restoration are intrinsically intertwined. Many hardware restorations will necessitate the recovery of a desktop from a backup. Migration of users from one platform to another will call for restoration on the new platform. Even when a full desktop restoration is not required, the process of backing up can safeguard the data. The restoration solution often supports common activities of technicians repairing, upgrading, enhancing, and re-tasking hardware.

Thus, management of the restoration solution must embrace the hardware life cycle. There must be clear policies that govern the individual decisions made regarding the organization's solution. Processes must be developed and refined to provide a reliable, repeatable system. Personnel should be put in place to implement and track the process. And products that support the policies ratified by management should be purchased and utilized.

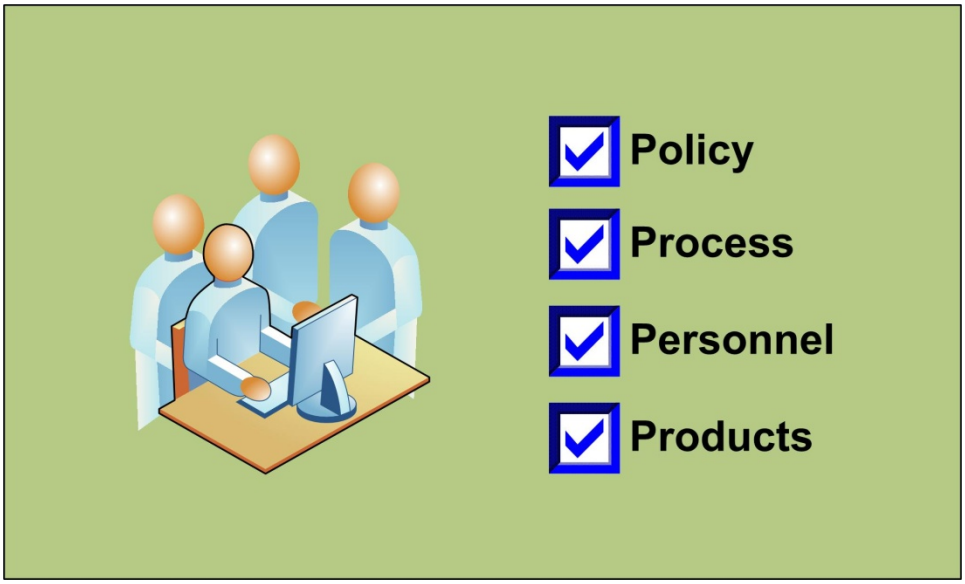

Figure 2.8: The hardware life cycle and desktop restoration management are intrinsically intertwined.

Policies

Policies help provide consistency, repeatability, and governance to systems and procedures. In the case of the hardware life cycle, they should be used to direct the decisions made for how hardware is modified. A clear understanding of the drivers for hardware change will help define the areas in which hardware policy should be set. If everyone can understand what consistently occurs when hardware needs to be repaired, upgraded, enhanced, or replaced, both the IT staff and users can more easily set expectations. If a user feels that they need more performant computers, a policy can help define why they have the machine that they do. Processes can be enacted on that policy to determine whether, indeed, their computer complies with the corporate standards for performance. If it does, the user should not feel singled out. If the computer does not comply, IT staff has actionable cause to investigate and determine what should be done.

Policies should be firm without being inflexible. If a user serves two roles in a company, that user may need different hardware t support his or her unique role. The desktop restoration solution should provide the flexibility to support that unique solution. People with atypical roles often have a more critical need for their desktop, and an inflexible policy that forbids them from having the hardware and software that they need will only harm the organization.

Simultaneously, being too flexible allows users to become resentful of others whom they deem as favorites. The proliferation of non-standard configurations can begin to overburden the processes, personnel, and programs used to provide the solution.

Analysis of the actual utilization of the system will suggest improvements and refinements. Those refinements will begin as changes to policy. A careful review of policy should be conducted on a regular basis to ensure that policy alleviates issues rather than causes them.

Processes

This chapter discusses many processes as examples for utilizing desktop restoration to help support the hardware life cycle. Some of the examples will work in one organization but not in another. Each organization must consider the resources that they choose to expend to mitigate the risk and reduce the productivity loss incurred by hardware change and desktop restoration.

For organizations that do not track the real costs of desktop unavailability, much of this chapter might seem like overkill. But for organizations that understand the impact of keeping workers from their jobs, the principles put forth in this guide can help to put numbers and budgets together to help control these costs. It can seem prudent to demand that users store important documents on file servers and consume 2 days to get a generic PC to a user that they spend 2 more days trying to restore to effectiveness. Then they must redo the work that they had failed to store on the file server. That is as much a process as discovering that a user's hard drive has failed, taking a newly refurbished computer from inventory, and restoring last night's backup so that the user has their desktop fully restored in working order 2 hours later. The cost of the 2-hour restoration should be carefully compared with the 4 days of lost productivity to determine the real value of the restoration system.

The processes must be tracked to determine trends and validate the expenditure or resources. Thus, in addition to performing the hardware alterations as outlined by policy, people and tools must track their own efficiency. A little time spent in analysis can uncover areas for improvement that can save more money and time. Proactive replacement of a motherboard that shows marked trends of failing before data is lost and users are left without the means to do their jobs can save a great deal of frustration and reduce corporate waste. Having processes in place that facilitate this type of decision (providing management with the confidence to understand the costs and risks of making the replacement) can make a company much more nimble.

Personnel

Regardless of the policies, processes, or products put into place, execution will eventually come down to the staff. People who respect the policy, understand and properly implement policy, and who know the products used and wield them well are the key to success for any solution.

Keep the staff deeply involved in the other elements of management. If staff members do not understand policy, they will not use it to help direct their decisions. If they find it does not solve problems but rather interferes with getting users back in operation, they will find it difficult to respect. They must also understand that some policy decisions affect areas outside their normal sphere of influence. By openly discussing how policy is formed and helping the staff take ownership of the policy, they become its greatest defenders. At this point, policy truly can be used to direct and govern the solution.

Staff works the process every day, so they should be the ones most proactive in refining it to help it work as effectively as possible. The more input they are allowed to have in the formulation of the procedures, the more they will be able to follow them effectively (and perhaps enthusiastically). They must also learn to respect the less desirable elements of the process. Almost no one likes to record what they did. But as this forms the foundation of determining process improvement, it is a necessary evil. One suggestion that may help is involving the staff in the evaluation of the data. If they see the patterns for themselves and then help to resolve the issue, their self satisfaction in overcoming a problem may help them embrace the less desirable aspects of the job.

It also needs to be someone's job to monitor the backup process. It is not glamorous to check the report and find out why the backups are not occurring. But after a catastrophic hardware failure occurs, it is too late to figure out that an agent was not installed or a senior executive always turned off his computer at night so that the data was never captured. The task can be more daunting with mobile users. Still, the task of ensuring that timely backups are captured remains at the heart of the desktop restoration solution and someone must take responsibility to assure that the backups are processed.

The staff also needs to understand the products that they use. It may be easier to tote a CD around to install an updated device driver, but it is far more effective if this task can be done through automated distribution. They need time and training to get the full value of the investment made in the desktop restoration solution.

Products

Throughout the chapter, suggestions have been made concerning areas in which the product or products used to facilitate desktop restoration may play a role in maintenance of PC hardware. At a minimum, the products used should capture a copy of critical data stored on the local hard drive so that it can be placed on another hard drive in an emergency.

But the PC restoration system can provide much more. It can be used to facilitate the repair, upgrade, and enhancement of personal computer hardware. It can facilitate re-tasking hardware from one user to another. It can ease moving desktops to new hardware—even moving from standard desktops to mobile computing solutions.

A careful examination of why hardware changes in a given organization can help define the types of hardware alterations that the organization expects. The time consumed in making these alterations can be projected to determine the real costs to the business for these changes.

Once the costs are established, products can be reviewed. Each should provide some relief from the costs expected by the business. This relief becomes the return on investment (ROI). With this information, the value of the restoration product can be cast in the appropriate terms to make a decision.

If a product is already in place, the full capability of the product should be explored. Often products have features that were not implemented when the product was first installed. As time goes on, the value of these features may become more evident or compelling. Also, consider product upgrades. Although some product upgrades may offer little value, most vendors seek to increase the value of their product by addressing the real problems of their customers. Reevaluate the features of the available upgrades to an existing product to determine whether they offer real value in the context of a specific restoration solution.

Summary

This chapter has discussed how hardware changes over time. It provides practical advice on how to integrate the hardware life cycle with the desktop restoration system to help maximize the life of computer hardware while minimizing downtime and lost productivity. The next chapter will examine how the desktop restoration system can influence the software life cycle.