Chapter 1

Installing Windows 7

MICROSOFT EXAM OBJECTIVES COVERED IN THIS CHAPTER:

- ✓ **Perform a clean installation.**
  - This objective may include but is not limited to: identifying hardware requirements; setting up as the sole operating system; setting up as dual boot; installation methods; boot from the source of installation; preparing the installation source: USB, CD, network share, WDS
- ✓ **Upgrade to Windows 7 from previous versions of Windows.**
  - This objective may include but is not limited to: upgrading from Windows Vista; migrating from Windows XP; upgrading from one edition of Windows 7 to another edition of Windows 7
- ✓ **Migrate user profiles.**
  - This objective may include but is not limited to: migrating from one machine to another; migrating from previous versions of Windows; side-by-side vs. wipe and load
- ✓ **Configure updates to Windows 7.**
  - This objective may include but is not limited to: configuring update settings; determining source of updates; configuring Windows Update policies; reviewing update history; checking for new updates; rolling back updates

In this chapter I will show you how to install Windows 7 because, before you can master any Microsoft product, you must first know how to properly install the product.

Preparing for the installation of Windows 7 involves making sure your hardware meets the minimum requirements and that your hardware is supported by the operating system.

Once you've completed all the planning, you are ready to install Windows 7. This is a straightforward process that is highly automated and user friendly.

Another consideration when installing Windows 7 is whether you are going to upgrade from a previous version of Windows or install a clean copy on your computer. An upgrade attempts to preserve existing settings; a clean install puts a fresh copy of the operating system on your computer. Installation preparation also involves making choices about your system's configuration, such as selecting a disk-partitioning scheme.

To complete the Windows 7 installation, you will need to activate the product through Windows Activation. This process is used to reduce software piracy. After Windows 7 is installed, you can keep the operating system up-to-date with post-installation updates.

When you install Windows 7, you should also consider whether the computer will be used for dual-boot or multi-boot purposes. Dual-booting or multi-booting allows you to have your computer boot with operating systems other than Windows 7.

Introducing Windows 7

Unless you have been living on another planet, you know that Windows 7 is not Microsoft's first client operating system. Before I start explaining Windows 7, you should know about some of the features of Windows XP and Windows Vista and how they affect Windows 7.

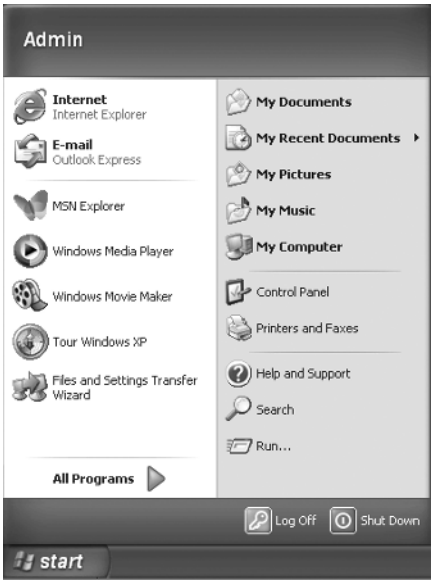
I understand that many IT professionals did not make the move from Windows XP to Windows Vista and that is why we give a brief overview of some of the features of both.

Overview of Windows XP

Microsoft introduced Windows XP in 2001. Microsoft Windows XP was a replacement to the Millennium operating system. Windows XP was a stable environment that catered to both the home user and work environment user.

Windows XP was the first operating system to introduce the dual column Start menu, shown in Figure 1.1. The Windows XP operating system also redesigned how the Control Panel was structured.

FIGURE 1.1 Windows XP Start menu



Windows XP was also the first operating system to use the new core called the kernel. Previous versions of Microsoft used a *9x* version of the core systems, but this new kernel was more stable and ran more efficiently.

Windows XP also introduced Remote Assistance (which is still in use in Windows 7). This allows an administrator to accept an invitation from a user and then connect to that user's machine to help the user technically from a remote location.

Windows XP made it easier to keep your machine up-to-date with the ability to schedule Windows updates with the Microsoft website, also included with Windows 7. This allows users to guarantee that their machines are always running with the latest security patches and also with the latest versions of the XP system files.

Another feature that was introduced into the XP operating system and is still used in Windows 7 is driver signing. If a manufacturer of a device did not adhere to Microsoft's standards and the devices were not digitally signed, you have the ability to stop the installation of the drivers.

As Microsoft developed Windows Vista, it incorporated some new features. These features are available for Windows XP only if you install Service Pack 3, but they are included with Windows 7.

Windows XP Service Pack 3

With the release of Windows XP Service Pack 3, the operating system obtained some new benefits over the basic XP system. First off, Service Pack 3 includes all previous service pack fixes and patches. It also includes all required security fixes. The following features are some of the enhancements included in Service Pack 3.

Network Access Protection (NAP) Network Access Protection (NAP) is a compliancy checking platform that is included with Windows 2008 Server, Windows Vista, Windows 7, and Windows XP with SP3. NAP allows you to create compliancy policies that check computers before allowing them access to the network.

Windows Product Activation Users have the ability to install the complete integrated operating system with SP3 without the need of a product key. The operating system will ask the user to provide a product key at a later time.

Microsoft Cryptographic Module The `rsaenh.dll` file has been redesigned with the SHA2 hashing algorithms (SHA256, SHA382, and SHA512) in X.509 certificate validation already included.

Now that we have looked at some of the features of XP and how these features affect Windows 7, let's take a look at Windows Vista and some of the features that are still included with Windows 7.

Overview of Windows Vista

Windows Vista was the next generation of Microsoft's client operating system to be released after Windows XP. Since the majority of the IT market did not switch to Windows Vista, it is important to understand some basics about it. Windows 7 has many of the same features and attributes.

There were many new features and changes from Windows XP to Windows Vista. Let's take a look at some of them.

New Improved Desktop Windows Vista introduced a new improved desktop called Windows Aero. Windows Aero offers Vista Home Premium, Vista Business, Vista Ultimate, and Vista Enterprise users a more stable desktop. Computers running Windows Aero will require a compatible graphics adapter. Windows 7 also includes the Windows Aero Desktop.

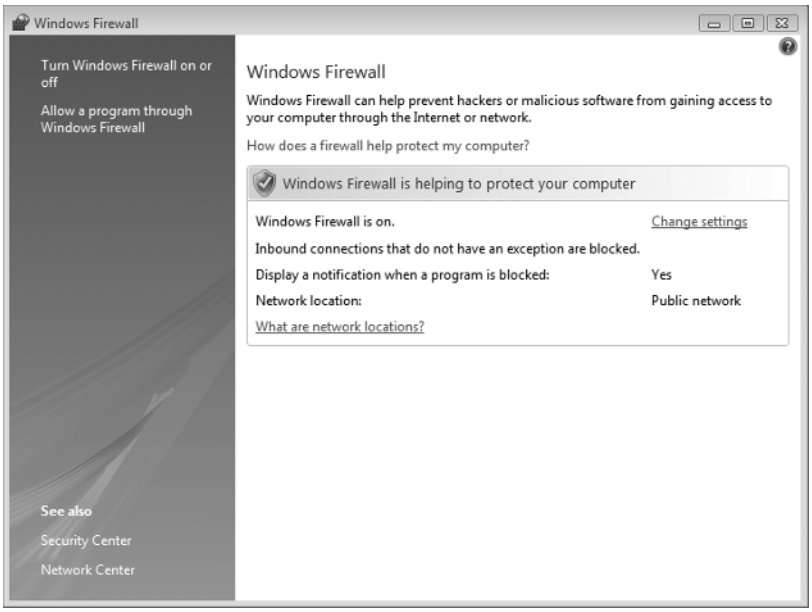
Windows Sidebar Windows Vista introduced a new vertical bar that is displayed on the side of the desktop called the Windows Sidebar. The Windows Sidebar has mini applications called gadgets running within it. Windows 7 has removed the Windows Sidebar, but you can still add gadgets to the Windows 7 Desktop.

Gadgets are mini applications that allow you to easily perform and see useful functions such as a clock, a slide show, an Internet feed, a calendar, weather reports, a stocks feed, a currency exchange, and so forth. Many downloadable gadgets are available from Microsoft's website. Gadgets will be explained in detail in Chapter 4, "Managing the Windows 7 Environment."

Parental Controls Parental controls allow the computer administrator (or parent) to configure how other family members will be able to use the computer system. You can set which sites specific users can visit and what times a specific user can use the computer system. Parental controls have been improved and are still included on Windows 7.

Improved Windows Firewall Firewalls are hardware devices or software applications that either restrict or allow users and data from an internal or external source. Microsoft Vista has included an improved version of Microsoft's software-based firewall, as shown in Figure 1.2.

FIGURE 1.2 Windows Vista Firewall



This improved version helps protect your computer system by restricting operating system resources if they operate in an unusual way. For example, let's say you have an application that uses a particular port to function properly. If that application tries to use a different port, the system stops the application, thus protecting other computer systems from possible problems. Windows 7 also includes Windows Firewall.

Windows Vista User Account Control Introduced in Windows Vista and Windows Server 2008, the User Account Control (UAC) is a new security feature that allows a standard user to perform many functions without needing to use a non-administrative account.

Windows Search Windows Search, also included with Windows 7, allows you to search files or applications quickly and easily from anywhere in Windows Vista. One of the nice

features of Windows Search is that when you start typing in your search term, all files, folders, and applications that have names starting with the first letters you type start to appear. For example, if you type **No,** everything with names starting with *no*, including Notepad, appear.

Live Icons If you have a compatible video adapter and choose to run Windows Aero (also included with Windows 7), you have the ability to use live icons. When you mouse over a live icon, you can see what is in the application or folder it represents.

Windows Vista is easy to install but you must verify that the machine that you are loading Vista onto can handle the installation. Table 1.1 lists the requirements for a Windows Vista–capable PC as well as the requirements for Windows Vista Premium.

TABLE 1.1 Hardware requirements (non-network Installation)

Component	Windows Vista–capable PC	Windows Vista Premium PC
Processor	800 MHz 32-bit (x86) or 64-bit (x64) processor; Intel Core/ Pentium/Celeron, AMD, Via, or compatible	1 GHz 32-bit (x86) or 64-bit (x64) processor; Intel Core/Pentium/ Celeron, AMD, Via, or compatible
Memory	512 MB	1 GB
Disk space	20 GB hard drive with 15 GB of free disk space	40 GB hard drive with 15 GB free disk space
Graphics	DirectX 9 video card capable of SVGA at 800×600 resolution (WDDM driver support recommended)	DirectX 9 video card that supports a WDDM driver, Pixel Shader 2.0 in hardware, and 32 bits per pixel; graphics card memory dependent on desired resolution

Processors with Windows Vista

Windows Vista supports computers with one or two physical processors. Windows Vista Starter, Windows Vista Home Basic, and Windows Vista Home Premium support one physical processor. Windows Vista Business, Windows Vista Enterprise, and Windows Vista Ultimate support two physical processors. There is no limit to the number of processor cores these editions support, so you will be able to use quad-core processor architectures with Windows Vista.

Now that we have taken a look at Windows XP and Windows Vista, it's time to take a look at some of the features of Windows 7. Microsoft Vista did not take off the way Microsoft had anticipated. Vista got a bad reputation from the get-go due to the higher-end machine requirements. To allow Vista to run properly, you needed a dual core processor and a beefed-up machine.

Many smaller IT departments do not even have dual-core processors in their servers, and they were not about to rebuy all of their client machines. Also, Vista took much more hard disk space compared to its predecessor, XP. So many organizations held off installing Vista.

Microsoft heard the masses and started building a new operating system. What it came up with is now called Windows 7. Microsoft Windows 7 is the newest version of Microsoft's client operating system software. Windows 7 combines the best of Windows XP and Windows Vista.

Microsoft currently has six different versions of the Windows 7 operating system:

- Windows 7 Starter
- Windows 7 Home Basic
- Windows 7 Home Premium
- Windows 7 Professional
- Windows 7 Enterprise
- Windows 7 Ultimate

The Windows 7 hardware requirements are discussed in greater detail in Chapter 2, "Automating the Windows 7 Installation."

New Features in Windows 7

Windows 7 has improved in many of the weak areas plaguing Windows Vista. Windows 7 has a much faster boot time and shutdown compared to Windows Vista. It is also easier to install and configure.

The Windows 7 operating system functions are also faster than its previous counterparts. Opening, moving, extracting, compressing, and installing files and folders are also more efficient than they were in previous versions of Microsoft's client operating systems.

Let's take a look at some of the improvements and features of Windows 7. This is just an overview of some of the benefits to using Windows 7.

Windows 7 Taskbar In the previous versions of Windows, you had a Quick Launch bar on the left-hand side, and on the right-hand side you could see which programs were loaded and running. The Quick Launch bar is now gone and has been replaced by the Windows 7 Taskbar and Jump List, as shown in Figure 1.3.

FIGURE 1.3 Windows 7 Taskbar

The Windows Taskbar allows a user to quickly access the programs they use the most. One advantage to having the applications on the Windows 7 Taskbar is fewer icons on the Desktop, thus allowing for a more manageable Desktop environment.

Jump Lists Jump Lists are a new feature to the Windows lineup, and they allow you to quickly access files that you have been working on. For example, if you have the Word icon in the Taskbar, you can right-click it to see all the files that you have been working with recently. In the case of Internet Explorer, you could view all the websites that you have visited recently.

Another advantage to using Jump Lists is that you can preset certain applications, like Windows Media Player.

New Preview Pane Windows XP and Windows Vista have a preview pane, but Windows 7 has improved on the preview pane by allowing you to now view text files, music files, picture files, HTML files, and videos. Another new advantage is if you have installed Microsoft Office and Adobe Acrobat Reader, you now have the ability to also view Office files and PDF files.

Windows Touch This is one of the cooler features included with Windows 7. Windows Touch allows you to control the operating system and its applications by using a touchscreen.

For example, you can open a picture and then move it around, make it larger or smaller, or place it anywhere on the Desktop, all with the touch of your fingers on the screen.

Touchscreens are placed on laptops, tabletops, GPS devices, phones, and now on the Windows 7 operating system.

Windows XP Mode Microsoft realizes that many organizations are running Windows XP and older applications on these Windows XP systems. Windows XP Mode allows an organization that chooses to upgrade to Windows 7 to still have the ability to run older Windows XP applications on the Windows 7 operating system.

In Windows XP Mode, Windows 7 uses virtualized technology to run a virtual XP operating system to allow the use of the older applications.

Simpler Home Networking Windows 7 networking has been made easier with the improvement of HomeGroups. Using HomeGroups is an easy way to set up a network with Windows 7. Windows 7 searches for your home network, and if one is found, it connects after you enter the HomeGroup password.

If a home network is not found, a networking wizard automatically creates a password for the HomeGroup. This password allows you to connect all of your other computers to the same network, and it can be changed anytime after the installation of Windows 7.

Device Stage Device Stage is new to the Windows operating systems family. It allows you to connect a compatible device to your PC and have a picture of the device appear. Using Device Stage, you can easily share files between devices and computers.

Before Windows 7 Device Stage, when you connected a device to the PC, you might see multiple devices. For example, when you add a multifunction printer (printer, scanner, and copier), it might be added as three separate devices. Device Stage helps resolve this issue.

Another feature of the Device Stage is that the device vendors can customize the icons for the Device Stage, so that the same multi-function printer can have the ability to order ink from the Device Stage.

View Available Networks (VAN) If you have used a laptop, you have used this feature. When you use a wireless network adapter and you right-click the icon in the system tray, you can choose the wireless network to which you want to connect. Connecting to a wireless network is done through the wireless network adapter. Now that same functionality is built into the Windows 7 operating system.

Windows Internet Explorer 8 Windows 7 includes the newest version of Internet Explorer (IE8). IE8, shown in Figure 1.4, allows a user to work faster and more efficiently on the Internet due to new search features, address bars, and favorites.

FIGURE 1.4 IE8

The following list includes some of the new features of IE8:

Instant Search This feature allows you to quickly access search requests without typing in the entire search criteria. As you start typing in the search request, you start seeing suggestions for your search.

The advantage to Instant Search is that it will also use your browsing history to narrow down the suggestions. If one of the suggestions is what you are looking for, you can choose it without finishing the query.

Accelerators This new feature allows you to accelerate actions on Internet services and applications. For example, if you were looking for a street address and you clicked the blue accelerator icon, a map would appear right there on the screen.

Microsoft accelerators can be used for email, searching, and so forth. Websites such as eBay and Facebook also offer accelerators for their services.

Web Slices Web Slices are instances on a website that you can access without the need of accessing the site itself. For example, you can get stock quotes, sports scores, or auction items without visiting the respective sites. With Web Slices, as the information that you are watching changes, the updates will show immediately.

Real World Scenario

Choosing an Appropriate Operating System

As an IT consultant, I have clients who want to stay on the leading edge of technology but don't have the money to replace all of their equipment. This is where I have to convince the client that it is better to slowly migrate their equipment.

Try presenting a timeline to your customers or organization that shows the migration to Windows 7. Your clients will be happy, and you will have the time needed to migrate your organization.

I understand that you are reading this book so that you can install Windows 7 in your organization, but since not all of your machines will be able to run Windows 7, it is important to know the minimum requirements for Windows XP and Vista.

Windows 7 Architecture

Windows 7 is built on the Windows Vista core, but Windows 7 has limited the files that load at startup to help with the core performance of the operating system. Microsoft has also removed many of the fluff items that Windows Vista used, allowing for better performance.

When Microsoft first released Windows 7 as a beta, there was a 64-bit version but no 32-bit version. This did not go over well with the Internet bloggers. I even saw a petition online to have a 32-bit version released.

The funny thing is that I also saw a petition asking Microsoft to *not* release a 32-bit version. The logic behind this petition was that the release of a 32-bit version would force users and manufacturers to upgrade everything to 64-bit. Regardless, Microsoft has released Windows 7 as both 32-bit and 64-bit version.

Microsoft could not release just a 64-bit version of Windows 7. This would alienate many users with 32-bit computer systems, and it would cost Microsoft a large share of the client-side software market (it's already had to deal with the PC/Mac commercials). So you have a choice of either using Windows 7 32-bit or 64-bit.

32-bit versus 64-bit

The terms *32-bit* and *64-bit* are referring to the CPU, or processor. The number represents how the data is processed. It is processed either as 2^{32} or 2^{64}. The larger the number is, the larger the amount of data that can be processed at any one time.

To get an idea of how 32-bit and 64-bit processors operate, think of a large highway with 32 lanes. Vehicles can travel on those 32 lanes only, so when traffic gets backed up, the result is delays. Now think of how many more vehicles can travel on a 64-lane highway.

The problem here is that a 32-lane highway can't handle the number of vehicles a 64-lane highway could. You need to have the infrastructure to allow for that volume of vehicles. The same is true for computers. Your computer has to be configured to allow you to run a 64-bit processor.

So what does all of this mean to the common user or administrator? It's all about Random Access Memory, or RAM. A 32-bit operating system can handle up to 4 GB of RAM, and a 64-bit processor can handle up to 16 exabytes of RAM. The problem is that Windows and most motherboards can't handle this much RAM.

None of this is new. Although 64-bit processors are just starting to get accepted with Windows, other operating systems, such as Apple, have been using 64-bit processors for many years.

So should you switch all of your users to 64-bit? The answer is no. Most users do not need to have large amounts of RAM, and many manufactures do not have 64-bit-compliant components.

For example, I am writing this book on a 64-bit computer, but if I open Internet Explorer and go to any website that uses Adobe Flash Player, it will not work. Currently, Adobe does not have a 64-bit Flash Player.

Computer processors are typically rated by speed. The speed of the processor, or central processing unit (CPU), is rated by the number of clock cycles that can be performed in 1 second. This measurement is typically expressed in gigahertz (GHz). One GHz is one billion cycles per second. Keep in mind that processor architecture must also be taken into account when considering processor speed. A processor with a more efficient pipeline will be faster than a processor with a less efficient pipeline at the same CPU speed.

Now that you have seen the new features of Windows 7, let's look at how to prepare the machine to install Windows 7.

Preparing to Install Windows 7

Installing Windows 7 is very simple because of the installation wizard. The installation wizard will walk you through the entire installation of the operating system.

The harder part of installing Windows 7 is preparing and planning for the installation. One thing I often say to IT professionals is, "An hour of planning will save you days of work." Planning a Windows 7 rollout is one of the hardest and most important tasks that you will perform when installing Windows 7.

There are many decisions that should be made before you insert the actual Windows 7 media into the machine. The first decision is which version of Windows 7 you want to install. Let's take a look at the different versions of Windows 7.

Different Versions of Windows 7

Microsoft has six different versions of the Windows 7 operating system. This allows an administrator to custom fit a user's hardware and job function to the appropriate version of Windows 7. The six different versions of Windows 7 are:

- Windows 7 Starter
- Windows 7 Home Basic
- Windows 7 Home Premium
- Windows 7 Professional
- Windows 7 Enterprise
- Windows 7 Ultimate

Many times Microsoft releases multiple editions of the operating system contained within the same Windows 7 media disk. You can choose to unlock the one you want based on the product key you have. Let's take a closer look at the different versions of Windows 7.

Windows 7 Starter

The Windows 7 Starter edition was designed for small notebook PCs, and it is now available worldwide. This is a change from the previous versions of the Windows Starter editions. Previously, the Starter editions were available only to certain locations. Windows 7 Starter edition has some features that work well on small notebook PCs:

- A safe, reliable, and supported operating system
- HomeGroup, which allows a user to easily share media, documents, and printers across multiple PCs in homes or offices without the need of a domain

- Improved Windows Taskbar and Jump Lists
- Broad application and device compatibility with unlimited concurrent applications

At the time this book was written, the three concurrent applications restriction was removed. Concurrent applications restriction meant that you could only run a certain amount of applications at any one time. This was a limitation in Vista Starter Edition. If you plan on using the Windows 7 Starter edition, please check Microsoft's website for any possible changes to this restriction.

There are many limitations to using the Windows 7 Starter edition. Windows 7 Starter edition does not include the following:

- Aero Glass. You are allowed to use only the Windows Basic or other opaque themes. Also, you do not get to use the Live Taskbar Previews or Aero Peek.
- Personalization features for changing Desktop backgrounds, window colors, and sound schemes.
- The ability to easily switch between users. You must log off to change users.
- Multi-monitor support.
- DVD playback or Windows Media Center for watching recorded TV or other media.
- Remote media streaming for streaming your videos, music, and recorded TV from your home computer.
- Domain support for business customers.
- XP Mode for those who want the ability to run older Windows XP programs on Windows 7.

Windows 7 Home Basic

The Windows 7 Home Basic edition is going to be issued only to limited areas throughout the world. The Home Basic edition, at the time this was written, is not going to be available to U.S. customers. Only emerging markets will be able to purchase the Home Basic edition so that they can have an inexpensive version of Windows 7. The Home Basic edition has some of the following features:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- HomeGroup, which allows a user to easily share media, documents, and printers across multiple PCs in homes or offices without the need of a domain
- Improved Taskbar and Jump Lists
- Live thumbnail previews and an enhanced visual experience

- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- Windows Mobility Center

Windows 7 Home Premium

Windows 7 Home Premium is the main operating system for the home users. Home Premium offers many features, including these:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- HomeGroup, which allows a user to easily share media, documents, and printers across multiple PCs in homes or offices without the need of a domain
- Improved Taskbar and Jump Lists
- Live thumbnail previews and an enhanced visual experience
- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- Mobility Center
- Windows Aero transparent glass design and advanced Windows navigation
- Easy networking and sharing across all your PCs and devices
- Improved media format support and enhancements to Windows Media Center and media streaming, including Play To
- Multitouch
- Improved handwriting recognition

Windows 7 Professional

Windows 7 Professional was designed with the small business owner in mind. Microsoft has designed Windows 7 Professional so that you can get more done and safeguard your data. Professional offers the following features:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- HomeGroup, which allows a user to easily share media documents and printers across multiple PCs in homes or offices without the need of a domain
- Improved Taskbar and Jump Lists
- Live thumbnail previews and an enhanced visual experience
- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- Mobility Center

- Action Center, which makes it easier to resolve many IT issues yourself
- Aero transparent glass design and advanced Windows navigation
- Easy networking and sharing across all your PCs and devices
- Improved media format support and enhancements to Windows Media Center and media streaming, including Play To
- Multitouch
- Improved handwriting recognition
- Domain Join, which enables simple and secure server networking
- Encrypting File System, which protects data with advanced network backup
- Location Aware Printing, which helps find the right printer when moving between the office and home
- Windows XP Mode to enable customers to run many Windows XP productivity applications

Windows 7 Enterprise and Ultimate

Windows 7 Enterprise and Ultimate are the two versions designed for mid-size and large organizations. These two operating systems have the most features and security options out of all Windows 7 versions. Here are some of the features:

- Broad application and device compatibility with unlimited concurrent applications
- A safe, reliable, and supported operating system
- HomeGroup, which allows a user to easily share media, documents, and printers across multiple PCs in homes or offices without the need of a domain
- Improved Taskbar and Jump Lists
- Live thumbnail previews and an enhanced visual experience
- Advanced networking support (ad hoc wireless networks and Internet connection sharing)
- Mobility Center
- Aero transparent glass design and advanced Windows navigation
- Easy networking and sharing across all your PCs and devices
- Improved media format support and enhancements to Windows Media Center and media streaming, including Play To
- Multitouch
- Improved handwriting recognition
- Domain Join, which enables simple and secure server networking
- Encrypting File System, which protects data with advanced network backup

- Location Aware Printing, which helps find the right printer when you are moving between the office and home
- Windows XP Mode, which enables customers to run many Windows XP productivity applications
- BitLocker, which protects data on removable devices
- DirectAccess, which links users to corporate resources from the road without a virtual private network (VPN)
- BranchCache, which makes it faster to open files and web pages from a branch office
- AppLocker, which restricts unauthorized software and also enables greater security

Windows 7 Ultimate also includes the multilanguage pack; Windows 7 Enterprise does not.

Table 1.2 shows a comparison of all the Windows 7 versions and what they include. This table, based on Microsoft's websites, is only a partial representation of the features and applications that are included on all the different versions.

TABLE 1.2 Windows 7 edition comparison

	Starter Edition	Home Basic Edition	Home Premium Edition	Professional Edition	Enterprise and Ultimate Edition
Processor (32-bit or 64-bit)	Both	Both	Both	Both	Both
Multiprocessor support	No	No	Yes	Yes	Yes
32-bit maximum RAM	4 GB	4 GB	4 GB	4 GB	4 GB
64-bit maximum RAM	8 GB	8 GB	16 GB	192 GB	192 GB
Windows HomeGroup	Yes	Yes	Yes	Yes	Yes
Jump Lists	Yes	Yes	Yes	Yes	Yes
Internet Explorer 8	Yes	Yes	Yes	Yes	Yes
Media Player 12	Yes	Yes	Yes	Yes	Yes
System Image	Yes	Yes	Yes	Yes	Yes
Device Stage	Yes	Yes	Yes	Yes	Yes
Sync Center	Yes	Yes	Yes	Yes	Yes

	Starter Edition	Home Basic Edition	Home Premium Edition	Professional Edition	Enterprise and Ultimate Edition
Windows Backup	Yes	Yes	Yes	Yes	Yes
Remote Desktop	Yes	Yes	Yes	Yes	Yes
ReadyDrive	Yes	Yes	Yes	Yes	Yes
ReadyBoost	Yes	Yes	Yes	Yes	Yes
Windows Firewall	Yes	Yes	Yes	Yes	Yes
Windows Defender	Yes	Yes	Yes	Yes	Yes
Taskbar Previews	No	Yes	Yes	Yes	Yes
Mobility Center	No	Yes	Yes	Yes	Yes
Easy User Switching	No	Yes	Yes	Yes	Yes
Windows Aero Glass	No	No	Yes	Yes	Yes
Multi-touch	No	No	Yes	Yes	Yes
DVD playback	No	No	Yes	Yes	Yes
Windows Media Center	No	No	Yes	Yes	Yes
XP Mode	No	No	No	Yes	Yes
Encrypting File System (EFS)	No	No	No	Yes	Yes
BitLocker	No	No	No	No	Yes
AppLocker	No	No	No	No	Yes
BranchCache	No	No	No	No	Yes
DirectAccess	No	No	No	No	Yes

Hardware Requirements

Before you can insert the Windows 7 DVD and install the operating system, you must make sure the machine's hardware can handle the Windows 7 operating system.

To install Windows 7 successfully, your system must meet or exceed certain hardware requirements. Table 1.3 lists the requirements for a Windows 7–capable PC.

TABLE 1.3 Hardware requirements

Component	Requirements
CPU (processor)	1 GHz 32-bit or 64-bit processor
Memory (RAM)	1 GB of system memory
Hard disk	16 GB of available disk space
Video adapter	Support for DirectX 9 graphics with 128 MB memory (to enable the Aero theme)
Optional drive	DVD-R/W drive
Network device	Compatible network interface card

The hardware requirements listed in Table 1.3 were those specified at the time this book was written. Always check Microsoft's website for the most current information.

The Windows 7–capable PC must meet or exceed the basic requirements to deliver the core functionality of the Windows 7 operating system. These requirements are based on the assumption that you are installing only the operating system without any premium functionality. For example, you may be able to get by with the minimum requirements if you are installing the operating system just to learn the basics of the software. Remember, the better the hardware, the better the performance.

The requirements for the graphics card depend on the resolution at which you want to run. The required amount of memory is as follows:

- 64 MB is required for a single monitor at a resolution of 1,310,720 pixels or less, which is equivalent to a 1280×1024 resolution.
- 128 MB is required for a single monitor at a resolution of 2,304,000 pixels or less, which is equivalent to a 1920×1200 resolution.
- 256 MB is required for a single monitor at a resolution larger than 2,304,000 pixels.

In addition, the graphics memory bandwidth must be at least 1,600 MB per second, as assessed by the Windows 7 Upgrade Advisor.

Real World Scenario

Deciding on Minimum Hardware Requirements

The company you work for has decided that everyone will have their own laptop running Windows 7. You need to decide on the new computers' specifications for processor, memory, and disk space.

The first step is to determine which applications will be used. Typically, most users will work with an email program, a word processor, a spreadsheet, presentation software, and maybe a drawing or graphics program. Additionally, an antivirus application will probably be used. Under these demands, a 1 GHz Celeron processor and 1,000 MB of RAM will make for a very slow-running machine. So for this usage, you can assume that the minimum baseline configuration would be higher than a 1 GHz processor with at least 2 GB of RAM.

Based on your choice of baseline configuration, you should then fit a test computer with the applications that will be used on it and test the configuration in a lab environment simulating normal use. This will give you an idea of whether the RAM and processor calculations you have made for your environment are going to provide a suitable response.

Today's disk drives have become capable of much larger capacity while dropping drastically in price. So for disk space, the rule of thumb is to buy whatever is the current standard. At the time this book was written, 500 GB drives were commonplace, which is sufficient for most users. If users plan to store substantial graphics or video files, you may need to consider buying larger-than-standard drives.

Also consider what the business requirements will be over the next 12 to 18 months. If you will be implementing applications that are memory- or processor-intensive, you may want to spec out the computers with hardware sufficient to support upcoming needs to avoid costly upgrades in the near future.

Measurement Used for Disk Space and Memory

Hard disks are commonly rated by capacity. The following measurements are used for disk space and memory capacity:

- 1 MB (megabyte) = 1,024 KB (kilobytes)
- 1 GB (gigabyte) = 1,024 MB
- 1 TB (terabyte) = 1,024 GB
- 1 PB (petabyte) = 1,024 TB
- 1 EB (exabyte) = 1,024 PB

If you are not sure if your machine meets the minimum requirements, Microsoft includes some tools that can help you determine if the machine is Windows 7–compatible.

The Hardware Compatibility List (HCL)

Along with meeting the minimum requirements, your hardware should appear on the *Hardware Compatibility List (HCL)*. The HCL is an extensive list of computers and peripheral hardware that have been tested with the Windows 7 operating system.

The Windows 7 operating system requires control of the hardware for stability, efficiency, and security. The hardware and supported drivers on the HCL have been put through rigorous tests to ensure their compatibility with Windows 7. Microsoft guarantees that the items on the list meet the requirements for Windows 7 and do not have any incompatibilities that could affect the stability of the operating system.

If you call Microsoft for support, the first thing a Microsoft support engineer will ask about is your configuration. If you have any hardware that is not on the HCL, you may not be able to get support from Microsoft.

To determine if your computer and peripherals are on the HCL, check the most up-to-date list at `https://winqual.microsoft.com/HCL/Default.aspx`.

BIOS Compatibility

Before you install Windows 7, you should verify that your computer has the most current Basic Input/Output System (BIOS). This is especially important if your current BIOS does not include support for Advanced Configuration and Power Interface (ACPI) functionality. ACPI functionality is required for Windows 7 to function properly. Check the computer's vendor for the latest BIOS version information.

Driver Requirements

To successfully install Windows 7, you must have the critical device drivers for your computer, such as the hard drive device driver. The Windows 7 media comes with an extensive list of drivers. If your computer's device drivers are not on the Windows 7 installation media, you should check the device manufacturer's website. If you can't find the device driver on the manufacturer's website and no other compatible driver exists, you are out of luck. Windows 7 will not recognize devices that don't have Windows 7 drivers.

New Install or Upgrade

Once you've determined that your hardware meets the minimum requirements, you need to decide whether you want to do an upgrade or a clean install.

An upgrade allows you to retain your existing operating system's applications, settings, and files. If you currently have a computer with Windows Vista, you are eligible to use an upgrade copy of Windows 7.

The bad news is that you must always perform a clean install with Windows XP or earlier versions of Windows. You can, however, use the Windows Easy Transfer utility to migrate files and settings from Windows XP to Windows 7 on the same computer. The steps to do this will be shown later in this chapter.

Another possibility is to upgrade your Windows XP machine to Windows Vista and then upgrade the new Vista operating system to Windows 7.

You can perform an upgrade to Windows 7 if the following conditions are true:

- You are running Windows Vista.
- You want to keep your existing applications and preferences.
- You want to preserve any local users and groups you've created.

You must perform a clean install of Windows 7 if any of the following conditions are true:

- There is no operating system currently installed.
- You have an operating system installed that does not support an in-place upgrade to Windows 7 (such as DOS, Windows 9*x*, Windows NT, Windows Me, Windows 2000 Professional, or Windows XP).
- You want to start from scratch, without keeping any existing preferences.
- You want to be able to dual-boot between Windows 7 and your previous operating system.

Table 1.4 shows each Vista operating system that can be upgraded and the edition of Windows 7 to which it should be updated.

TABLE 1.4 Windows Vista Upgrade Options

Windows Vista Edition	Windows 7 Edition
Home Premium edition	Home Premium edition
Business edition	Professional edition
Ultimate edition	Ultimate edition

Upgrade Considerations

Almost all Windows Vista applications should run with the Windows 7 operating system. However, the following are a few possible exceptions to this statement:

- Applications that use file-system filters, such as antivirus software, may not be compatible.
- Custom power-management tools may not be supported.

Before upgrading to Windows 7, be sure to stop any antivirus scanners, network services, or other client software. These software packages may see the Windows 7 install as a virus and cause installation issues.

If you are performing a clean install to the same partition as an existing version of Windows, the contents of the existing Users (or Documents And Settings), Program Files, and Windows directories will be placed in a directory named `Windows.old`, and the old operating system will no longer be available.

Hardware Compatibility Issues

You need to ensure that you have Windows 7 device drivers for your hardware. If you have a video driver without a Windows 7–compatible driver, the Windows 7 upgrade will install the Standard VGA driver, which will display the video with an 800×600 resolution. Once you get the Windows 7 driver for your video, you can install it and adjust video properties accordingly.

Application Compatibility Issues

Not all applications that were written for earlier versions of Windows will work with Windows 7. After the upgrade, if you have application problems, you can address the problems as follows:

- If the application is compatible with Windows 7, reinstall the application after the upgrade is complete.
- If the application uses dynamic-link libraries (DLLs), and there are migration DLLs for the application, apply the migration DLLs.
- Use the Microsoft Application Compatibility Toolkit (ACT) to determine the compatibility of your current applications with Windows 7. ACT will determine which applications are installed, identify any applications that may be affected by Windows updates, and identify any potential compatibility problems with User Account Control and Internet Explorer. Reports can be exported for detailed analysis.
- If applications were written for earlier versions of Windows but are incompatible with Windows 7, use the Windows 7 Program Compatibility Wizard. From Control Panel, click the Programs icon and then click the Run Programs From Previous Versions link to start the Program Compatibility Wizard. If the application is not compatible with Windows 7, upgrade your application to a Windows 7–compliant version.

Windows 7 Upgrade Advisor

To assist you in the upgrade process, the Windows 7 Setup program can check the compatibility of your system, devices, and installed applications and then provide the results to you. You can then analyze these results to determine whether your hardware or software applications will port properly from previous Windows versions to Windows 7.

You can download the Windows 7 *Upgrade Advisor* from Microsoft's website at `www.microsoft.com/downloads`. The Windows 7 Upgrade Advisor is compatible with Windows 7, Windows Vista, and Windows XP with Service Pack 2 or higher.

When you are running the Upgrade Advisor on a machine running Windows XP, if you do not have the .NET Framework 2.0, you will be asked to download and install it. After the .NET Framework is installed, you can restart the Upgrade Advisor installation.

After your computer is scanned, the Upgrade Advisor will determine whether any incompatibilities exist between your computer and Windows 7. It will also tell you which edition of Windows 7 seems to be best for your computer. However, you are by no means limited to upgrading to the recommended edition. The Upgrade Advisor compatibility reports are broken up into three categories:

System Requirements The System Requirements report will alert you to any shortcomings your system might have when running certain editions of Windows 7. For example, my lab computer should have no problems accessing all the features of Windows 7 Enterprise but it won't be able to access all of the features of Windows 7 Home Premium or Windows 7 Ultimate because it doesn't have a TV tuner card.

Devices The Devices report will alert you to any potential Windows 7 driver issues. Each device in your system will be listed in this section as either a device to be reviewed or a device that should automatically work after Windows 7 is installed. You will need a driver for the network card after Windows 7 is installed.

Programs The Programs report will alert you to any potential application compatibility issues.

You can also save or print a task list that tells you the most compatible Windows 7 edition, your current system configuration, and the steps you need to take before and after installing Windows 7.

In Exercise 1.1, I will walk you through the Windows 7 Upgrade Advisor. The Upgrade Advisor will need to be downloaded from Microsoft's website.

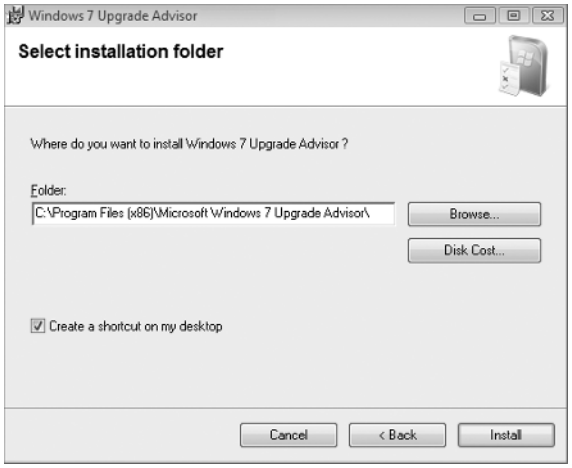
EXERCISE 1.1

Using the Windows 7 Upgrade Advisor

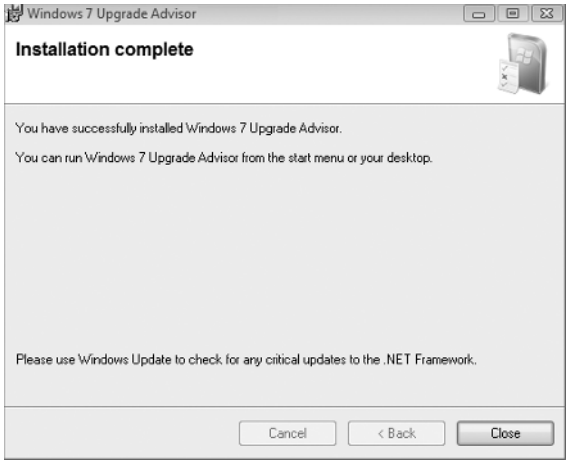
1. Go to `www.microsoft.com/downloads` and download the Windows 7 Upgrade Advisor.
2. After the download is complete, run the `.msi` installation.
3. The Windows 7 Upgrade Advisor Wizard will start. Click the Next button.

EXERCISE 1.1 *(continued)*

4. At the License screen, click the I Accept The License Terms check box and click Next.
5. At the Select Installation Folder screen, accept the defaults or choose a directory location where you would like this program installed. Click Install.



6. At the Installation Complete screen, click the Close button.



7. On the Desktop, double-click the Windows 7 Upgrade Advisor icon.
8. When the Windows 7 Upgrade Advisor starts, click the Start Check button to start the scan of the machine.

9. Once the system scan is complete, the Upgrade Advisor will give you the results. You can print or save them. Close the Upgrade Advisor.

An Upgrade Checklist

Once you have made the decision to upgrade, you should develop a plan of attack. The following upgrade checklist (valid for upgrading from Windows Vista) will help you plan and implement a successful upgrade strategy.

- Verify that your computer meets the minimum hardware requirements for Windows 7.
- Be sure your hardware is on the HCL.
- Make sure you have the Windows 7 drivers for the hardware. You can verify this with the hardware manufacturer.
- To audit the current configuration and status of your computer, run the Windows 7 Upgrade Advisor tool from the Microsoft website, which also includes documentation on using the utility. It will generate a report of any known hardware or software compatibility issues based on your configuration. You should resolve any reported issues before you upgrade to Windows 7.
- Make sure your BIOS is current. Windows 7 requires that your computer have the most current BIOS. If it does not, it may not be able to use advanced power-management features or device-configuration features. In addition, your computer may cease to function during or after the upgrade. Use caution when performing BIOS updates because installing the incorrect BIOS can cause your computer to fail to boot.
- Take an inventory of your current configuration. This inventory should include documentation of your current network configuration, the applications that are installed, the hardware items and their configuration, the services that are running, and any profile and policy settings.
- Back up your data and configuration files. Before you make any major changes to your computer's configuration, you should back up your data and configuration files and then verify that you can successfully restore your backup. Chances are if you have a valid backup, you won't have any problems. Chances are if you don't have a valid backup, you will have problems.
- Delete any unnecessary files or applications, and clean up any program groups or program items you don't use. Theoretically, you want to delete all the junk on your computer before you upgrade. Think of this as the spring-cleaning step.
- Verify that there are no existing problems with your drive prior to the upgrade. Perform a disk scan, a current virus scan, and defragmentation. These, too, are spring-cleaning chores. This step just prepares your drive for the upgrade.
- Perform the upgrade. In this step, you upgrade from the Windows Vista operating system to Windows 7.
- Verify your configuration. After Windows 7 has been installed, use the inventory to compare and test each element that was inventoried prior to the upgrade to verify that the upgrade was successful.

Handling an Upgrade Failure

Before you upgrade, you should have a contingency plan in place. Your plan should assume the worst-case scenario. For example, what happens if you upgrade and the computer doesn't work anymore? It is possible that, after checking your upgrade list and verifying that everything should work, your attempt at the actual upgrade may not work. If this happens, you may want to return your computer to the original, working configuration.

Indeed, I have made these plans, created my backups (two, just in case), verified them, and then had a failed upgrade anyway—only to discover that I had no clue where to find the original operating system CD. A day later, with the missing CD located, I was able to get up and running again. My problem was an older BIOS, and the manufacturer of my computer did not have an updated BIOS.

Disk Space Partitioning

Disk partitioning is the act of taking the physical hard drive and creating logical partitions. A logical drive is how space is allocated to the drive's primary and logical partitions. For example, if you have a 500 GB hard drive, you might partition it into three logical drives: a C: drive, which might be 200 GB; a D: drive, which might be 150 GB; and an E: drive, which might be 150 GB.

The following are some of the major considerations for disk partitioning:

- The amount of space required
- The location of the system and boot partition
- Any special disk configurations you will use
- The utility you will use to set up the partitions

Partition Size One important consideration in your disk-partitioning scheme is determining the partition size. You need to consider the amount of space taken up by your operating system, the applications that will be installed, and the amount of stored data. It is also important to consider the amount of space required in the future.

Microsoft recommends that you allocate at least 16 GB of disk space for Windows 7. This allows room for the operating system files and for future growth in terms of upgrades and installation files that are placed with the operating system files.

The System and Boot Partitions When you install Windows 7, files will be stored in two locations: the system partition and the boot partition. The system partition and the boot partition can be the same partition.

The system partition contains the files needed to boot the Windows 7 operating system. The system partition contains the Master Boot Record (MBR) and boot sector

of the active drive partition. It is often the first physical hard drive in the computer and normally contains the necessary files to boot the computer. The files stored on the system partition do not take any significant disk space. The active partition is the system partition that is used to start your computer. The C: drive is usually the active partition.

The boot partition contains the files that are the Windows 7 operating system files. By default, the Windows operating system files are located in a folder named Windows.

Special Disk Configurations Windows 7 supports several disk configurations. Options include simple, spanned, and striped volumes. These configuration options are covered in detail in Chapter 3, "Managing Disks."

Disk Partition Configuration Utilities If you are partitioning your disk prior to installation, you can use several utilities, such as the DOS or Windows FDISK program, or a third-party utility such as Norton's Partition Magic. You can also configure the disks during the installation of the Windows 7 operating system.

You might want to create only the first partition where Windows 7 will be installed. You can then use the Disk Management utility in Windows 7 to create any other partitions you need. The Windows 7 Disk Management utility is covered in Chapter 3.

Language and Locale

Language and locale settings determine the language the computer will use. Windows 7 supports many languages for the operating system interface and utilities.

Locale settings are for configuring the format for items such as numbers, currencies, times, and dates. For example, English for the United States specifies a short date as mm/dd/yyyy (month/day/year), while English for South Africa specifies a short date as yyyy/mm/dd (year/month/day).

Installing Windows 7

You can install Windows 7 either from the bootable DVD or through a network installation using files that have been copied to a network share point. You can also launch the `setup.exe` file from within the Windows 7 operating system to upgrade your operating system.

The Windows 7 DVD is bootable. To start the installation, you simply restart your computer and boot to the DVD. The installation process will begin automatically. You will walk through the steps of installing Windows 7 from the DVD in Exercise 1.2.

If you are installing Windows 7 from the network, you need a distribution server and a computer with a network connection. A distribution server is a server that has the Windows 7 distribution files copied to a shared folder. The following steps are used to install Windows 7 over the network:

1. Boot the target computer.
2. Attach to the distribution server and access the share that has the files copied to it.

3. Launch `setup.exe`.
4. Complete the Windows 7 installation using either the clean install method or the upgrade method. These methods are discussed in detail in the following sections.

Performing a Clean Install of Windows 7

On any installation of Windows 7, there are three stages to the installation.

Collecting Information During the collection phase of the installation, Windows 7 gathers the information necessary to complete the installation. This is where Windows 7 gathers your local time, location, keyboard, license agreement, installation type, and installation disk partition.

Installing Windows This section of the installation is where your Windows 7 files are copied to the hard disk and the installation is completed. This phase takes the longest as the files are installed.

Set Up Windows In this phase, you set up a username, computer name, password, product key, and security settings and review the date and time. After this is finished, your installation will be complete.

As explained earlier, you can run the installation from the optical media or over a network. The only difference in the installation procedure is your starting point: from your optical drive or from a network share. The steps in the following exercise assume you are using the Windows 7 DVD to install Windows 7.

Setting Up Your Computer for Hands-On Exercises

Before beginning Exercise 1.2, verify that your computer meets the requirements for installing Windows 7 as listed in Table 1.3. For Exercise 1.2, it is assumed you are not currently running a previous version of Windows that will be upgraded.

The exercises in this book are based on your computer being configured in a specific manner. Your computer should have at least a 20 GB drive that is configured with the minimum space requirements and partitions.

When you boot to the Windows 7 installation media, the Setup program will automatically start the Windows 7 installation. In Exercise 1.2, you will perform a clean install of Windows 7. This exercise assumes that you have access to Windows 7 Ultimate; other editions may vary slightly. You can also download an evaluation version of Windows 7 from Microsoft's website.

EXERCISE 1.2

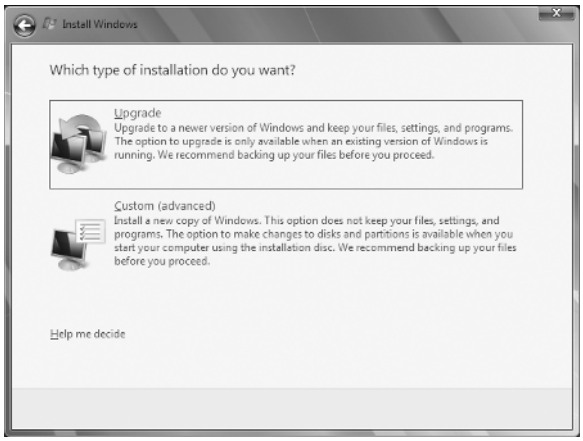
Performing a Clean Install of Windows 7

1. Insert the Windows 7 DVD into the machine and start the computer.
2. If you are asked to Hit Any Key to start the DVD, press Enter.
3. The first screen will ask you to enter your language, local time, and keyboard. After filling in these fields, click Next.

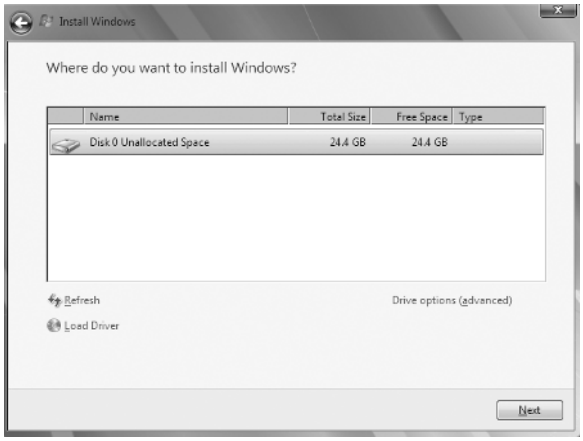
4. At the next screen, click the Install Now button.

5. A message appears to tell you that the setup is starting. The licensing screen will be first. Read the license agreement and then check the I Accept The License Terms check box. Click Next.

6. When asked which type of installation you want, click Custom (Advanced).



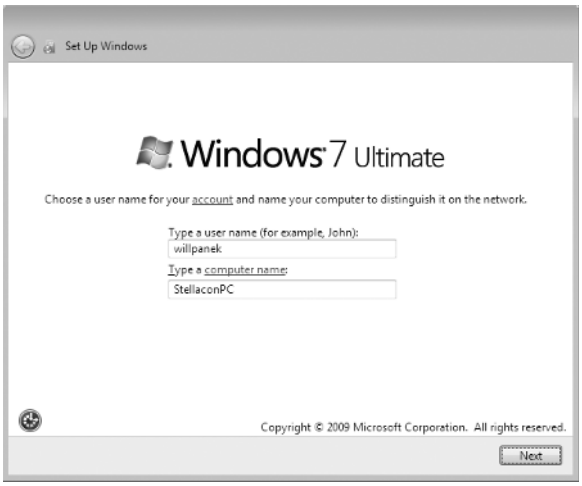
7. The next screen asks you to identify the disk to which you would like to install Windows 7. Choose an unformatted free space or a partition (partition will be erased) with at least 20 GB available. You can also click the Drive Options (Advanced) link to create your own partition. After you choose your partition, click Next.



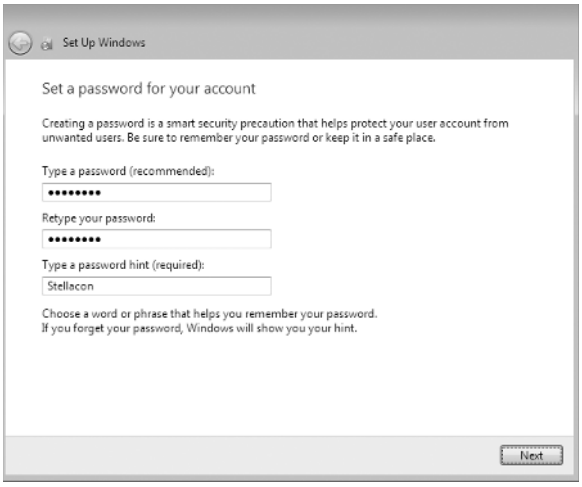
8. When your partition is set, the installation will start. You will see the progress of the installation during the entire process. When the installation is complete, the machine will reboot.

9. After the installation is complete, the Username And Computer Name screen will appear. Type in your username and computer name and click Next.

EXERCISE 1.2 *(continued)*



10. Set your password on the next screen. Enter your password twice and enter your hint. Click Next.



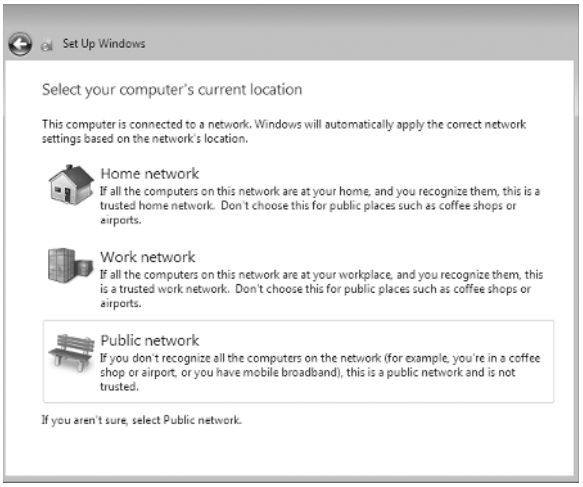
11. The next screen asks you to enter your 25-digit product key. Enter your product key and make sure the check box—to automatically register your machine when you're online—is checked. Click Next.

12. Settings related to Windows Update and security will appear next. You can use the recommended settings, install important updates for Windows only, or have the

computer ask you later. If you select the option to use the recommended settings, the following settings will be configured:

- Windows Update will be enabled and updates will automatically install.
- Windows Defender will be installed and any collected information will be sent to Microsoft.
- Errors will automatically be sent to Microsoft.
- The latest drivers for your hardware will automatically be downloaded from Windows Update.

13. You will now be able to verify your time and date settings. Configure your time, time zone, and date. Click Next.
14. The next step is to set your computer's current location. You have the ability to choose from a home, work, or public location. Choose the location where your computer is located.



15. Windows will finalize your setup and the installation will be complete.

Performing an Upgrade to Windows 7

This section describes how to perform an upgrade to Windows 7 from Windows Vista. Similar to a clean install, you can run the installation from the installation DVD or over a network. The only difference in the installation procedure is your starting point: from your optical drive or from a network share. For the steps in the following sections, it is assumed that you are using the Windows 7 DVD to install the Windows 7 operating system.

The three main steps in the Windows 7 upgrade process are very similar to the process for a clean install. The three steps of upgrading to Windows 7 are:

1. Collecting information
2. Installing Windows
3. Setting up Windows

In Exercise 1.3, you will go through the process of installing Windows 7 by upgrading Windows Vista.

EXERCISE 1.3

Upgrading Windows Vista to Windows

1. Insert the Windows 7 DVD.
2. If Autorun does not start, navigate to the DVD drive and click `setup.exe`. Once the setup starts (via either `setup.exe` or Autorun), click Install Windows 7.
3. You are prompted to update your current operating system. If you choose not to update, the installation might fail. You can also choose to send information to Microsoft during this process.
4. The Microsoft Windows 7 license terms appear. The installation will not allow you to click Next until you have accepted the license terms.
5. You are prompted to select the type of installation you want to perform. Choose the Upgrade link.
6. You will see a compatibility report that will alert you of any applications or drivers that are not supported in Windows 7. Click Next.

   The following steps will take place in the Installing Windows section of the upgrade.

7. During the Installing Windows phase, all the files required by the Setup program will be copied to the hard drive. The computer automatically reboots during the installation process. This process takes several minutes and proceeds automatically without user intervention. The following steps appear on the screen along with a completion percentage for each:

   - Copying Windows files
   - Gathering files, settings, and programs
   - Expanding Windows files
   - Installing features and updates
   - Transferring files, settings, and programs

   Once your computer finishes copying files and reboots, you will be in the Setup Windows phase of the installation. The following steps are involved with completing an upgrade.

8. You'll be asked for your Windows product key. Type in your 25-digit product key and click Next.
9. Settings related to Windows Update and security appear. You can use the recommended settings, install important updates for Windows only, or have the computer ask you later.
10. On the next screen, set up your local time and date and choose whether you want daylight savings time. Click Next.
11. The installation completes.

Troubleshooting Installation Problems

The Windows 7 installation process is designed to be as simple as possible. The chances for installation errors are greatly minimized through the use of wizards and the step-by-step process. However, it is possible that errors may occur.

Identifying Common Installation Problems

As most of you are aware, installations seldom go off without a hitch. You might encounter some of the following installation errors:

Media Errors Media errors are caused by defective or damaged DVDs. To check the disc, put it into another computer and see if you can read it. Also check your disc for scratches or dirt—it may just need to be cleaned.

Insufficient Disk Space Windows 7 needs at least 16 GB of free space for the installation program to run properly. If the Setup program cannot verify that this space exists, the program will not let you continue.

Not Enough Memory Make sure your computer has the minimum amount of memory required by Windows 7 (1 GB). Having insufficient memory may cause the installation to fail or blue-screen errors to occur after installation.

Not Enough Processing Power Make sure your computer has the minimum processing power required by Windows 7 (1 GHz). Having insufficient processing power may cause the installation to fail or blue-screen errors to occur after installation.

Hardware That Is Not on the HCL If your hardware is not listed on the HCL, Windows 7 may not recognize the hardware or the device may not work properly.

Hardware with No Driver Support Windows 7 will not recognize hardware without driver support.

Hardware That Is Not Configured Properly If your hardware is Plug and Play compatible, Windows 7 should configure it automatically. If your hardware is not Plug and Play compatible, you will need to manually configure the hardware per the manufacturer's instructions.

Incorrect Product Key Without a valid product key, the installation will not go past the Product Key screen. Make sure you have not typed in an incorrect key (check your Windows 7 installation folder or your computer case for this key).

Failure to Access TCP/IP Network Resources If you install Windows 7 with typical settings, the computer is configured as a DHCP client. If there is no DHCP server to provide IP configuration information, the client will still generate an auto-configured IP address but be unable to access network resources through TCP/IP if the other network clients are using DHCP addresses.

Installing Nonsupported Hard Drives If your computer is using a hard disk that does not have a driver included on the Windows 7 media, you will receive an error message stating that the hard drive cannot be found. You should verify that the hard drive is properly connected and functional. You will need to obtain a disk driver for Windows 7 from the manufacturer and then specify the driver location by selecting the Load Driver option during partition selection.

Troubleshooting with Installation Log Files

When you install Windows 7, the Setup program creates several log files. You can view these logs to check for any problems during the installation process. Two log files are particularly useful for troubleshooting:

- The action log includes all of the actions that were performed during the setup process and a description of each action. These actions are listed in chronological order. The action log is stored as `\Windows\setupact.log`.
- The error log includes any errors that occurred during the installation. For each error, there is a description and an indication of the severity of the error. This error log is stored as `\Windows\setuperr.log`.

In Exercise 1.4, you will view the Windows 7 Setup logs to determine whether there were any problems with your Windows 7 installation.

EXERCISE 1.4

Troubleshooting Failed Installations with Setup Logs

1. Select Start ➢ Computer.
2. Double-click Local Disk (C:).
3. Double-click Windows.
4. In the Windows folder, double-click the `setupact.log` file to view your action log in Notepad. When you are finished viewing this file, close Notepad.
5. Double-click the `setuperr.log` file to view your error file in Notepad. If no errors occurred during installation, this file will be empty. When you are finished viewing this file, close Notepad.
6. Close the directory window.

Migrating Files and Settings

Rather than perform an in-place upgrade, you can choose to migrate your files and settings from an existing installation. In this case, you can use the User State Migration Tool (USMT) or the Windows Easy Transfer utility.

User State Migration Tool

You can download a utility called the *User State Migration Tool (USMT)* that is used by administrators to migrate large numbers of users over automated deployments. The USMT for Windows 7 is now part of the Windows Automated Installation Kit (Windows AIK). The USMT is similar to Windows Easy Transfer with the following differences:

- The USMT is more configurable and can use XML files to specify which files and settings are transferred.
- The USMT is scriptable and uses command-line utilities to save and restore user files and settings.

The USMT consists of two executable files: `ScanState.exe` and `LoadState.exe`. In addition, there are three premade migration rule information files: `Migapp.xml`, `Migsys.xml`, and `Miguser.xml`. Finally, you can create a `Config.xml` file that specifies what should and should not be migrated. The purpose of these files is as follows:

- `ScanState.exe` collects user data and settings information based on the configuration of the `Migapp.xml`, `Migsys.xml`, and `Miguser.xml` files and stores it as an image file.
- `LoadState.exe` then deposits the information that is collected to a computer running a fresh copy of Windows 7.

The following information is migrated:

- From each user:
  - Documents
  - Video
  - Music
  - Pictures
  - Desktop files
  - Start menu
  - Quick Launch toolbar
  - Internet Explorer Favorites
- From the All Users profile:
  - Shared Documents
  - Shared Video
  - Shared Music

- Shared Desktop files
- Shared Pictures
- Shared Start menu
- Shared Internet Explorer Favorites
- Files with certain filename extensions, including `.doc`, `.dot`, `.rtf`, `.txt`, `.wps`, `.wri`, `.xls`, `.csv`, `.wks`, `.ppt`, `.pps`, `.pot`, `.pst`, and more
- Access control lists (ACLs)

USMT will not migrate hardware settings, drivers, passwords, application binaries, synchronization files, DLL files, or other executables.

Using the USMT

The USMT is downloadable software from Microsoft's website. In its simplest form, you use the USMT in the following manner:

1. Run `ScanState.exe` on the source computer. `ScanState.exe` will copy the user state data to an intermediate store. The intermediate store (for example, a CD-RW) must be large enough to accommodate the data that will be transferred. `Scanstate.exe` would commonly be executed as a shortcut sent to users that they would deploy in the evening or through a scheduled script.
2. Install a fresh copy of Windows 7 on the target computer.
3. Run `LoadState.exe` on the target computer. `LoadState.exe` will access the intermediate store to restore the user settings.

When you use the USMT, you can create a script that can be run manually or can be used as an automated process at a scheduled time. Table 1.5 defines the options for the `Scanstate.exe` and `Loadstate.exe` commands.

TABLE 1.5 Options for `Scanstate.exe` and `Loadstate.exe`

Option	Description
`/config`	Specifies the `Config.xml` file that should be used
`/encrypt`	Encrypts the store (`Scanstate.exe` only)
`/decrypt`	Decrypts the store (`Loadstate.exe` only)
`/nocompress`	Disables data compression
`/genconfig`	Generates a `Config.xml` file but does not create a store
`/targetxp`	Optimizes ScanState for use with Windows XP

Option	Description
`/all`	Migrates all users
`/ue`	User exclude: excludes the specified user
`/ui`	User include: includes the specified user
`/uel`	Excludes user based on last login time
`/v verboselevel`	Used to identify what verbosity level will be associated with the log file on a scale of 0–13, with 0 being the least verbose

Windows Easy Transfer

Windows 7 ships with a utility called *Windows Easy Transfer* that is used to transfer files and settings from one computer to another. You can transfer some or all of the following files and settings from a computer running Windows XP with Service Pack 2 or Windows Vista:

- User accounts
- Folders and files
- Program settings
- Internet settings
- Favorites
- Email messages, contacts, and settings

You can transfer the migrated files and settings using the following methods:

- Easy Transfer Cable, which is a USB cable that connects to the source and destination computers
- CD or DVD
- Removable media, such as a USB flash drive or a removable hard drive
- Network share
- Direct network connection

You can password-protect the migrated files and settings if you use CDs, DVDs, removable media, or a network share.

Upgrading from Windows XP to Windows 7

Since the upgrade option from Windows XP to Windows 7 is not available, you can use Windows Easy Transfer to integrate settings from Windows XP to Windows 7 on the same computer.

The first step in this migration process is to copy your files to removable media such as an external hard drive or thumb drive or to a network share. After the installation of the Windows 7 operating system, you can then migrate these files onto the Windows 7 system.

Exercise 1.5 shows how to accomplish the goal of migrating Windows XP to Windows 7.

EXERCISE 1.5

Migrating Windows XP to Windows 7

First, copy files using Windows Easy Transfer.

1. Insert the Windows 7 DVD while running Windows XP. If the Windows 7 installation window opens automatically, close it.
2. Open Windows Explorer by right-clicking the Start menu, and then clicking Explore.
3. Browse to the DVD drive on your computer and click `migsetup.exe` in the Support\Migwiz directory.
4. When the Windows Easy Transfer window opens, click Next.
5. Select an external hard disk or USB flash drive.
6. Click This Is My Old Computer. Windows Easy Transfer scans the computer.
7. Click Next. You can also determine which files should be migrated by selecting only the user profiles you want to transfer or by clicking Customize.
8. Enter a password to protect your Easy Transfer file, or leave the box blank, and then click Save.
9. Browse to the external location on the network or to the removable media where you want to save your Easy Transfer file, and then click Save.
10. Click Next. Windows Easy Transfer displays the file name and location of the Easy Transfer file you just created.

Then, use the Windows 7 DVD to install the operating system.

1. Start Windows 7 Setup by browsing to the root folder of the DVD in Windows Explorer and then double clicking `setup.exe`.
2. Click Go Online To Get The Latest Updates (Recommended) to retrieve any important updates for Windows 7. This step is optional. If you choose not to check for updates during Setup, click Do Not Get The Latest Updates.
3. Read and accept the Microsoft Software License Terms. Click I Accept The License Terms (required to use Windows), and then click Next. If you click I Decline (cancel installation), Windows 7 Setup will exit.

4. Click Custom to perform an upgrade to your existing Windows installation.
5. Select the partition where you would like to install Windows. To move your existing Windows installation into a `Windows.old` folder and replace the operating system with Windows 7, select the partition where your current Windows installation is located.
6. Click Next and then click OK.
7. Windows 7 Setup will proceed without further interaction.

Finally, migrate files to the destination computer.

1. If you saved your files and settings in an Easy Transfer file on a removable media such as a UFD rather than on a network share, insert the removable media into the computer.
2. Click Start, click All Programs, click Accessories, click System Tools, and then click Windows Easy Transfer.
3. The Windows Easy Transfer window opens; click Next.
4. Click an external hard disk or USB flash drive.
5. Click This Is My New Computer.
6. Click Yes, Open The File.
7. Browse to the location where the Easy Transfer file was saved. Click the filename, and then click Open.
8. Click Transfer to transfer all files and settings. You can also determine which files should be migrated by selecting only the user profiles you want to transfer or by clicking Customize.
9. Click Close after Windows Easy Transfer has completed moving your files.

After the migration process is complete, you should regain the disk space used by the Windows XP system by deleting the `Windows.old` directory, using the Disk Cleanup tool. The following steps show you how to use the Disk Cleanup tool.

1. Open Disk Cleanup. Click Start, click All Programs, click Accessories, click System Tools, and then click Disk Cleanup.
2. Click Clean Up System Files.
3. Previous installations of Windows are scanned. After they are scanned, select Previous Windows Installation(s) and any other categories of files you want to delete.
4. Click OK and then click Delete Files.

Upgrading to Windows 7

Another important decision that should be considered is whether to upgrade your Windows XP clients to Windows Vista first and then upgrade the machine to Windows 7.

As you have seen, you can migrate your users' data, but let's say you have software installed and you can't locate the CD/DVD for that software package. It may be beneficial to a user or organization to upgrade the Windows XP machine to Windows Vista. After that installation is complete, upgrade the Vista machine to Windows 7.

This is just another option that is available to you when migrating your users to the Windows 7 operating system.

Supporting Multiple-Boot Options

You may want to install Windows 7 but still be able to run other operating systems. *Dual-booting* or multibooting allows your computer to boot multiple operating systems. Your computer will be automatically configured for dual-booting if there was a supported operating system on your computer prior to the Windows 7 installation, you didn't upgrade from that operating system, and you installed Windows 7 into a different partition.

One reason for dual-booting is to test various systems. If you have a limited number of computers in your test lab and you want to be able to test multiple configurations, you should dual-boot. For example, you might configure one computer to multiboot with Windows XP Professional, Windows Vista, and Windows 7.

Here are some keys to successful dual-boot configurations:

- Make sure you have plenty of disk space.
- Windows 7 must be installed on a separate partition in order to dual-boot with other operating systems.
- Install older operating systems before installing newer operating systems. If you want to support dual-booting with Windows XP and Windows 7, Windows XP must be installed first. If you install Windows 7 first, you cannot install Windows XP without ruining your Windows 7 configuration. This requirement also applies to Windows 9*x*, Windows 2000, and Windows Vista.
- Never, ever upgrade to Windows 7 dynamic disks. Dynamic disks are seen only by Windows 2000, Windows XP Professional, Windows Server 2003, Windows Vista, and Windows 7 and are not recognized by any other operating system, including Windows NT and Windows XP Home Edition.
- Only Windows NT 4.0 (with Service Pack 4), Windows 2000, Windows XP, Windows Vista, Windows 7, Windows Server 2003, and Windows Server 2008 can recognize

NTFS file systems. Other Windows operating systems use FAT16 or FAT32 and cannot recognize NTFS. All Windows-based operating systems can recognize FAT partitions.

- If you will dual-boot with Windows 9*x*, you must turn off disk compression or Windows 7 will not be able to read the drive properly.
- Do not install Windows 7 on a compressed volume unless the volume was compressed using NTFS compression.
- Files that are encrypted with Windows 7 will not be available to Windows NT 4.

If you are planning on dual-booting with Windows NT 4, you should upgrade to NT 4 Service Pack 4 (or higher), which provides NTFS version 5 support.

Once you have installed each operating system, you can choose the operating system that you will boot to during the boot process. You will see a boot selection screen that asks you to choose which operating system you want to boot.

The Boot Configuration Data (BCD) store contains boot information parameters that were previously found in `boot.ini` in older versions of Windows. To edit the boot options in the BCD store, use the bcdedit utility, which can be launched only from a command prompt. To open a command prompt window, you can do the following:

1. Launch `\Windows\system32\cmd.exe`.
2. Open the Run command by pressing the [Windows] key + R and then entering **`cmd`**.
3. Type **`cmd.exe`** in the Search Programs And Files box and press Enter.

After the command prompt window is open, type **`bcdedit`** to launch the **`bcdedit`** utility. You can also type **`bcdedit/?`** to see all the different `bcdedit` commands. A few `bcdedit` commands may be needed when dual-booting a machine. Table 1.6 shows a few of the `bcdedit` commands that may be needed when dual-booting.

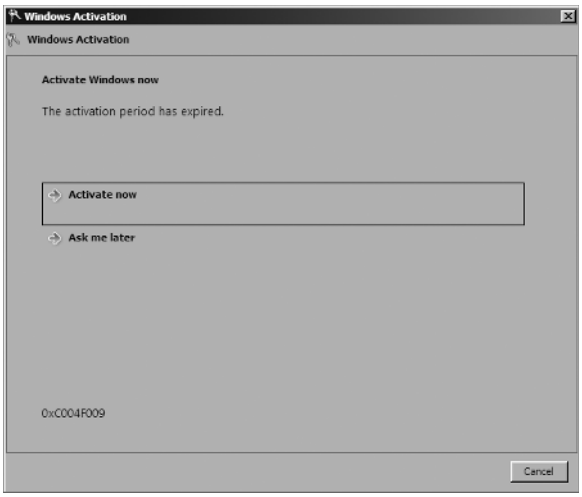
TABLE 1.6 `Bcdedit` commands

Command	Explanation
`/default`	Allows you to specify which operating system will start when the time-out expires.
`/displayorder`	Shows the display order that the boot manager uses when showing the display order to the user.
`/timeout`	Specifies the amount of time used before the system boots into the default operating system.

Using Windows Activation

Windows Activation is Microsoft's way of reducing software piracy. Unless you have a corporate license for Windows 7, you will need to perform postinstallation activation. This can be done online or through a telephone call. Windows 7 will attempt automatic activation three days after you log on to it for the first time. There is a grace period when you will be able to use the operating system without activation. After the grace period expires, you will not be able to create new files or save changes to existing files until Windows 7 is activated. When the grace period runs out, the Windows Activation Wizard will automatically start (see Figure 1.5); it will walk you through the activation process.

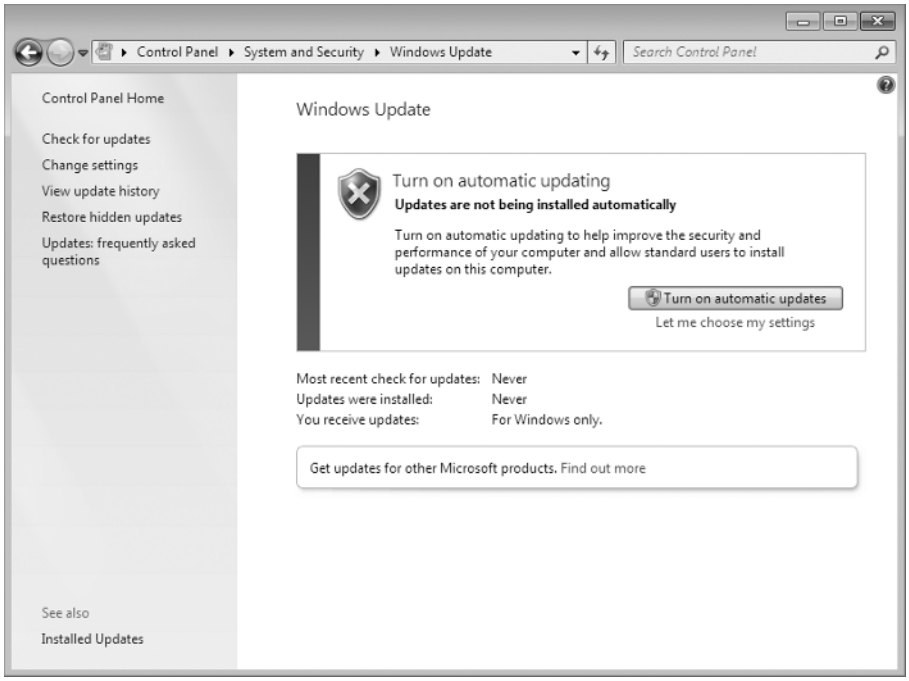
FIGURE 1.5 The Windows Activation Wizard screen



Using Windows Update

Windows Update, shown in Figure 1.6, is a utility that connects to Microsoft's website and checks to ensure that you have the most up-to-date versions of Microsoft products.

FIGURE 1.6 Windows Update



Some of the common update categories associated with Windows Update are as follows:

- Critical updates
- Service packs
- Drivers

Follow these steps to configure Windows Update:

1. Select Start ➢ Control Panel.
   - From Windows Icons View, select Windows Update.
   - From Windows Category View, select System And Security, Windows Update.
2. Configure the options you want to use for Windows Update, and click OK.

   The options you can access from Windows Update include the following:

- Check For Updates
- Change Settings
- View Update History

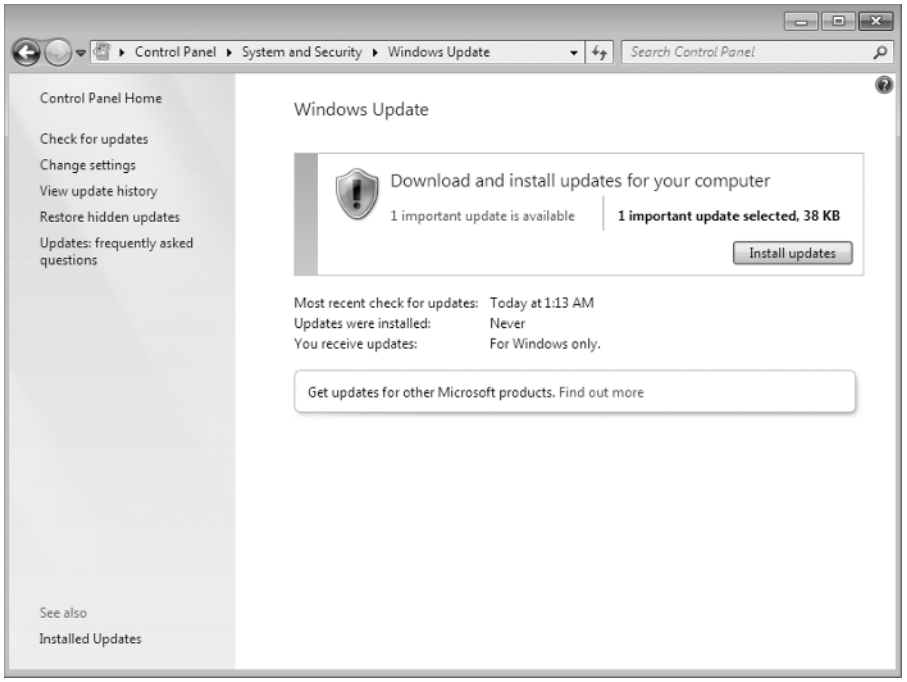
- Restore Hidden Updates
- Updates: Frequently Asked Questions
- Installed Updates

Check for Updates

When you click Check For Updates, Windows Update will retrieve a list of available updates from the Internet. You can then click View Available Updates to see what updates are available. Updates are marked as Important, Recommended, or Optional. Figure 1.7 shows a sample list of updates.

Change Settings

FIGURE 1.7 Checking for updates



Clicking Change Settings allows you to customize how Windows can install updates. You can configure the following options:

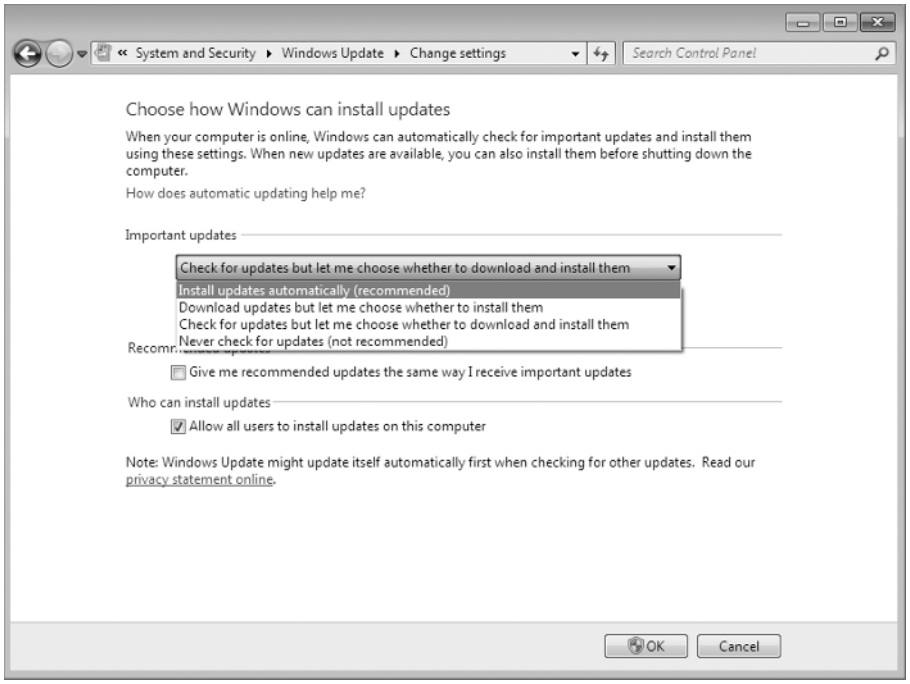
- "Install updates automatically (recommended)"
- "Download updates but let me choose whether to install them"
- "Check for updates but let me choose whether to download and install them"
- "Never check for updates (not recommended)"

Figure 1.8 shows the settings that can be configured for Windows Update.

View Update History

View Update History, as shown in Figure 1.9, is used to view a list of all of the installations that have been performed on the computer. You can see the following

FIGURE 1.8 Windows Update Change settings



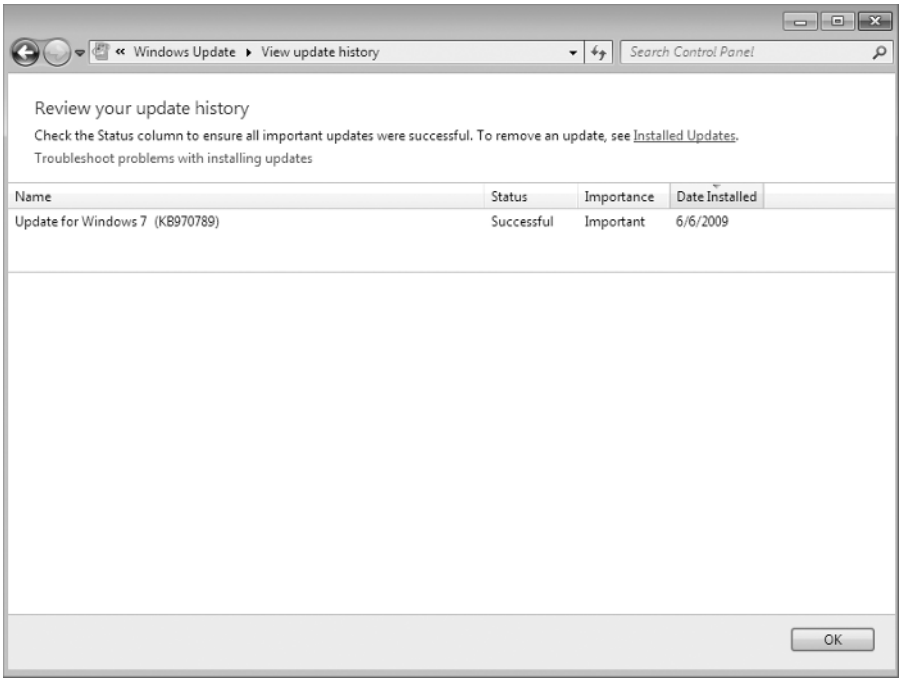
information for each installation:

- Update Name
- Status (Successful, Unsuccessful, or Canceled)
- Importance (Important, Recommended, or Optional)
- Date Installed

Restore Hidden Updates

With Restore Hidden Updates you can list any updates that you have hidden from the list of available updates. An administrator might hide updates that they do not want users to install.

FIGURE 1.9 Windows Update, View Update History



Sometimes it is important for an administrator to test and verify updates before the users can install them. This area allows you to see hidden updates so that they can be tested before deployment.

Installed Updates

Installed Updates allows you to see the updates that are installed and to uninstall or change them if necessary. The Installed Updates feature is a part of the Programs And Features applet in the Control Panel, which allows you to uninstall, change, and repair programs.

Installing Windows Service Packs

Service packs are updates to the Windows 7 operating system that include bug fixes and product enhancements. Some of the options that might be included in service packs are security fixes or updated versions of software, such as Internet Explorer.

Prior to installing a service pack, you should perform the following steps:

1. Back up your computer.

2. Check your computer to ensure that it is not running any malware or other unwanted software.
3. Check with your computer manufacturer to see whether there are any special instructions for your computer prior to installing the service pack.

You can download service packs from `www.microsoft.com`, you can receive service packs via Windows Update, or you can pay for a copy of the service pack to be mailed to you on disc. Before you install a service pack, you should read the release note that is provided for each service pack on Microsoft's website.

Summary

In this chapter I started with a discussion of how Windows XP introduced many new features to the normal user. I also discussed how Windows XP was the first operating system to use the new core called the kernel.

Windows Vista introduced many new features, such as a new improved Desktop, Windows Sidebar, parental controls, improved Windows Firewall, Windows Vista User Account Control (UAC), Windows Search, and live icons.

Microsoft then took the best of both worlds (XP and Vista) and created Windows 7. Windows 7 has introduced many new features, such as the Windows 7 Taskbar, Jump Lists, a new preview pane, Windows Touch, Windows XP Mode, simpler home networking, Device Stage, View Available Networks (VAN), and the new Windows Internet Explorer 8 (IE8).

We also took at look at the difference between 64-bit and 32-bit operating systems and showed some of the advantages that 64-bit entails, like greater RAM and processor speed.

Then you learned about installing Windows 7. Installation is an easy process, but you must first make sure the machine is compatible with the Windows 7 operating system.

There are two main ways to install Windows 7: upgrade or clean install. You can upgrade a Windows Vista machine to Windows. You can migrate the user's data and information from a Windows XP machine, but there is no upgrade option.

After the Windows 7 installation is complete, you'll want to make sure all updates and service packs are installed. You can use Microsoft Windows Update to complete that task.

Exam Essentials

Understand the Windows 7 hardware requirements. The minimum hardware requirements to run Windows 7 properly are a CPU (processor) of at least 1 GHz (32-bit or 64-bit processor), at least 1 GB of memory (RAM), hard disk with 16 GB of available disk space, video adapter, support for DirectX 9 graphics with 128 MB memory (to enable the Aero theme), DVD-R/W drive, and a compatible network interface card.

Understand the Hardware Compatibility List. The Hardware Compatibility List (HCL) is an extensive list of computers and peripheral hardware that have been tested with the Windows 7 operating system. The hardware and supported drivers on the HCL have been put through rigorous tests to ensure their compatibility with Windows 7. Microsoft guarantees that the items on the list meet the requirements for Windows 7 and do not have any incompatibilities that could affect the stability of the operating system.

Understand how to complete a clean install. If your machine meets the minimum hardware requirements, you can install Windows 7. There are a few different ways to install Windows 7 onto a computer. You can install Windows 7 using the installation disk, over a network, or from an image (see Chapter 2, "Automating the Windows 7 Installation").

Understand how to complete an upgrade. You can upgrade a Windows Vista machine to Windows 7. To complete an upgrade on a Windows Vista machine, insert the Windows 7 DVD into the Vista machine or connect to the Windows 7 files over the network and complete an upgrade on the computer.

You can't upgrade a Windows XP machine to Windows 7. If the machine is running Windows XP, you have to use a migration tool to migrate all the user data from Windows XP to a Windows 7 machine.

Understand how to migrate a user to Windows 7. If you can't perform an upgrade on the computer, you can choose to migrate your files and settings from an existing installation. In this case, you can use the Windows Easy Transfer utility or the User State Migration Tool (USMT).

Review Questions

1. You are the network administrator for a mid-size organization that wants to start looking at migrating their computer systems to Windows 7. They have asked you to explain the new features of Windows 7 to all the department heads. Which of the following are new features to Windows 7? (Choose all that apply.)
   - **A.** Windows 7 Taskbar
   - **B.** Jump List
   - **C.** Windows XP Mode
   - **D.** Windows Touch

2. You are the network administrator for a small company that has just switched its machines from Windows XP to Windows Vista and Windows 7. One of the users who has Windows Vista asks you why there is a vertical sidebar on the screen. What feature of Windows Vista is this?
   - **A.** Parental controls
   - **B.** Jump List
   - **C.** Windows Sidebar
   - **D.** Windows Firewall

3. Your company has asked you to implement Network Access Protection (NAP) on the network. You already have Windows Server 2008 installed on your servers but your organization wants to know which client operating systems will support NAP. What operating systems support NAP? Choose all that apply.
   - **A.** Windows XP with SP2
   - **B.** Windows XP with SP3
   - **C.** Windows Vista
   - **D.** Windows 7

4. You are the IT manager for a medium-size organization. Your organization is looking at upgrading its Windows XP machines to Windows 7. The managers have heard of a new feature that allows you to connect a device to the machine and then the Windows 7 operating system shows a graphical picture of the device for use. Which Windows 7 feature are they referring to?
   - **A.** Device Manager
   - **B.** Device Stage
   - **C.** Staging Manager
   - **D.** ADD/Remove Hardware

5. You are the IT manager for your organization. The organization is looking at upgrading all of its machines from Windows XP to Windows 7. Many of the managers are concerned that their Windows XP applications won't be compatible with Windows 7. Which Windows 7 feature can you use to assure the managers that all of their Windows XP applications will continue to work?
   - **A.** Windows XP Compatibility Checker
   - **B.** Windows XP Application Center
   - **C.** Windows XP Mode
   - **D.** Windows XP Application Upgrade tool

6. Your organization has approached you to give a presentation on the new Internet Explorer 8. During the presentation, one of the managers asks you to let them know what some of its new features are. Which of the following can you tell them about? (Choose all that apply.)
   - **A.** Instant Search
   - **B.** Root Hints
   - **C.** Accelerators
   - **D.** Web Slices

7. You are the IT administrator for a large computer training company that uses laptops for all its employees. Currently the users have to connect to the wireless network through the wireless network adapter. Windows 7 now includes this built in as which feature?
   - **A.** Available Network Finder (ANF)
   - **B.** View Networks (VN)
   - **C.** Network Availability Viewer (NAV)
   - **D.** View Available Networks (VAN)

8. You are the network administrator for a mid-size company. One of the managers has come into your office and asked you about setting up a network in his house. He wants to use Windows 7. What feature allows him to set up a home network using Windows 7?
   - **A.** Home Networking
   - **B.** HomeGroups
   - **C.** Quick Connect
   - **D.** Networking Groups

9. Which new Windows 7 feature allows you to quickly access files that you have been working on?
   - **A.** Quick Connect
   - **B.** Jump Lists
   - **C.** File Finder
   - **D.** Quick File Access

10. You are the IT Manager for a pharmaceutical company. The company wants to create a medication dispenser that can be used on the floors of hospital units. The dispensers have to work through touchscreen technology. Which Windows 7 feature has built-in touchscreen technology?

A. Windows Touch Screen

B. Windows Pure Touch

C. Windows Touch

D. Windows Pure Screen

11. You are the network administrator for a large organization that has decided to convert all of its Windows XP machines to Windows 7. How can it put Windows 7 on all the Windows XP machines without losing the users' information?

A. Upgrade all the Windows XP machines to Windows 7.

B. Format all the XP machines and do a clean install of Windows 7.

C. Use a migration tool to migrate all the users' data and then load a clean copy of Windows 7.

D. Do nothing. The Windows XP machines can't be upgraded without losing all the user's data.

12. You are the network administrator for a mid-size organization. You have a machine with Windows Vista and you need to load Windows 7. You want to make the machine dual-boot. You install Windows 7 on a new partition on the machine. You want the machine to start in Windows Vista by default. How do you accomplish this?

A. Change the `Boot.ini` file so that Windows Vista is the default.

B. Edit `Bcdedit.exe` with the `/default` parameter to set Windows Vista as the default.

C. Delete the Windows 7 `Boot.ini` file so the machine reverts to Vista by default.

D. Edit the `Bcdedit.exe` with the `/order` parameter to set Windows Vista as the default.

13. Alexandria, your network manager, has been asked by the organization to verify that all machines in the company that are running Windows Vista can upgrade to Windows 7. How can Alexandria perform this task?

A. She can check the Windows Vista machines against the Hardware Compatibility List.

B. She can install Windows 7 on all the machines to see if they operate properly.

C. She can call the manufacture of all the machines and ask to see if each machine is compatible.

D. She can ask each user to email her the specifications of their machines and then go online to the machine manufacturer to find out if they will run Windows 7 properly.

14. You have just completed the install on one of your new Windows 7 machines. After the install is complete, what's the next step in making sure the machine is ready to be used?

A. Set up the machine to dual-boot.

B. Check Microsoft's website for all updates and patches.

C. Configure the `sethc.exe` file.

D. Load Microsoft Office.

15. You are the network administrator for an organization that wants to convert all of its Windows XP machines to Windows 7. Your organization wants to keep as much user data as possible. You decide to use Windows Easy Transfer. Which of the following can be migrated to the new machines using Windows Easy Transfer? (Choose all that apply.)

A. User accounts

B. Folders and files

C. Program settings

D. Internet settings

E. Favorites

F. Email messages, contacts, and settings

16. Which of the following options can be configured in Windows Update? (Choose all that apply.)

A. Check For Updates

B. Change Settings

C. View Update History

D. Restore Hidden Updates

17. You are the network administrator for a small organization that needs to consolidate equipment. You want to make sure all machines are multibootable between Windows 7, Windows Vista, and Windows XP. In what order do you load the operating system to accomplish this task?

A. Windows 7, Windows Vista, Windows XP

B. Windows 7, Windows XP, Windows Vista

C. Windows XP, Windows Vista, Windows 7

D. Windows Vista, Windows 7, Windows XP

18. You are installing Windows 7 on a new machine. The machine has encountered installation errors. Which files can you view to see the errors or issues? (Choose two.)

A. `setupact.log`

B. `setuplog.log`

C. `setupdc.log`

D. `setuperr.log`

19. You are a network administrator that has decided to implement Windows 7. You have to be able to use the Encrypting File System (EFS). Which Windows 7 versions can you install? (Choose all that apply.)

A. Home Edition

B. Home Premium Edition

C. Professional Edition

D. Enterprise Edition

20. You have a machine that is currently running Windows Vista Ultimate edition. You would like to upgrade this machine to Windows 7. Which Windows 7 editions can you upgrade this machine to? Choose all that apply.

A. Home Premium Edition

B. Professional Edition

C. Enterprise Edition

D. Ultimate Edition

Answers to Review Questions

1. A, B, C, D. Windows 7 has included many new features, including the Windows 7 Taskbar, Jump Lists, a new preview pane, Windows Touch, Windows XP Mode, simpler home networking, Device Stage, View Available Networks (VAN), and the new Windows Internet Explorer 8 (IE8).

2. C. Windows Vista introduced a new vertical bar that is displayed on the side of the Desktop, and this is called the Windows Sidebar. The Windows Sidebar has mini applications running within the bar called gadgets. Windows 7 has removed the sidebar, but you can still continue to use gadgets.

3. B, C, D. Network Access Protection (NAP) is a compliancy checking platform that is included with Windows 2008 Server, Windows Vista, Windows 7, and Windows XP with SP3. NAP allows you to create compliancy policies that check computers before allowing them access to the network.

4. B. Device Stage is new to the Windows 7 operating system family. Device Stage allows you to connect a compatible device to your PC and a picture of the device will appear. This allows you to easily share files between devices and computers.

5. C. With Windows XP Mode, an organization that chooses to upgrade to Windows 7 will still have the ability to run older Windows XP applications on the Windows 7 operating system.

6. A, C, D. Some of the new features of IE8 are Instant Search, accelerators, and Web Slices. Instant Search allows you to quickly access search requests without typing in the entire search criteria. Accelerators allow you to accelerate actions on Internet services and applications. Web Slices are instances on a website that you want to access without accessing the site.

7. D. The feature the question is referring to is View Available Networks (VAN). Before Windows 7, when you used a wireless network adapter, you would choose the wireless network that you want to connect to by using the wireless network adapter properties. In Windows 7, this is built into the operating system.

8. B. HomeGroups provide an easy way to set up a network using Windows 7. Windows 7 will search for your home network, and if one is found, it will connect after the HomeGroup password is entered. If a home network is not found, a networking wizard will automatically create a password for the HomeGroup so other computers can join.

9. B. Jump Lists are a new feature in Windows 7 that allows you to quickly access files that you have been working on. Another advantage to using Jump Lists is that certain applications, like Windows Media Player, can be preset, and in the case of Internet Explorer, you could view all the recent websites that you have visited.

10. C. Windows Touch allows you to control the operating system and its applications by using a touchscreen. Touchscreens can be placed on laptops, tabletops, GPS devices, phones, and now on the Windows 7 operating system.

11. C. You can't upgrade Windows XP to Windows 7, so you must use a migration tool to migrate all the users' data and then install a clean copy of Windows 7.

12. B. Windows 7 and Windows Vista no longer use a `boot.ini` file to control the boot order. Using the `Bcdedit /default` command will allow you to configure Vista as the default operating system.

13. A. To find out if a machine is compatible with Windows 7, just check the machine with the Hardware Compatibility List. The hardware listed on the HCL has been tested to verify compatibility.

14. B. After you install the Windows 7 operating system, the next step would be to load all updates and patches. You can download these patches for free from Microsoft's website by using Windows Update.

15. A, B, C, D, E, F. The Windows Easy Transfer can migrate everything listed in the options.

16. A, B, C, D. Windows Update also includes Updates: Frequently Asked Questions and Installed Updates as two other configurable options.

17. C. To make the machine multibootable, you must make sure the oldest operating systems is always be loaded first. So, for example, if you want to dual-boot Windows 7 and Windows Vista, Windows Vista must be loaded first.

18. A, D. The action log includes all of the actions that were performed during the setup process and a description of each action. The action log is stored as `\Windows\setupact.log`. The error log includes any errors that occurred during the installation. The error log is stored as `\Windows\setuperr.log`.

19. C, D. To use the Encrypting File System (EFS), you must install Windows 7 Professional, Windows 7 Enterprise, or Windows 7 Ultimate.

20. D. If you are upgrading a version of Windows Vista Ultimate, you must upgrade the machine to Windows 7 Ultimate.