

CHAPTER 12

Installing Windows

In this chapter, you will learn:

- How to plan a Windows installation
- How to install Windows Vista
- How to install Windows XP
- How to install Windows 2000

Windows Vista, XP, and 2000 all share the same basic Windows architecture, and they all have similar characteristics. Windows Vista and Windows XP are both available for purchase, but you can no longer purchase Windows 2000. However, because many individual users and corporations still rely on Windows 2000, you need to know how to support it. At the time this book went to print, Windows 7 is available in the Release Candidate version (Windows 7 RC). The Release Candidate version of an operating system is the last beta version released before retail versions become available. How to install and support Windows 7 is not covered in this book.

This chapter discusses how to plan a Windows Vista, XP, and 2000 installation and the steps to perform each installation, including what to do after the OS is installed.



Notes This book does not cover DOS or Windows 9x. However, you can learn about both operating systems by studying the content on the CD that accompanies this book. See the content “Windows 9x/Me Commands and Startup Disk” and “Supporting Windows 9x/Me.”



A+ Exam Tip The content in this chapter applies only to the A+ 220-701 Essentials exam.

HOW TO PLAN A WINDOWS INSTALLATION

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As a PC support technician, you can expect to be faced with installing Windows in a variety of situations. You might need to install Windows on a new hard drive, after an existing Windows installation has become corrupted, or to upgrade from one OS to another. Many decisions need to be made before and during the installation. Which OS version do you purchase? Does the hardware qualify for this version? Which method do you use to start the installation, and what decisions will you need to make after the installation has begun? Answers to all these questions are covered in this part of the chapter.

CHOOSE THE VERSION OF WINDOWS

When deciding which operating system to buy, know that the Windows operating system can be purchased as a retail version or OEM (Original Equipment Manufacturer) version (see Figure 12-1). The OEM version costs less than the retail version, but can only be installed on a new PC for resale.

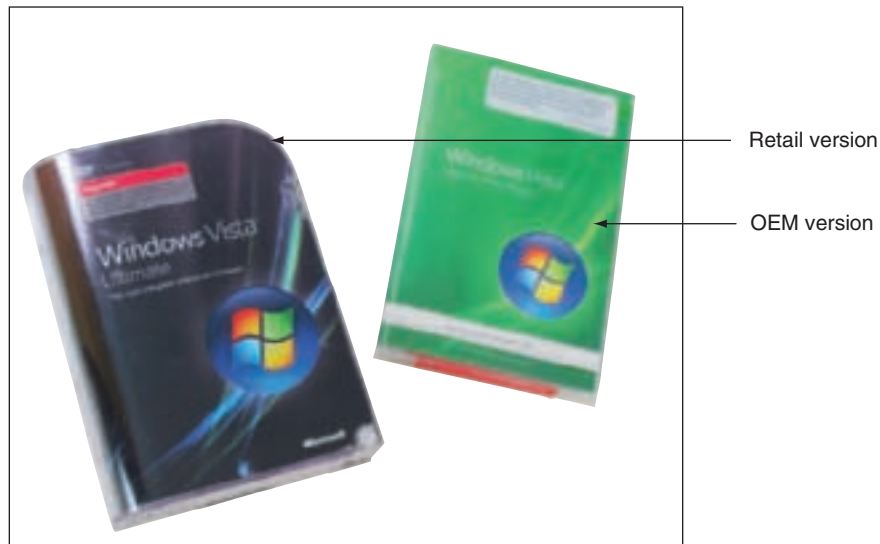


Figure 12-1 Packaging for Windows Vista retail and OEM versions
Courtesy: Course Technology/Cengage Learning

Now let's look at the different editions of Windows Vista and XP, the upgrade paths for each OS, and the minimum hardware requirements of each.

EDITIONS OF VISTA

Microsoft has released several editions of Vista designed to satisfy a variety of consumer needs. All the editions are included on the Windows Vista setup DVD; the edition installed depends on the product key that you enter during the installation. Therefore, upgrading to a better edition of Vista can easily be accomplished by using the **Windows Anytime Upgrade** feature. Here are the Vista editions:

- ▲ **Windows Vista Starter** has the most limited features and is intended to be used in developing nations. Microsoft reports that more than 139 nations, including Brazil, Thailand, and India, have benefited from Vista Starter.

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- ▲ **Windows Vista Home Basic** is similar to Windows XP Home Edition, and is designed for low-cost home systems that don't require full security and networking features.
- ▲ **Windows Vista Home Premium** is similar to Windows Vista Home Basic, but includes additional features such as the Aero user interface.
- ▲ **Windows Vista Business** is intended for business users. Computers can join a domain, support Group Policy, and use the Encrypted File System for better security. You can also purchase multiple site licenses (also called volume licensing) using this version. Consumer features not included in Windows Vista Business or Windows Vista Enterprise include Windows Media Center, Movie Maker, DVD Maker, and parental controls.
- ▲ **Windows Vista Enterprise** includes additional features over Windows Vista Business. The major additional security feature is BitLocker, which is useful to secure data stored on a hard drive if the drive is stolen. Multiple site licensing is available.
- ▲ **Windows Vista Ultimate** includes every Windows Vista feature. You cannot purchase multiple licensing with this edition.

The major features for all editions are listed in Table 12-1.

Feature	Starter	Home Basic	Home Premium	Business	Enterprise	Ultimate
Aero user interface			X	X	X	X
BitLocker hard drive encryption					X	X
Optional dual processors*				X	X	X
Complete PC backup				X	X	X
Encrypting File System (EFS)				X	X	X
IE parental controls	X	X	X			X
Network and Sharing Center	X	X	X	X	X	X
Scheduled and network backups			X	X	X	X
Tablet PC			X	X	X	X
Windows DVD Maker			X			X
Windows Media Center			X			X
Windows Movie Maker			X			X
Windows SideShow			X	X	X	X
Shadow Copy backup				X	X	X
Join a domain				X	X	X
Group Policy				X	X	X
Processor: 32-bit or 64-bit		X	X	X	X	X
Flip 3D display			X	X	X	X
Remote Desktop				X	X	X
Windows Meeting Space			X	X	X	X

*Multicore processors are allowed for all editions.

Table 12-1 Vista editions and their features

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WINDOWS XP EDITIONS

Windows XP comes in several editions: Windows XP Professional, Windows XP Home Edition, Windows XP Media Center Edition, Windows XP Tablet PC Edition, and Windows XP Professional x64 Edition (formally called Windows XP 64-Bit Edition), which uses 64-bit code.

Windows XP Professional offers these features (note that these features are not included with **Windows XP Home Edition**):

- ▲ A way for a user to control the computer from a remote location, called Remote Desktop
- ▲ A way for an administrator to manage user profiles from a server (roaming profiles)
- ▲ Additional security features
- ▲ Multilingual capabilities
- ▲ Support for higher-performance processors

Windows XP Media Center Edition is an enhanced edition of Windows XP Professional, and includes additional support for digital entertainment hardware such as video recording integrated with TV input. **Windows XP Tablet PC Edition** is designed for laptops and tablet PCs.



Notes Windows XP was the first Microsoft OS to embed Windows Internet Explorer, Windows Media Player, a Windows firewall, and other Microsoft products into the OS. Some users see this as a disadvantage, and others see it as an advantage. Tight integration allows applications to interact easily with other applications and the OS, but makes it more difficult for third-party software to compete with Microsoft applications, and more difficult to remove or reinstall an integrated component that is giving problems.

32-BIT OR 64-BIT VERSIONS

Recall from Chapter 2 that an OS is built using either 32-bit or 64-bit code. Use a 64-bit OS if you need increased performance and your system has enough resources to support a 64-bit OS. For Windows Vista, you can purchase an OEM version of the OS in either a 32-bit or 64-bit version. Windows Vista Ultimate retail edition comes with two DVDs: one 32-bit DVD and one 64-bit DVD (see Figure 12-2). Microsoft does not offer 64-bit



Figure 12-2 Windows Vista Ultimate can be purchased only as a single license version and comes with two DVDs
Courtesy: Course Technology/Cengage Learning

versions for other Vista retail editions. For these editions, you must purchase the 32-bit OS and use the coupon inside the box to order the 64-bit DVD from Microsoft. Windows XP Professional x64 Edition is the only edition of XP that uses 64-bit code. One reason to use a 64-bit OS is the ability to install more RAM. Table 12-2 shows how much memory each OS can support.

Operating System	32-Bit Version	64-Bit Version
Vista Ultimate	4 GB	128 GB
Vista Enterprise	4 GB	128 GB
Vista Business	4 GB	128 GB
Vista Home Premium	4 GB	16 GB
Vista Home Basic	4 GB	8 GB
Vista Starter	1 GB	NA
XP Professional	4 GB	128 GB
XP Home Edition	4 GB	NA

Table 12-2 Maximum memory supported by Windows editions

UPGRADE PATHS FOR EACH OS

All the retail editions of Windows can be purchased as an upgrade or for a clean install. The upgrade license costs considerably less than the clean install license. However, even if you purchase an upgrade license of Windows, you still might be required to perform a clean install due to the fact that some features from the old OS might not be compatible with or carry forward to the new OS. When you purchase the upgrade version of Windows, note that regardless of the path that you use—the upgrade or the clean install—Windows setup will verify whether the system is qualified to use the upgrade license.



Note If Service Pack 2 or a later service pack is applied to Windows XP, you can use **Windows Easy Transfer** to transfer Windows XP user data and preferences to Windows Vista.

Upgrade options from old OSs to Vista are outlined in Table 12-3. To see an example of a forced “clean install,” examine the Windows XP Professional to Windows Vista Home Premium path. The clean install is necessary because Windows XP Professional has features that are not offered by Windows Vista Home Premium. The upgrade path from Windows 2000 to Vista is another example. The clean install is necessary because the Vista setup program does not handle an upgrade from Windows 2000.



A+ Exam Tip The A+ 220-701 Essentials exam expects you to know the upgrade paths available to Windows Vista/XP/2000.



Note You cannot upgrade from Windows 95/98/Me or Windows NT to Windows Vista; you must purchase the more expensive for-a-new-PC version of Vista for these installations.

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From This OS	To Vista Home Basic, 32-Bit	To Vista Home Premium, 32-Bit	To Vista Business, 32-Bit	To Vista Ultimate, 32-Bit	To Any 64-Bit Vista Edition
Vista Home, 64-bit	N/A	Clean install	Clean install	Clean install	Upgrade
XP Professional	Clean install	Clean install	Upgrade	Upgrade	Clean install
XP Home	Upgrade	Upgrade	Upgrade	Upgrade	Clean install
XP Media Center	Clean install	Upgrade	Clean install	Upgrade	Clean install
XP Tablet PC	Clean install	Clean install	Upgrade	Upgrade	Clean install
XP x64	Clean install	Clean install	Clean install	Clean install	Clean install
Windows 2000	Clean install	Clean install	Clean install	Clean install	Clean install

Table 12-3 Upgrade paths to Windows Vista

The upgrade paths to Windows XP are listed in Table 12-4.

From This OS	To XP Home Edition	To XP Professional	To XP x64
Windows 98/Me	Upgrade	Upgrade	Clean install
Windows 95	Clean install	Clean install	Clean install
Windows 2000	Clean install	Upgrade	Clean install
Windows NT	Clean install	Upgrade	Clean install
XP Home Edition	NA	Upgrade	Clean install

Table 12-4 Upgrade paths to Windows XP



Note All editions of Windows 9x/Me and Windows NT Workstation 3.51 and higher can be upgraded to Windows 2000.

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MINIMUM HARDWARE REQUIREMENTS

Here are the minimum hardware requirements for Windows Vista. However, as you consider this list, please note that with the limited memory and video listed in the second and third bullets, you won't be able to see the Aero user interface. Also, know that Vista comes on a single DVD. If your computer has a CD drive, you can order the multiple set of Vista CDs from Microsoft after you have purchased the Vista DVD. Also know that Microsoft occasionally changes the minimum and recommended requirements for an OS.

- ▲ A processor rated at least 800 MHz
- ▲ 512 MB of RAM
- ▲ SVGA video
- ▲ A 20 GB hard drive with at least 15 GB free space
- ▲ A CD-ROM drive

Note For best performance, a Vista system needs 2 GB of RAM or more. Also, Vista is most often sold in retail stores on DVD, so having a DVD drive makes your installation easier.

Recommended hardware requirements for Windows Vista Home Premium, Business, Enterprise, and Ultimate editions are:

- ▲ A processor rated at least 1 GHz, which can be a 32-bit or 64-bit processor
- ▲ 1 GB of RAM
- ▲ A video card or embedded video chip that supports DirectX 9 or higher and the Windows Display Driver Model (WDDM)
- ▲ 128 MB of graphics memory
- ▲ A 40 GB hard drive with at least 15 GB free space
- ▲ A DVD-ROM drive
- ▲ Internet access

Recommended requirements for Vista Home Basic are:

- ▲ A processor rated at least 800 MHz, which can be a 32-bit or 64-bit processor
- ▲ 512 MB of RAM
- ▲ A video card or embedded video chip that supports DirectX 9 or higher
- ▲ 32 MB of graphics memory
- ▲ A 20 GB hard drive with at least 15 GB free space
- ▲ A DVD-ROM drive
- ▲ Internet access

Table 12-5 lists the minimum and recommended requirements for Windows XP. For Windows 2000, you must have at least 650 MB of free space on your hard drive, at least 64 MB of RAM, and a 133-MHz Pentium-compatible CPU or higher.

Component or Device	Minimum Requirement	Recommended Requirement
One or two CPUs	Pentium II 233 MHz or better	Pentium II 300 MHz or better
RAM	64 MB	128 MB up to 4 GB
Hard drive partition	2 GB	More than 2 GB
Free space on the hard drive partition	1.5 GB (bare bones)	2 GB or more
CD-ROM drive or DVD-ROM drive	12x	12x or faster
Video	Super VGA (800x600)	Higher resolutions are nicer
Input devices	Keyboard and mouse or other pointing device	Keyboard and mouse or other pointing device

Table 12-5 Minimum and Recommended Requirements for Windows XP Professional

HARDWARE COMPATIBILITY

Many hardware manufacturers have chosen to not produce Vista drivers for their older devices, so it's very important to find out if your hardware will be compatible with Vista. Microsoft offers the Windows Vista Compatibility Center at www.microsoft.com/windows/compatibility

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(see Figure 12-3). From there you can search for each device to see if it's listed as having Vista drivers. If it's not listed, it still might work. Go to the Web site of the device manufacturer, and look for Vista drivers for the device. These drivers might not be certified by Vista, but will still work unless you plan to use a 64-bit version of Vista. All 64-bit drivers must be Microsoft certified. Use Device Manager to find out which devices are installed in your XP system.



Figure 12-3 Windows Vista Compatibility Center
Courtesy: Course Technology/Cengage Learning

Another way to find out if your Windows XP system qualifies for Windows Vista is to run the Vista Upgrade Advisor. Go to the www.microsoft.com site and search on “Vista Upgrade Advisor.” Then download and run the advisor. For upgrading to Windows XP, you can run the XP Readiness Analyzer. Use the following command from the Windows XP CD, substituting the drive letter of your CD-ROM drive for D in the command line, if necessary:

```
D:\I386\Winnt32 /checkupgradeonly
```

Depending on the release of Windows XP, your path might be different. The process takes about 10 minutes to run and displays a report that you can save and later print. The default name and path of the report is C:\Windows\compat.txt. The report is important if you have software you are not sure will work under Windows XP.

If you are not sure if your devices will work under the OS to which you are upgrading, one solution is to set up a dual boot. A **dual boot** allows you to install the new OS without disturbing the old one so you can boot to either OS. After the installation, you can test your software or hardware. If they work under the new OS, you can delete the old one. If they don't work, you can still boot to the old OS and use it. How to set up a dual boot is covered later in the chapter.

Before you install a new OS, be sure you have device drivers for all your critical devices such as your network card or motherboard. To find the drivers, look on the CD that came bundled with the device or check the Web site of the device manufacturer.

CHOOSE THE METHOD OF INSTALLATION

Depending on the circumstances and the available hardware, you have options as to the method used for the installation. Choices are the boot device you will use, how you might choose to use the network, and options involving installations from a hard drive image, recovery CDs, factory recovery partitions, and repairs to the existing installation. All these options are discussed next.

BOOT MEDIA USED FOR THE INSTALLATION

If an OS is not already installed on the hard drive, you must boot using the device from which you will install the OS. The boot device most likely will be the DVD or CD drive. However, you can use any device that the PC is capable of booting from. For example, suppose you want to install Windows Vista from the Vista setup DVD, but the system has a CD drive. You can use an external DVD drive that connects to the PC by way of a USB port. Access BIOS setup and set the boot order for USB as the first boot device. You can then boot from the external DVD drive and install Vista. Recall from earlier chapters that the boot order is the order of devices that BIOS looks to for an OS. To change the boot order, enter BIOS setup and look for the appropriate screen. The BIOS screen shown in Figure 12-4 shows a removable device as the first boot device.

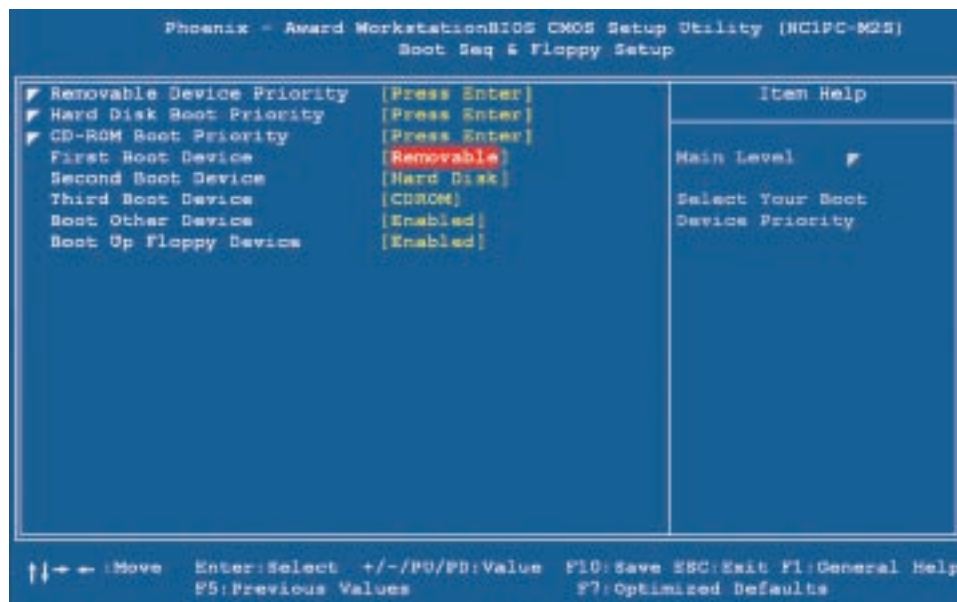


Figure 12-4 Set the boot order in BIOS setup
Courtesy: Course Technology/Cengage Learning

NETWORK INSTALLATION

You can copy the setup files on the Windows CD or DVD to a file server on the network. If you will be doing multiple installations, this method might save you some time. Copy the files from the CD or DVD to a folder on the server and share the folder. Then at each PC, you can execute the Setup program on the server. A server used in this way is called a **distribution server**. How to share folders on a network is covered in Chapter 19.

A+ Exam Tip The A+ 220-701 Essentials exam expects you to know about unattended installations and about the convenience of putting the Windows setup files on a file server.



Notes Before installing Windows on a single computer, you might want to copy the Windows installation files to the hard drive. You can do this if the hard drive is already formatted and you don't intend to format it during the installation.

UNATTENDED INSTALLATION

Windows offers a number of options for installations that can be automated so that you don't actually need to sit at the computer and respond to the questions that setup asks during installation. One method, called an **unattended installation**, is performed by storing the answers to installation questions in a text file or script that Windows calls an **answer file**. A sample answer file is stored on the Windows DVD or CD. System administrators who need to perform many installations might take the time to develop an answer file to perform unattended installations. Unattended installations work for both upgrades and clean installs. How to set up unattended installations is beyond the scope of this book.

INSTALL FROM AN IMAGE

Another option is **drive imaging**, sometimes called **disk cloning** or disk imaging. A drive image is a copy of the entire volume on which Windows is installed to another bootable media such as CDs or USB drives. When the image is created, all contents of the drive, including the OS, applications, and data, get duplicated to the other media. Images are created to make it easier to recover a hard drive from a catastrophic failure or to make it easier to deploy Windows and applications to many computers in a corporation. To set up a new drive from an image, you only need to copy the image to the drive rather than install Windows, applications (such as Microsoft Office), and data. Many corporations have a standard image of a hard drive that includes the OS and its settings and company-specific standard applications.

The original image is created by first installing Windows and then using the Windows utility **sysprep.exe** to remove configuration settings, such as the computer name that uniquely identifies the PC. Then, all applications are installed. Next, drive-imaging software is used to clone the entire hard drive to another media. Examples of drive-imaging software are True Image by Acronis (www.acronis.com) and Norton Ghost by Symantec Corp (www.symantec.com). Another example is Clonezilla managed by NCHC (www.clonezilla.org), which is free.

To use the image of the hard drive, you boot from the bootable media on which the image is stored and follow directions on-screen to copy the image to the hard drive. Figure 12-5 shows the opening menu for the Acronis software after you boot from a CD that holds the image. On the next screen, you can select the option to restore from backup. On the following screen (see Figure 12-6), you point to the file that holds the image, which is MyBackup2 in the figure. The software then copies the image to the drive.



A+ Exam Tip The A+ 220-701 Essentials exam expects you to know about installing an OS from a drive image. You are not expected to know how to create the image.

RECOVERY CDS AND DVDS

If you have a notebook computer or a brand-name computer, such as a Dell, IBM, or Gateway, and you need to reinstall the OS, use the recovery CD or DVD provided by the manufacturer instead of a regular Windows Setup CD. This recovery CD or DVD, as shown

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Figure 12-5 Opening menu after booting from the Acronis bootable media
Courtesy: Course Technology/Cengage Learning

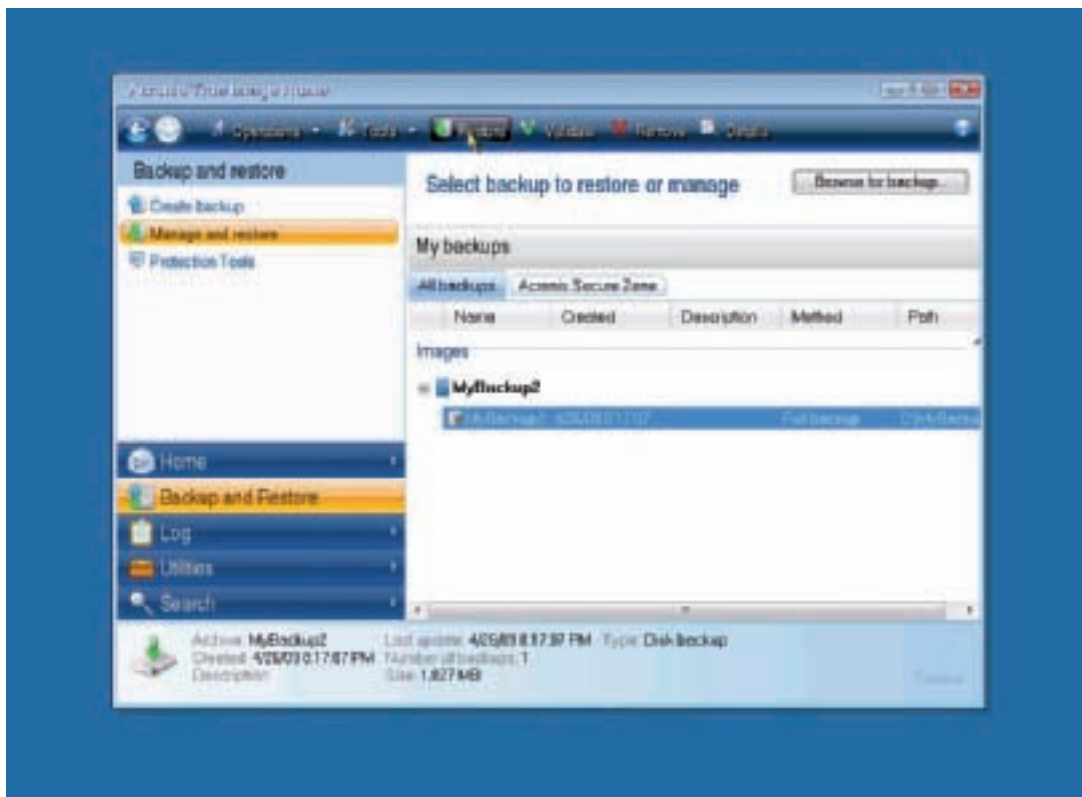


Figure 12-6 Select the image to copy to the hard drive
Courtesy: Course Technology/Cengage Learning

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in Figure 12-7, has drivers specific to your system. Also, the Windows build that is on the recovery disc might be different from the one provided by an off-the-shelf Windows Setup disc. For example, a Windows XP Home Edition installation on a notebook computer might have been built with all kinds of changes made to it by the notebook manufacturer. These changes will make it different from a Windows XP Home Edition bought in a retail store.



Figure 12-7 Windows Setup CD and Windows Recovery CDs for a notebook computer
Courtesy: Course Technology/Cengage Learning

When you purchase a brand-name computer, the recovery CD is sometimes included in the package. If it is not included, you can order it from the manufacturer. To order it, go to the manufacturer's Web site support section and find the recovery CD specific to your desktop or notebook computer. If you use it to reinstall the OS, be sure to also install all the service packs and updates to the OS. How to install updates and service packs is covered later in the chapter.

Notes In general, it's best to not upgrade an OS on a notebook unless you want to use some feature the new OS offers. For notebooks, follow the general rule, "If it ain't broke, don't fix it." For example, if a notebook is working well with Windows 2000 installed and serving its purpose, leave it alone. The most important reason to not upgrade a notebook OS is that notebook manufacturers are not committed to publish drivers for an OS the notebook was not designed to use. Many hardware components in a notebook are proprietary, and the notebook manufacturer is the only source for these drivers.

FACTORY RECOVERY PARTITION

For some brand-name computers, the hard drive contains a hidden recovery partition that can be used to reinstall Windows. Sometimes this hidden partition contains a utility that can be used to create a recovery CD. However, the CD must have already been created if it is to be there to help you in the event the entire hard drive fails. To access the utilities on the hidden partition, press a key during startup. The key to press is displayed on the screen early in the boot before the OS is loaded. If you don't see the message, search the Web site of the computer manufacturer to find the key combination. For one Dell laptop, you press Ctrl and F11 to start the recovery. One Gateway computer displays the message "Press F11 to start recovery." When you press these keys, a menu is displayed giving you the opportunity to reinstall Windows from setup files kept in the hidden partition.

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REPAIR AN EXISTING INSTALLATION

For desktop computers that use off-the-shelf Windows installations, Windows offers several different ways to repair the installation. The technique to use depends on how serious the problem is. Chapter 15 covers what to do when Windows Vista startup fails and what to do when Windows XP or Windows 2000 fails to start. Before you reinstall the OS, be sure to check out this chapter to make sure there is not an easier way to repair the existing installation.

INSTALLATION IN A VIRTUAL COMPUTER

Another type of Windows installation is when you install Windows in a virtual computer. A virtual computer or virtual machine is software that simulates the hardware of a physical computer. Using this software, you can install and run multiple operating systems at the same time on a PC (see Figure 12-8). These multiple instances of operating systems can be used to train users, run legacy software, and support multiple operating systems. For example, help-desk technicians can run a virtual machine for each OS they support on a single PC and quickly and easily switch from one OS to another by clicking a window. Another reason to use a virtual machine is that you can capture screen shots of the boot process in a virtual machine, which is the way the screen shots during the boot were made for this book.

To install an OS in a virtual machine, you first install the virtual machine software. Then use it to set up a virtual machine. Then you start this virtual machine and boot from the Windows setup CD or DVD to install the OS the same as is done with a normal PC. You must have a valid Windows license and product key for the virtual machine installation the same as for a

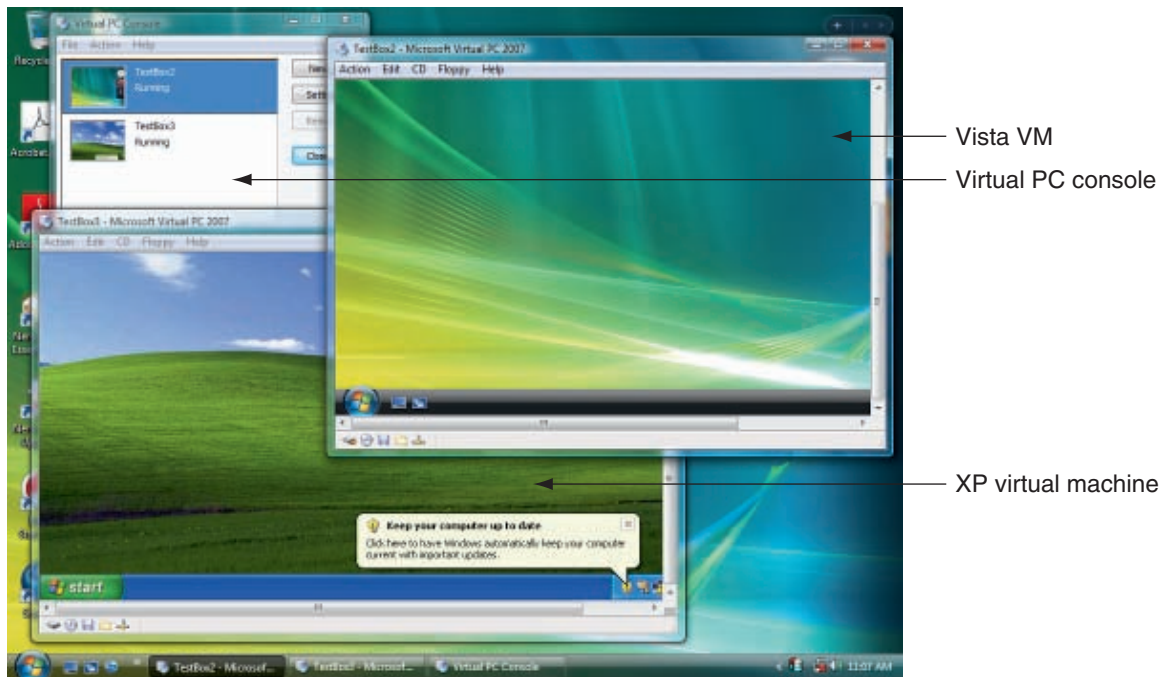


Figure 12-8 Two virtual machines running under Virtual PC
Courtesy: Course Technology/Cengage Learning

normal Windows installation on a physical PC. For example, in Figure 12-9, Virtual PC already has two machines set up and running. To set up a third virtual machine, click **New** in the Virtual PC Console box on the left side of the figure. A wizard launches and steps you through the process of creating a new machine. During the process, you can select the hard drive size and how much memory the machine has installed. The right side of Figure 12-9 shows one window in the wizard where you select what OS you plan to install in the machine, and the wizard recommends how much RAM the machine needs for this OS.

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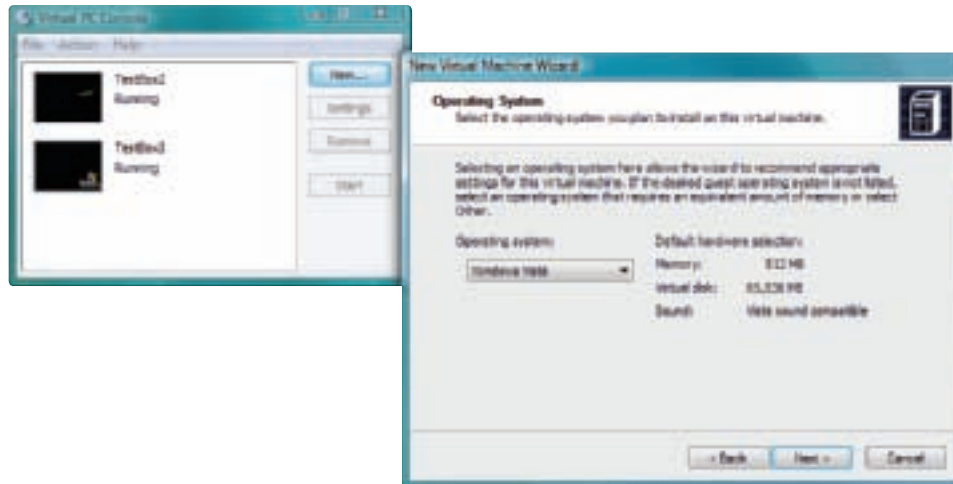


Figure 12-9 Using Virtual PC to set up a new virtual machine
Courtesy: Course Technology/Cengage Learning

After the machine is set up, you can click **Settings** in the console to change the hardware configuration of a machine. To install an OS in this machine, insert the setup CD or DVD in the optical drive, and, in the Virtual PC Console box, select the new machine and click **Start**. A window opens showing the virtual machine booting and then loading the setup program on the disc (see Figure 12-10).

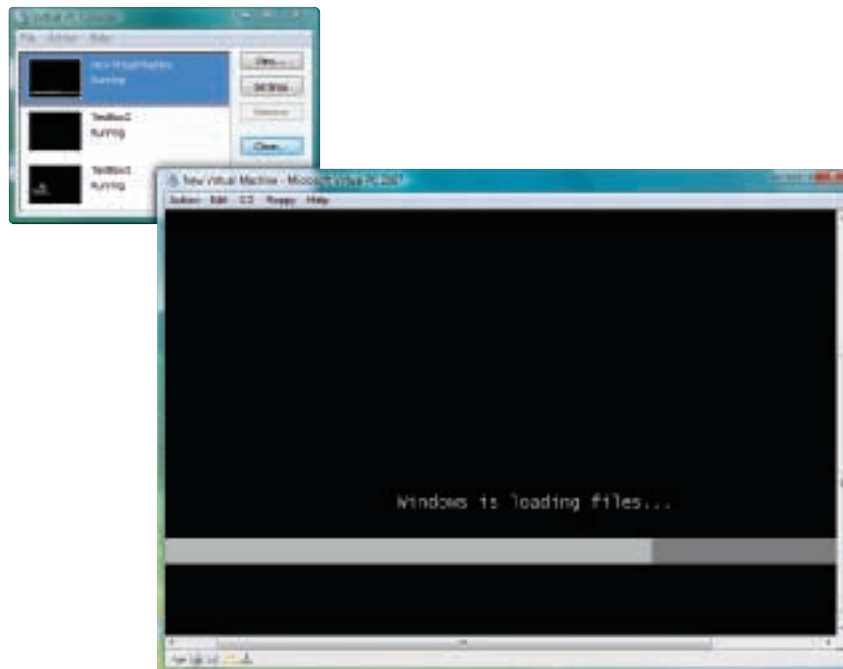


Figure 12-10 The new virtual machine loading OS files from the setup DVD
Courtesy: Course Technology/Cengage Learning

The two most popular virtual machine programs for Windows are Virtual PC by Microsoft and VMware by VMware, Inc. For the Mac OS, VMware Fusion by VMware, Inc. is the most popular. Virtual PC is free for downloading from the Microsoft Web site. VMware must be purchased, but offers more features than does Virtual PC. Recall from

Chapter 2 that VMware Fusion makes it possible to install Windows in a virtual machine on a Mac. You will learn to use Virtual PC in a project at the end of this chapter.

CHOOSE THE TYPE OF INSTALLATION: UPGRADE, CLEAN INSTALL, OR DUAL BOOT

If you are installing Windows on a new hard drive, then you are doing a clean install. If Windows is already installed on the hard drive and you want to install a different Windows operating system, then you have three choices:

- ▲ *Clean install.* You can perform a clean install, overwriting the existing operating system and applications.
- ▲ *Upgrade.* If the upgrade paths allow it, you can perform an upgrade installation. You can upgrade Windows XP to Vista, or you can upgrade Windows 2000 or Windows 98/Me to Windows XP.
- ▲ *Dual boot.* You can install Windows Vista or Windows XP in a second partition on the hard drive and create a dual-boot situation with the other OS.

Each of these options has advantages and disadvantages.

CLEAN INSTALL—ERASING EXISTING INSTALLATIONS

A clean install that overwrites the existing installation has some advantages; one advantage is that you get a fresh start. With an upgrade, problems with applications or the OS might follow you into the Windows Vista/XP load. If you erase everything (format the hard drive), then you are assured that the registry as well as all applications are as clean as possible. The disadvantage is that after Windows Vista/XP is installed, you must reinstall application software on the hard drive and restore the data from backups. If you do a clean install, you can choose to format the hard drive first, or simply do a clean install on top of the existing installation. If you don't format the drive, the data will still be on the drive, but the previous operating system settings and applications will be lost.

If you decide to do a clean install, verify that you have all the application software CDs or floppy disks and software documentation. Back up all the data, and verify that the backups are good. Then, and only then, format the hard drive or begin the clean install without formatting the drive. If you don't format the hard drive, be sure to run a current version of antivirus software before you begin the installation.

UPGRADE INSTALLATIONS

The advantages of upgrading are that all applications and data and most OS settings are carried forward into the new Windows environment, and the installation is faster. If you perform an upgrade, you must begin the installation while you are in the current OS (from the Windows desktop). An upgrade installation is appropriate if the system is generally healthy and does not have problems.

CREATING A DUAL BOOT

Don't create a dual boot unless you need two operating systems, such as when you need to verify that applications and hardware work under Windows Vista before you delete the old OS. Windows Vista/XP/2000 all require that they be the only operating system installed on a partition. So to set up a dual boot, you'll need at least two partitions on the hard drive or a second hard drive.

UNDERSTAND THE CHOICES YOU'LL MAKE DURING THE INSTALLATION

While Windows is installing, you must choose which drive and partition to install Windows, which file system to use, and how Windows will connect to the network. These three choices are discussed next.

DRIVES, PARTITIONS, AND FILE SYSTEMS

Recall from Chapter 8 that a hard drive set up by Windows can have up to four partitions. The first 512-byte sector on the drive, called the master boot record (MBR), holds the partition table. The MBR keeps track of where the partitions are located on the drive, the size of each partition, and which partition is the active partition (the bootable partition). The drive can have up to three primary partitions (also called volumes) and one extended partition, which can contain one or more logical drives. The active partition is always a primary partition. Each partition is formatted with a file system that keeps track of where folders and files are stored on the partition.

Windows assigns two different functions to hard drive partitions holding the OS (see Figure 12-11). The **system partition**, normally drive C, is the active partition of the hard drive. This is the partition that contains the OS boot record. Remember that the MBR program looks to this OS boot record for the boot program as the first step in turning the PC over to an OS. The other partition, called the **boot partition**, is the partition where the Windows operating system is stored.

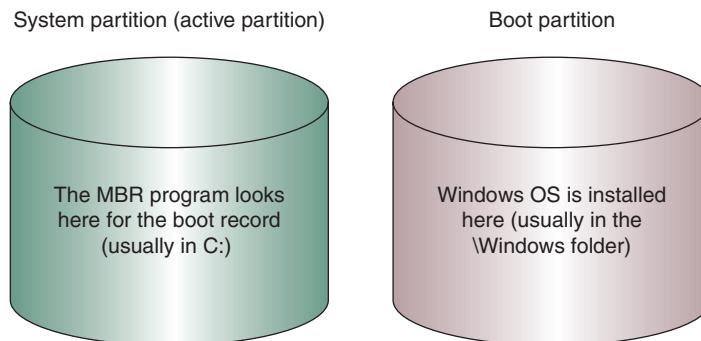


Figure 12-11 Two types of Windows hard drive partitions
Courtesy: Course Technology/Cengage Learning

Notes Don't be confused by the terminology here. It is really true that, according to Windows terminology, the Windows OS is on the boot partition, and the boot record is on the system partition, although that might seem backward. The PC boots from the system partition and loads the Windows operating system from the boot partition.

For most installations, the system partition and the boot partition are the same (drive C:), and Windows is installed in C:\Windows (for Windows Vista/XP) or C:\Winnt (for Windows 2000). An example of when the system partition and the boot partition are different is when Windows Vista is installed as a dual boot with Windows XP. Figure 12-12 shows how Windows Vista is installed on drive E and Windows XP is installed on drive C. For Windows Vista, the system partition is drive C and the boot partition is drive E. (For Windows XP on this computer, the system and boot partitions are both drive C.)

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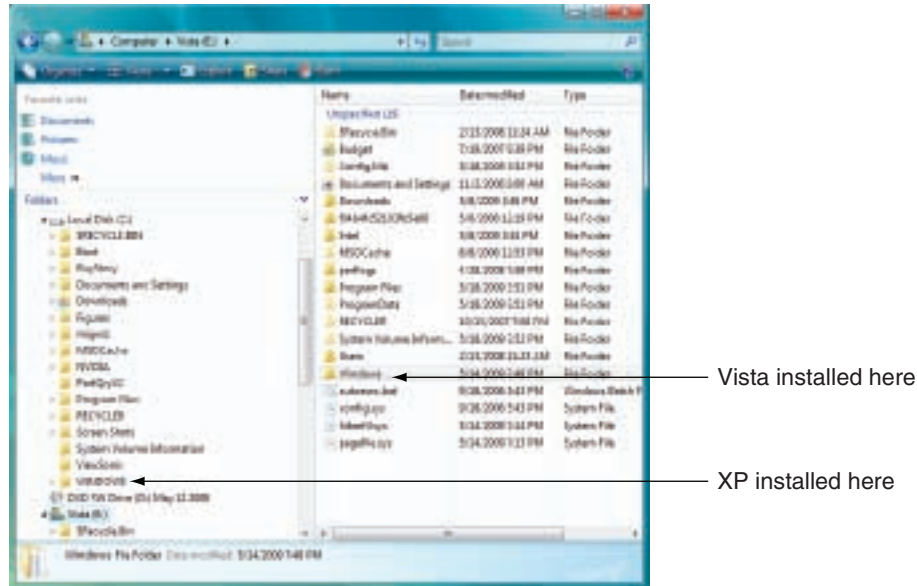


Figure 12-12 Windows Vista and Windows XP installed on the same system
Courtesy: Course Technology/Cengage Learning

When you install Windows, you must decide which drive and partition will hold the OS and the size of this partition. You can leave some space unallocated during the installation and later use the Disk Management utility to partition and format the space.

For most situations, you will have available a single hard drive and allocate all the space to drive C. However, here are reasons to use more than one volume on the drive:

- ▲ You plan to install more than one OS on the hard drive, creating a dual-boot system. For example, you might want to install Windows XP on one partition and Windows Vista on another, so you can test software under both operating systems. For this situation, install XP first using a partition that takes up only part of the hard drive. Later, you can install Vista on a second partition on the drive. (When setting up a dual boot, always install the older OS first.)
- ▲ Some people prefer to use more than one volume to organize data on their hard drives. For example, you might want to install Windows and all your applications on one volume and your data on another. Having your data on a separate volume makes backing up easier. In another situation, you might want to set up a volume on the drive that is used exclusively to hold backups of data on another computer on the network.



Caution

It's convenient to back up one volume to another volume on a different hard drive. However, don't back up one volume to another volume on the same hard drive, because when a hard drive fails, quite often all volumes on the drive are damaged and you will lose both your data and your backup.

The size of the volume that will hold Vista and its applications should be at least 20 GB, with at least 15 GB free space. An XP volume that will also hold applications needs to be at least 5 GB, although you can get by with less.

The volume on which Vista is installed will automatically be formatted using the NTFS file system. In the XP installation, you can choose between FAT32 and NTFS. Choose NTFS unless

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the size of the volume is 2 GB or less. FAT32 does not use as much overhead as NTFS and is a better choice for these smaller volumes. Here are the advantages NTFS offers over FAT32:

- ▲ NTFS uses smaller cluster sizes than FAT32, which means it makes more efficient use of disk space when storing many small files. Recall that a file is stored in whole clusters, and the unused space at the end of the last cluster, called slack, is wasted free space.
- ▲ NTFS retains two copies of its critical file system data and can use the extra copy to automatically recover from a corrupted file system.
- ▲ NTFS supports encryption (encoding files so they can't be deciphered by others) and disk quotas (limiting the hard drive space available to a user).
- ▲ NTFS supports compression (reducing the size of files and folders). FAT32 supports compression of an entire volume but not compression of individual files or folders.
- ▲ NTFS offers better security. For example, if you boot the system from another boot media such as a CD, you can access a volume using a FAT file system. If the volume uses NTFS, an administrator password is required to gain access.

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NETWORK CONFIGURATION

A Windows computer can be configured to work as one node in a workgroup or one node on a domain. A Windows **workgroup** is a logical group of computers and users that share resources (Figure 12-13), where administration, resources, and security on a

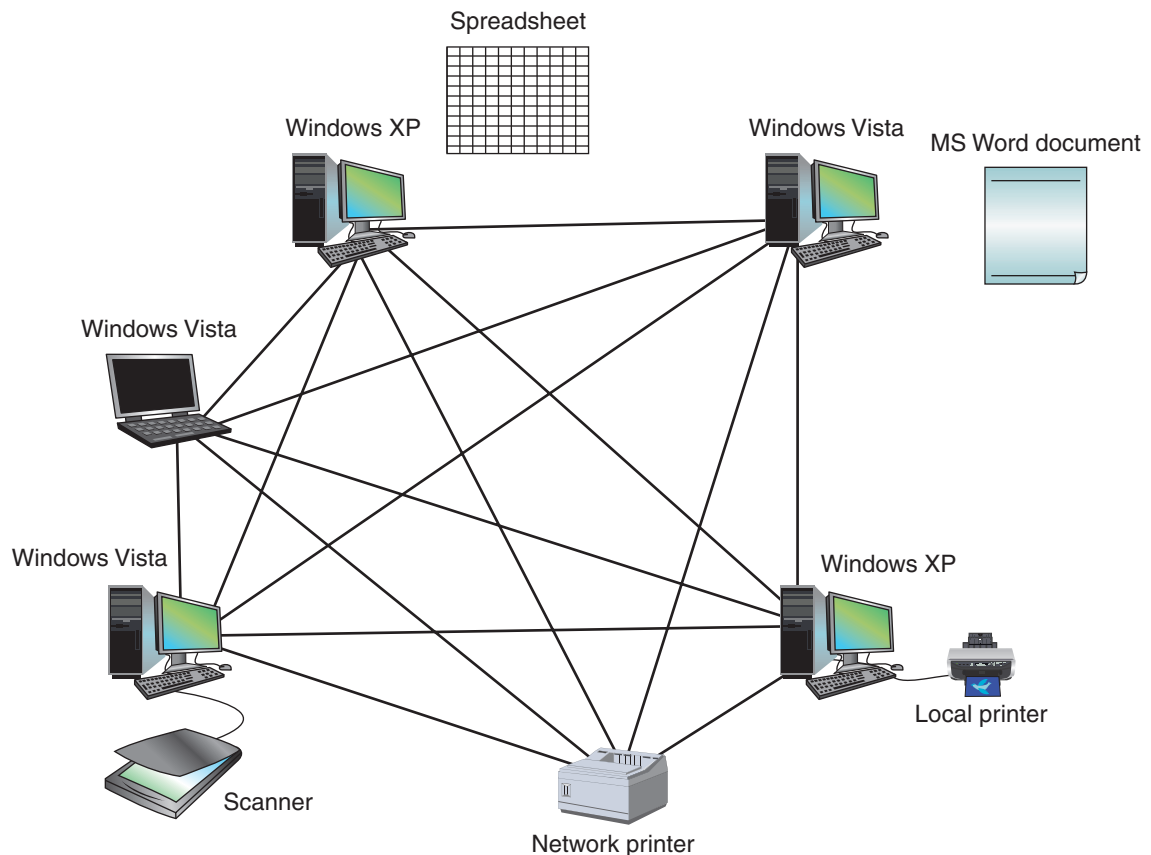


Figure 12-13 A Windows workgroup is a type of peer-to-peer network where no single computer controls the network and each computer controls its own resources
Courtesy: Course Technology/Cengage Learning

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workstation are controlled by that workstation. Each computer maintains a list of users and their rights on that particular PC. A workgroup is a type of **peer-to-peer (P2P)** network, which is a network that is managed by each computer without centralized control. A Windows **domain** is a group of networked computers that share a centralized directory database of user account information and security for the entire group of computers (Figure 12-14). A Windows domain is a type of **client/server** network, which is a network where resources are managed by a centralized computer. Using the client/server model, the directory database is controlled by a Network Operating System (NOS). Examples of network operating systems are Windows Server, Novell NetWare, UNIX, Linux, and Mac OS.

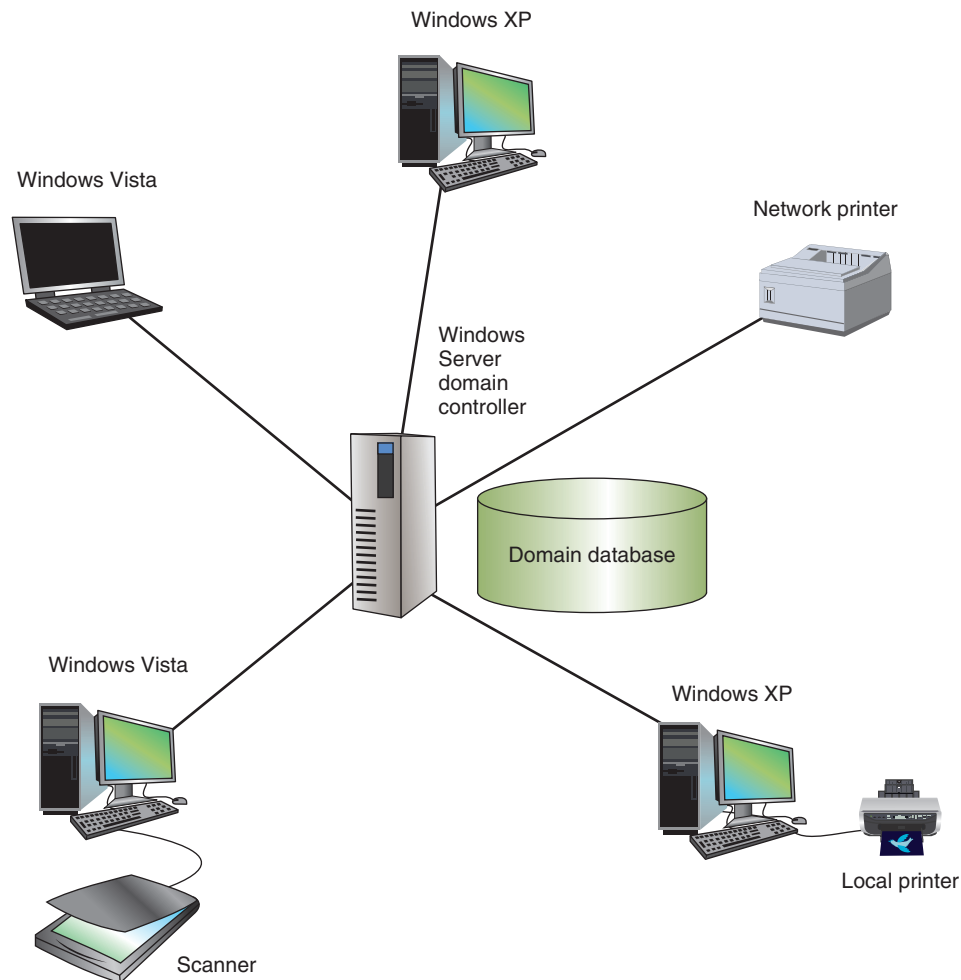


Figure 12-14 A Windows domain is a type of client/server network where security on each PC or other device is controlled by a centralized database on a domain controller
Courtesy: Course Technology/Cengage Learning

Note When looking at the diagrams in Figures 12-13 and 12-14, know that the connecting lines describe the logical connections between computers and not the physical connections. Both networks might be physically connected the same way, but logically, resources are controlled using a centralized database or controlled by each computer on the network.

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An example of a network operating system is Windows Server 2008, which controls a network using the directory database called **Active Directory**. The database of resources on the network including user accounts is managed in Active Directory by a network administrator or system administrator. Access to the network is controlled by the permissions assigned to a user account that is managed by Active Directory. If you are installing Windows on a PC that belongs to a domain, the administrator will tell you the information you need during the installation to join the domain. You'll need to know the domain name, computer name, user-name, and password. All users of this computer must have their own domain-level accounts (called a **global account**) assigned by the network or system administrator.

Regardless of whether Windows computers belong to a domain or workgroup, every Windows computer has an **administrator account** by default. This account is a type of **local account**, meaning that it is only recognized by the local computer. An administrator has rights and permissions to all computer software and hardware resources on the local computer. During the Vista installation, you are given the opportunity to enter a password to a local user account that is assigned administrator privileges. The default administrator account is disabled by default. During a Windows XP/2000 installation, you are given the opportunity to enter a password to the default administrator account and this account is enabled by default.

You can log on as an administrator after the OS is installed and create local user accounts that apply to this one computer. A user can log onto the system with a local account even if the computer belongs to a domain. However, resources managed by the domain will not be available until the user logs on with a domain-level account and password. How to set up local accounts is covered in Chapter 19.



Notes Windows Vista and XP Home Editions do not support joining a domain. If you plan to join a domain on your network, install Vista Business, Enterprise, or Ultimate editions, Windows XP Professional, or Windows 2000 Professional.

When deploying Vista or XP in a large organization, the User State Migration Tool (USMT) might be used to transfer user settings and data from an old PC to a new one. The **User State Migration Tool (USMT)** is a command-line tool that works only when the new Windows Vista or XP system is a member of a Windows domain.

An administrator uses two commands at the command prompt of this tool: the **scanstate** command, which is used to copy the information from the old computer to a server or removable media, and the **loadstate** command, which is used to copy the information to the new computer. These two commands can be stored in batch files and executed automatically when installing Vista or XP over a large number of computers in an enterprise.



A+ Exam Tip The A+ 220-701 Essentials exam expects you to know that the User State Migration Tool can be used to migrate user data to a new PC as part of the installation process.

Incidentally, when a Windows domain is not involved, Windows XP offers the Files and Settings Transfer Wizard and Windows Vista uses Windows Easy Transfer to copy user data and settings from one computer to another. How to use either utility can be found in Windows Help and Support.



A+ Exam Tip When moving user data and settings from one PC to another, the best practice is to leave the user data and settings on the original PC untouched for at least two months. This practice gives the user plenty of time to make sure everything has been moved over.

In summary, you need to know how to configure the computer to access the network. You should know these things before you begin the installation:

- ▲ The computer name and workgroup name for a peer-to-peer network.
- ▲ The username, user password, computer name, and domain name for a domain network.
- ▲ For TCP/IP networks, an IP address uniquely identifies the computer on the network. You need to know how this IP address is assigned. It might be assigned dynamically (IP address is assigned by a server each time it connects to the network) or statically (IP address is permanently assigned to the workstation). If the network is using static IP addressing, you need the IP address for the workstation.

FINAL CHECKLIST BEFORE BEGINNING THE INSTALLATION

Before you begin the installation, complete the final checklist shown in Table 12-6 to verify that you are ready.

Questions to Answer	Further Information
Does the PC meet the minimum or recommended hardware requirement?	CPU: RAM: Hard drive partition size: Free space on the partition:
Do you have in hand the Windows device drivers for your hardware devices and application setup CDs?	List hardware and software that need to be upgraded:
Do you have the product key available?	Product key:
How will users be recognized on the network?	Workgroup name: Domain name: Computer name:
How will the PC be recognized on the network?	Static or dynamic IP addressing: IP address (for static addressing):
Will you do an upgrade or clean install?	Current operating system: Does the old OS qualify for an upgrade?
For a clean install, will you set up a dual boot?	List reasons for a dual boot: For a dual boot Size of the second partition: Free space on the second partition: File system you plan to use:
Have you backed up important data on your hard drive?	Location of backup:

Table 12-6 Checklist to complete before installing Windows


 **Notes** The product key is written on the cover of the Windows setup CD or DVD or affixed to the back of the Windows documentation booklet, as shown in Figure 12-15. Technicians sometimes mount the product key sticker on the side of a computer. Try looking for it there (see Figure 12-16). For notebook computers, look for the product key sticker on the bottom of the notebook. If you have lost the product key and are moving this Windows XP installation from one PC to another, you can use a utility to find out the product key. On the PC that has the old Windows XP installation, download and run the key finder utility from Magical Jelly Bean Software at www.magicaljellybean.com/keyfinder.shtml. For Windows Vista, the product key is displayed in the System window. Click **Start**, right-click **Computer**, and select **Properties** from the shortcut window.



Figure 12-15 The product key is on a sticker on the back of the Windows XP documentation
Courtesy: Course Technology/Cengage Learning



Figure 12-16 The product key is sometimes placed on the side or front of a computer case
Courtesy: Course Technology/Cengage Learning

Before we get into the step-by-step instructions of installing an OS, here are some general tips about installing Windows:

- ▲ If you want to begin the installation by booting from the Windows CD or DVD or other media such as a USB device, verify that the boot sequence is first the optical drive or USB device, and then the hard drive.
- ▲ Also, because Windows prefers to handle its own Plug and Play hardware installations without the help of BIOS, Microsoft recommends that you disable the Plug and Play feature of your motherboard BIOS.
- ▲ Disable any virus protection setting that prevents the boot sector from being altered.
- ▲ For a notebook computer, connect the AC adapter and use this power source for the complete OS installation, updates, and installation of hardware and applications. You don't want the battery to fail you in the middle of the installation process.

HOW TO INSTALL WINDOWS VISTA

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In this part of the chapter, you will learn how to install Vista as an upgrade, clean install, and dual boot.

PERFORMING A VISTA IN-PLACE UPGRADE

To upgrade from Windows XP to Windows Vista, follow these steps:

1. Close any open applications. Close any boot management software or antivirus software that might be running in the background.
2. From the Windows XP desktop, launch the Windows Vista CD or DVD. The opening menu shown in Figure 12-17 appears. Click **Install now**.



Figure 12-17 Windows Vista Setup opening menu
Courtesy: Course Technology/Cengage Learning

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3. On the next screen, you can choose to allow the setup program to download updates for the installation. If you have Internet access, click **Go online to get the latest updates for installation (recommended)**. Setup will download the updates, as shown in Figure 12-18. When using this option, you'll need to stay connected to the Internet throughout the installation.

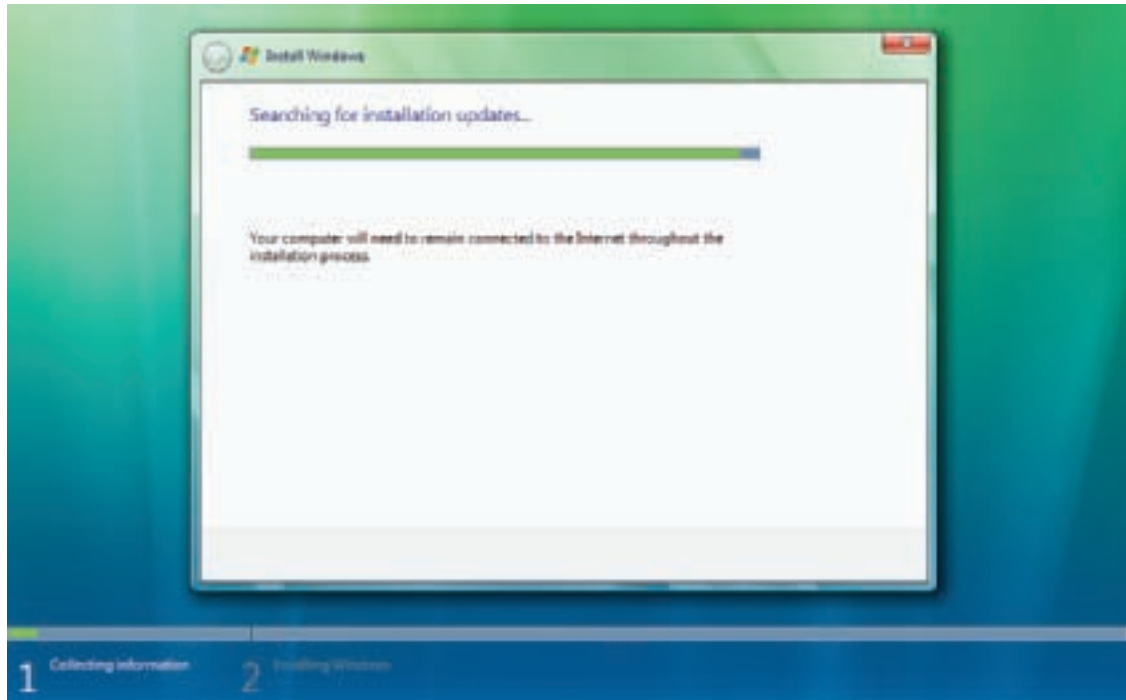


Figure 12-18 Setup uses the Internet to update the installation process
Courtesy: Course Technology/Cengage Learning

4. On the next screen, as shown in Figure 12-19, enter the Vista product key. It's printed on a sticker inside the CD or DVD case.
5. On the next screen, accept the license agreement.
6. On the next screen, shown in Figure 12-20, select the type of installation you want, either an upgrade or a clean install. Select **Upgrade**.
7. The installation is now free to move forward. The PC will reboot several times. At the end of this process, a screen appears asking for your country, time, currency, and keyboard layout. Make your selections and click **Next**.



Note Notice in Figure 12-19 the checkbox "Automatically activate Windows when I'm online." Normally, you would leave this option checked so that Vista activates immediately. However, if you are practicing installing Vista and intend to install it several times using the same DVD, you might choose to uncheck this box and not enter the product key during the installation. When you do that, you will be prompted to select the edition of Vista to install. You can later decide to enter the product key and activate Vista after the installation.

8. On the following screens, you are asked to enter a user name, password, computer name, date, and time. In addition, you are asked how you want to handle Windows updates. The user name that you enter will be assigned administrative permissions.

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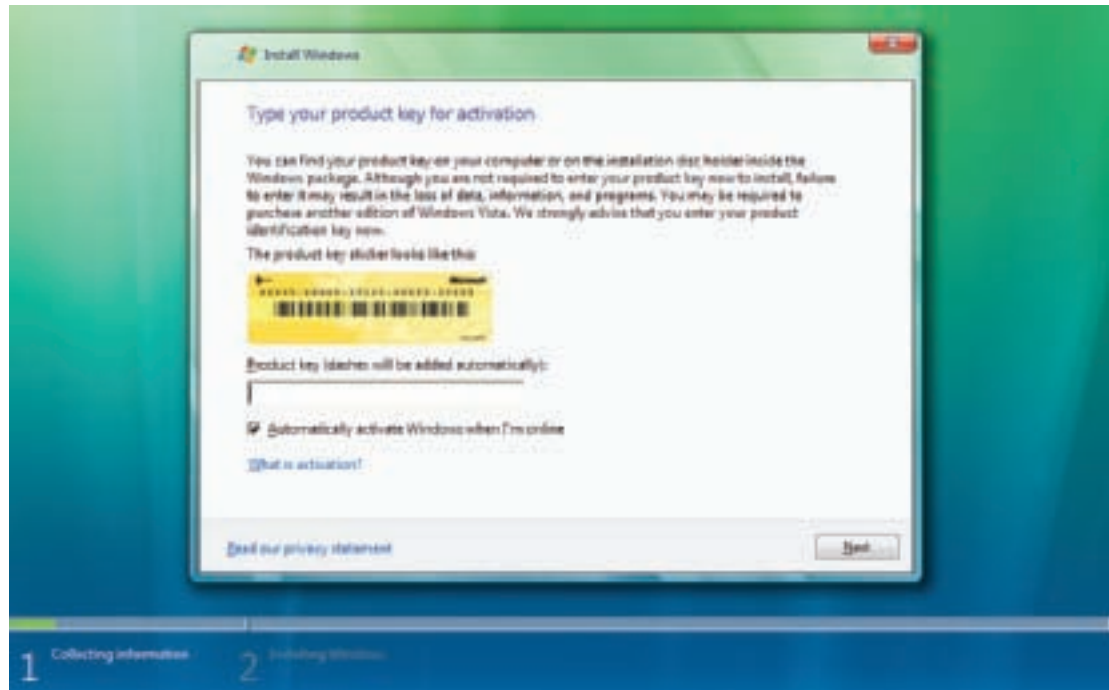


Figure 12-19 Enter the product key found inside the Vista CD or DVD case
Courtesy: Course Technology/Cengage Learning

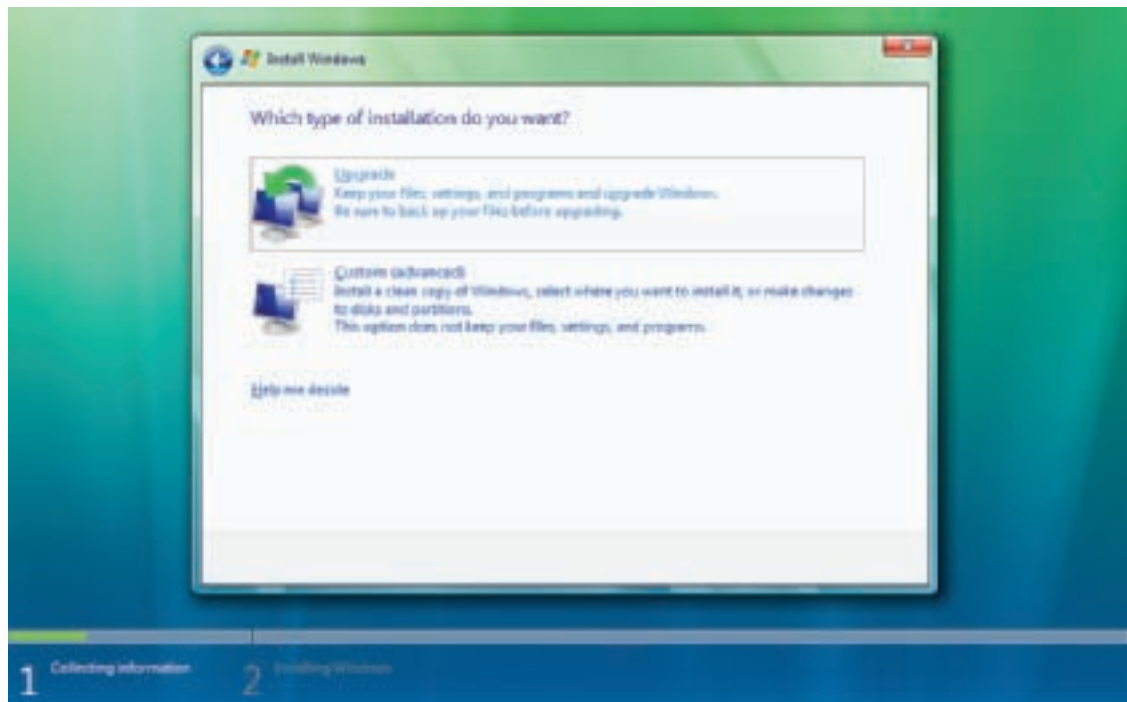


Figure 12-20 Select the type of installation you want
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9. Finally, Setup checks your computer's performance, and then a logon screen appears (see Figure 12-21).



Figure 12-21 Vista logon screen after the installation
Courtesy: Course Technology/Cengage Learning

PERFORMING A CLEAN INSTALL OR DUAL BOOT

To perform a clean install of Windows Vista or a dual boot with another OS, do the following:

1. Boot directly from the Windows Vista CD or DVD. If you have trouble booting from the disc, go into BIOS setup and verify that your first boot device is the optical drive. Select your language preference, and then the opening menu shown earlier in Figure 12-17 appears. Click **Install now**.
2. On the next screens, enter the product key and accept the license agreement.
3. On the next screen, shown earlier in Figure 12-20, select the type of installation you want. Choose **Custom (advanced)**.

Note If your computer refuses to boot from the DVD, verify that your optical drive is a DVD drive. Perhaps it is only a CD drive. If this is the case, you can use another computer on your network that has a DVD drive to read the disc. This computer can act as your file server for the Vista installation on the first PC, or you can copy the installation files on the DVD across the network to a folder on the hard drive of your first PC and install the OS from this folder.

4. On the next screen, you will be shown a list of partitions on which to install the OS. For example, the computer shown in Figure 12-22 has two hard drives (Disk 0 and Disk 1), each with one partition. You can choose to install Vista on drive C: (the only partition on the first hard drive) or drive E: (the only partition on the second hard drive). For this computer, Windows XP is installed on drive C:. If you choose drive C:, then you will be

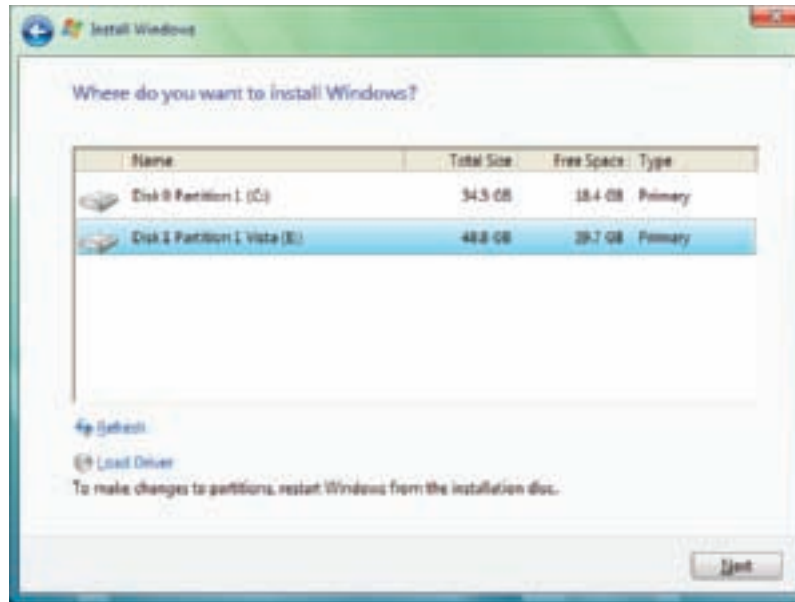


Figure 12-22 Select a partition to install Vista in a clean install or dual boot environment

Courtesy: Course Technology/Cengage Learning

performing a clean install on top of Windows XP, erasing XP. If you choose drive E:, then you will be installing Vista on the second hard drive and the system will function with a dual boot configuration. Make your selection and click Next.

In another example where the installation begins with a new hard drive, the setup screen in Figure 12-23 appears. Suppose you want to install Vista on this drive and later install Windows 7 as a dual boot. To allocate only part of the drive for the Vista partition, click

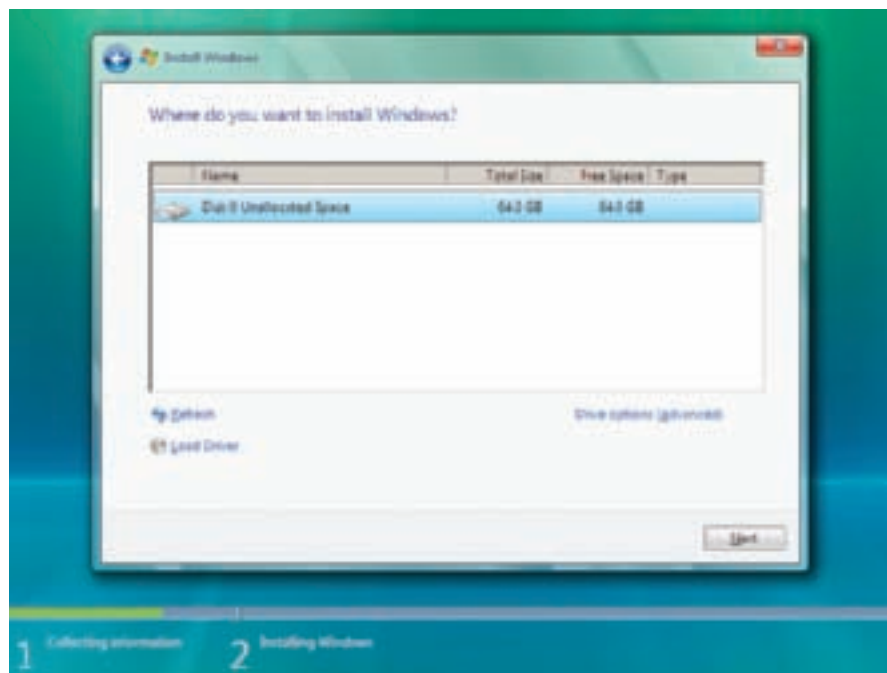


Figure 12-23 Installation with a single clean hard drive

Courtesy: Course Technology/Cengage Learning

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Drive options (advanced). Options to manage partitions appear. Click **New**. On the next screen (see Figure 12-24), enter the size of the Vista partition and click **Apply**. The new partition appears, as shown in Figure 12-25, and we still have plenty of room on the drive for Windows 7.

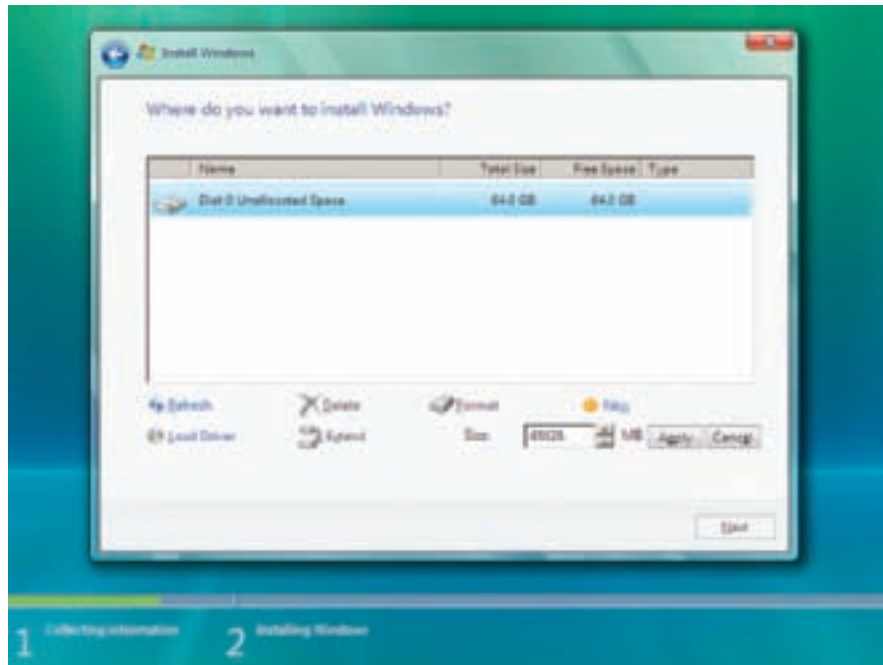


Figure 12-24 Options are available to manage partitions
Courtesy: Course Technology/Cengage Learning

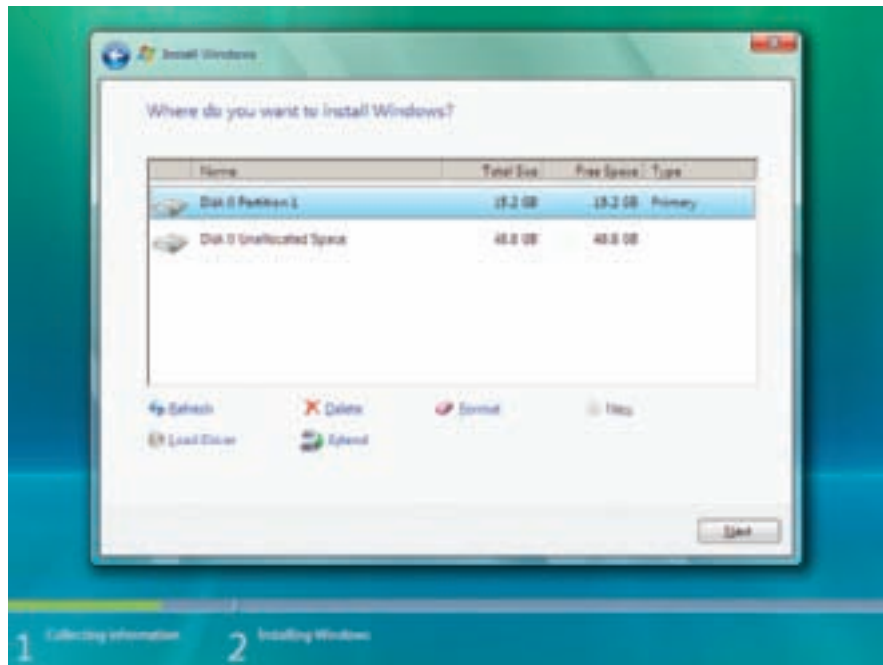


Figure 12-25 The Vista partition using part of the available space
Courtesy: Course Technology/Cengage Learning

The installation now continues the same way as an upgrade installation.

After the installation, when you boot with a dual boot, the **boot loader menu** automatically appears and asks you to select an operating system, as shown in Figure 12-26.

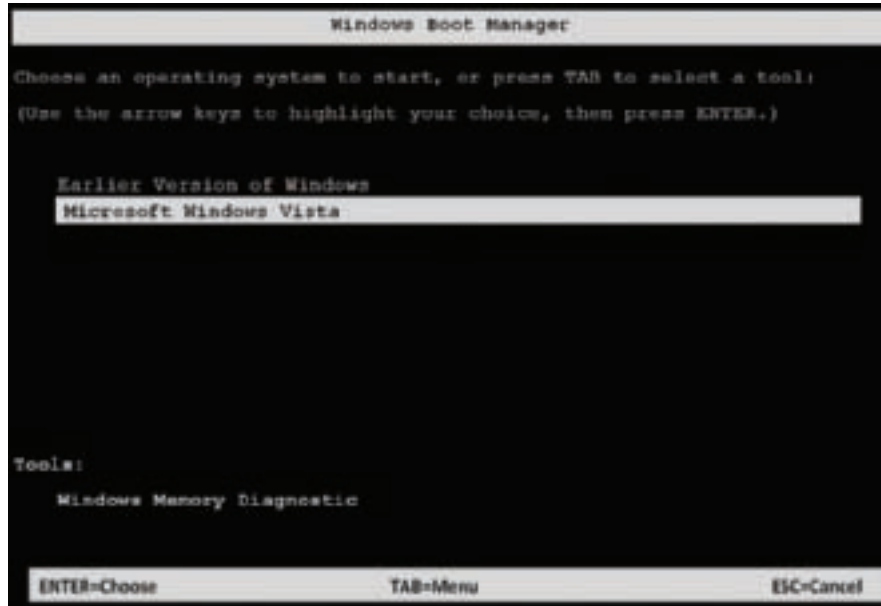


Figure 12-26 Vista boot loader menu
Courtesy: Course Technology/Cengage Learning

When using a dual boot, you can execute an application while Windows Vista or XP is loaded even if the application is installed under the other OS. If the application is not listed in the Start menu, locate the program file in Windows Explorer. Double-click the application to run it from Windows Vista or XP. You do not have to install an application twice under each OS.

PERFORMING A CLEAN INSTALL USING THE VISTA UPGRADE DVD

With Windows 2000/XP, you could use an upgrade CD to install the OS even when an OS was not installed. During the installation, you were required to provide the setup CD of an older version of Windows to prove that you had the right to use the upgrade CD. However, Vista does not make this provision. Vista setup expects that an old OS is installed if you use the upgrade DVD.

This requirement presents a problem when you cannot boot your Windows XP system to start the Vista installation from within Windows XP. You have two options in this situation. One option is to reinstall Windows XP and then install Windows Vista as an upgrade. Another option is to use the Vista upgrade DVD to perform a clean install. However, during the Vista installation, when you enter the product key, Vista verifies that the product key is for an upgrade DVD or for-a-new-PC DVD. If you are using an upgrade product key for a clean install, Setup gives you an error, and stops the installation. The error message is, “To use the product key you entered, start the installation from your existing version of Windows.” Follow these steps to get around that error:

1. Boot from the Vista DVD and start the installation. When you get to the installation window that asks you to enter your product key, don't enter the key and uncheck **Automatically activate Windows when I'm online**.

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2. A message appears asking you to enter the key. Click **No** to continue. On the next window (see Figure 12-27), select the edition of Vista you have purchased, check **I have selected the edition of Windows that I purchased**, and click **Next**.

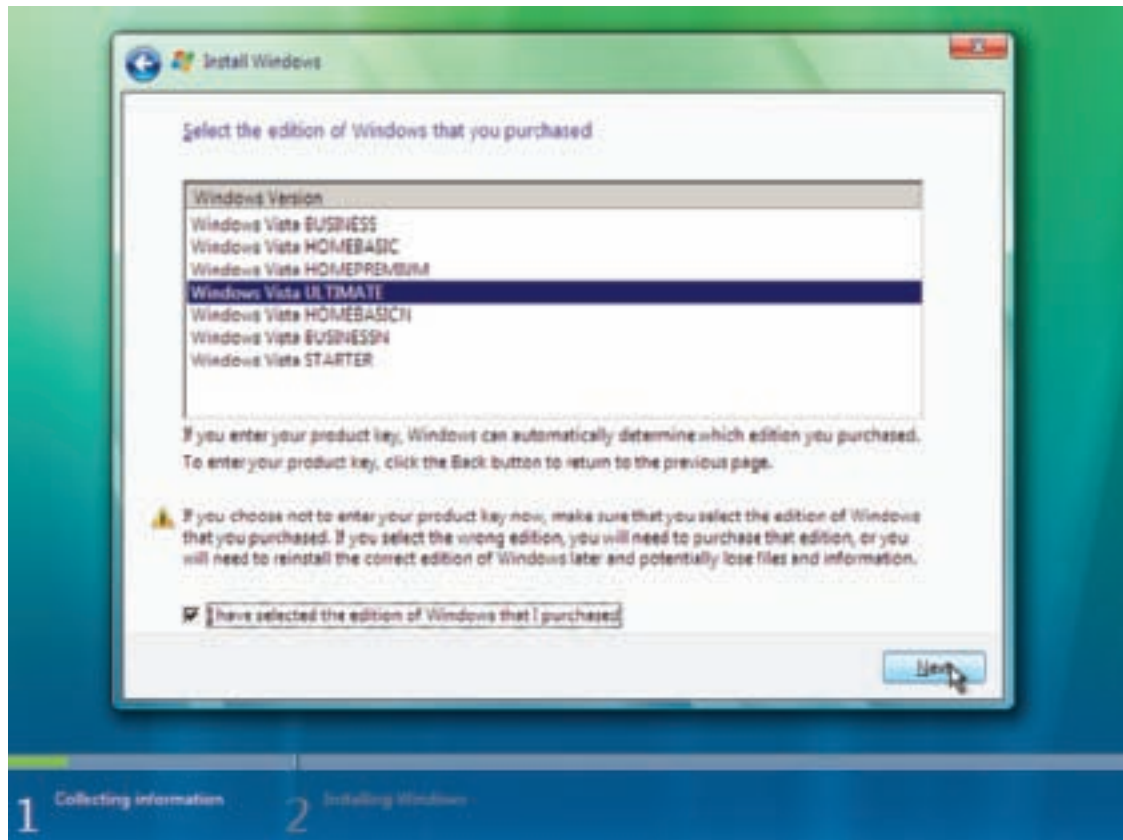


Figure 12-27 Installing Windows Vista without entering the product key
Courtesy: Course Technology/Cengage Learning

3. Complete the installation. You will not be able to activate Vista without the product key.
4. From the Vista desktop, start the installation routine again, but this time as an upgrade. If you get an error, restart the installation. Enter the product key during the installation and Vista will activate with no problems.

Notes If you have problems installing Windows, search the Microsoft Web site (support.microsoft.com) for solutions. Vista Setup creates several log files during the installation that can help you solve a problem. To see a list of log files, visit the support.microsoft.com site and search on "Vista installation logs."

WHAT TO DO AFTER THE VISTA INSTALLATION

After you have installed Vista, you need to do the following:

1. Verify that you have network access.
2. Activate Windows.
3. Install updates and service packs for Windows.
4. Verify automatic updates are set as you want them.

5. Configure Vista components.
6. Install hardware.
7. Install applications.

If Windows is installed in a workgroup and not a domain, in addition to these seven steps, you need to create a local user account for each user of this PC. How to create local accounts is covered in Chapter 19. Now let's look at the details of the seven items from the preceding list.

VERIFY THAT YOU HAVE NETWORK ACCESS

When you install Windows, the setup process should connect you to the network and to the Internet, if available. To verify that you have network and Internet access, do the following:

1. For Vista, click **Start, Network** to open the Network window (see Figure 12-28). You should see other computers and resources on the network in the right pane, and you should be able to drill down to see shared resources on these computers.

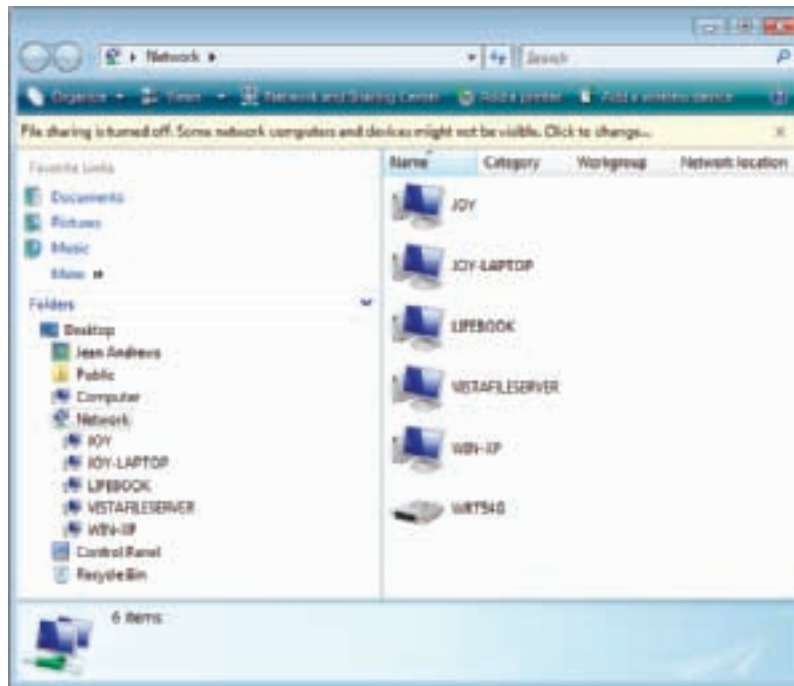


Figure 12-28 Use the Network window to access resources on your network
Courtesy: Course Technology/Cengage Learning

2. If the Network window does not show other computers on your network, first try rebooting the PC. Then verify that the computer, workgroup, or domain names are correct using the System dialog box. Click **Start**, right-click **Computer**, and select **Properties** from the shortcut menu. The System window appears, as shown in Figure 12-29.
3. Under *Computer name, domain, and workgroup settings*, click **Change settings** and respond to the UAC box. The System Properties dialog box is displayed, as shown in the left side of Figure 12-30. (If you are installing a Vista Home edition, the Network ID button in the figure will be missing because these editions cannot join a domain.) If the

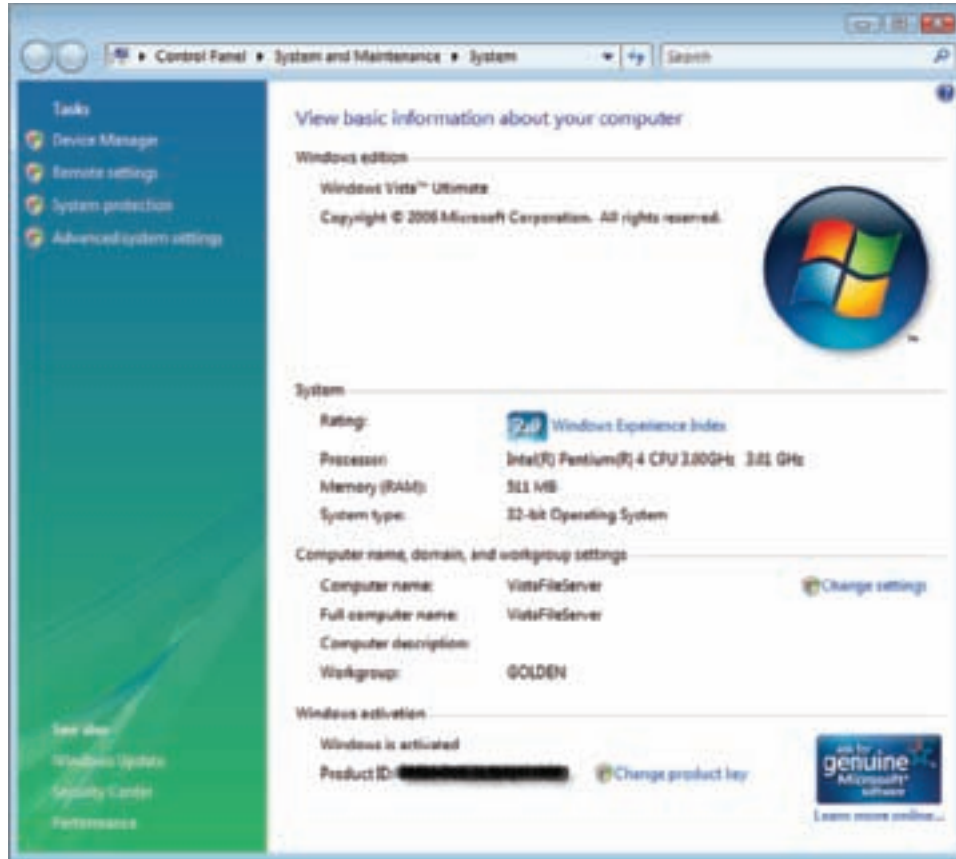
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Figure 12-29 Use the System window to change computer settings
Courtesy: Course Technology/Cengage Learning

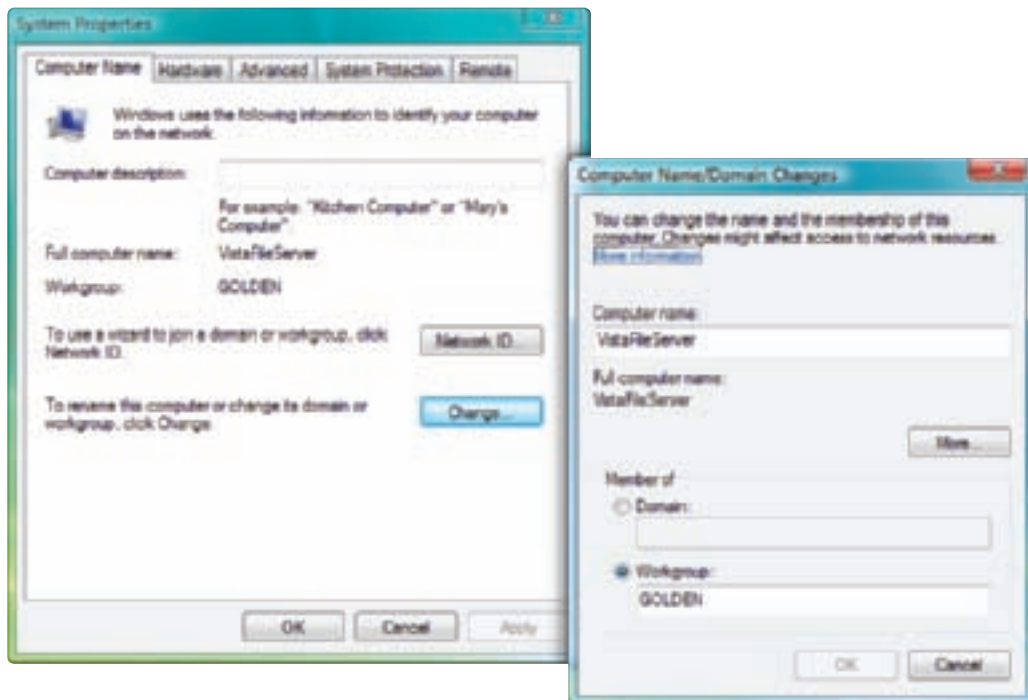


Figure 12-30 Use the System Properties box to change the workgroup name, domain name, or computer name
Courtesy: Course Technology/Cengage Learning

computer name, workgroup name, or domain name is not correct, click **Change** to make your changes and respond to the UAC box. The dialog box to make your changes is shown on the right side of Figure 12-30. You will need to restart the computer before your changes will take effect.

4. To verify that you have Internet access, open **Internet Explorer** and try to navigate to a couple of Web sites.

Notes If your computer is part of a Windows domain, when Windows Vista starts up, it displays a blank screen instead of a logon screen. To log onto the domain, press Ctrl+Alt+Del to display the logon screen. If you want to log onto the local machine instead of the domain, type **.username**. For example, to log onto the local machine using the local user account "Jean Andrews," type **.\Jean Andrews**.

If you have problems with accessing the network or the Internet, you'll need to dig a little deeper into Windows networking, which is covered in Chapter 17.

ACTIVATE WINDOWS VISTA

Product activation is a method used by Microsoft to prevent unlicensed use of its software so that you must purchase a Windows license for each installation of Windows. After you install Windows Vista or XP, you have 30 days to activate the OS. (Windows 2000 does not require activating.) If you don't activate Vista within the given time, the screen in Figure 12-31 is displayed, forcing you to activate Vista, enter or purchase a new product key for the activation, or convert Windows to Reduced Functionality Mode (RFM), which greatly limits what you can do in Vista. After you are in RFM mode, if you activate Windows, it will return to the fully functioning mode.

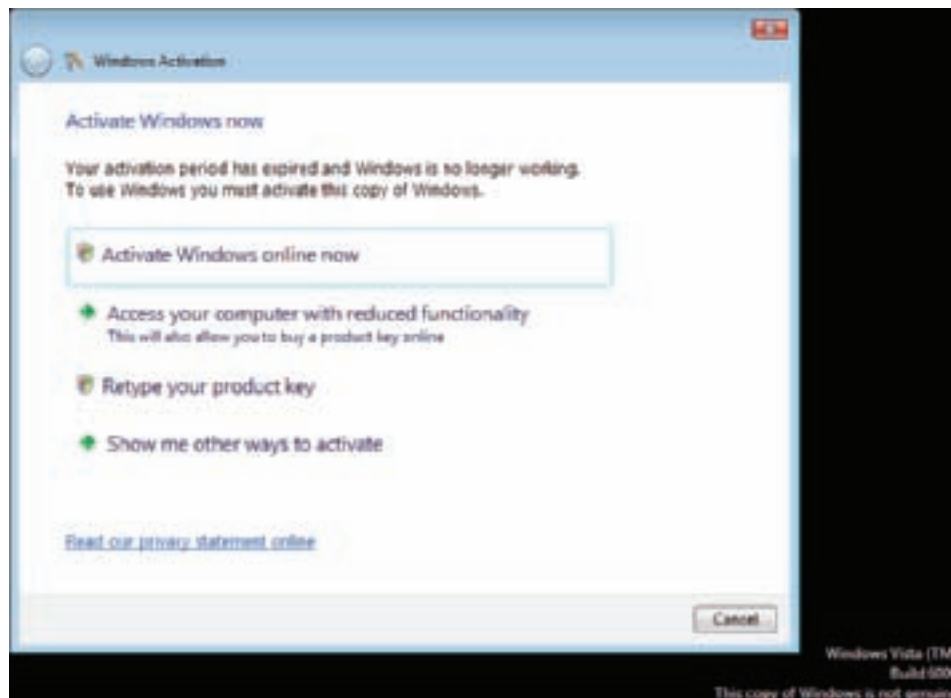


Figure 12-31 Vista informs the user that the activation period has expired
Courtesy: Course Technology/Cengage Learning

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Notes If you need more than 30 days before you activate Windows, you can use this command in a command prompt window: **slmgr -rearm**. Your activation period will be extended an additional 30 days from the day you issue the command. You can use the command three times, at which time Vista will revert to RFM mode.

To view the activation status and activate Windows Vista, open the System window. For example, in Figure 12-32, to activate Vista, click **25 day(s) to activate. Activate Windows now.**

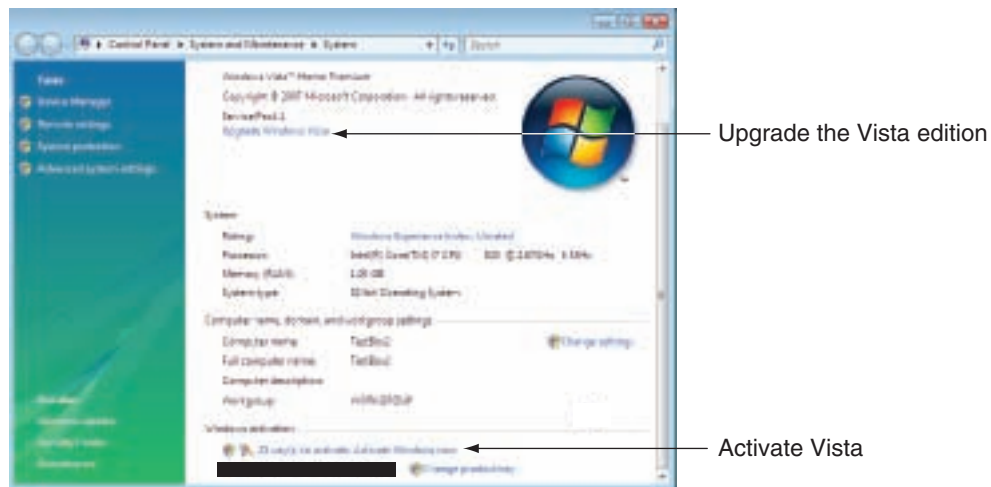


Figure 12-32 Activate or upgrade Vista or change the product key
Courtesy: Course Technology/Cengage Learning

If you install Windows from the same DVD on a different computer, and you attempt to activate Windows from the new PC, a dialog box appears telling you of the suspected violation of the license agreement. You can call a Microsoft operator and explain what caused the discrepancy. If your explanation is reasonable (for example, you uninstalled Windows Vista from one PC and installed it on another), the operator can issue you a valid certificate. You can then type the certificate value into a dialog box to complete the boot process.

Also, notice in Figure 12-32 that you can see and change the product key at any time. If you change the key after Vista is activated, you must activate Vista again, because the activation is tied to the product key and the system hardware. Incidentally, if you replace the motherboard or replace the hard drive and memory at the same time, you must also reactivate Vista.

Note If you have purchased Windows Vista Home Basic, Home Premium, or Business editions, you can upgrade them to Vista Ultimate. To do that, in the System window, click **Upgrade Windows Vista** (see Figure 12-32). You are taken to the Microsoft Web site (www.microsoft.com) to purchase the upgrade and download an upgrade program file, which includes a new product key. You use the downloaded file and the Vista DVD to install the new edition of Windows Vista. A Vista DVD contains the setup files for Vista Home, Business, and Ultimate editions.

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INSTALL WINDOWS UPDATES AND SERVICE PACKS

The Microsoft Web site offers patches, fixes, and updates for known problems and has an extensive knowledge base documenting problems and their solutions. It's important to keep these updates current on your system to fix known problems and plug up security holes that might allow viruses and worms in. Be sure to install updates before you attempt to install software or hardware.

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To download and apply Windows updates, click **Start**, **All Programs**, and **Windows Update**. The Windows Update window appears, as shown in Figure 12-33 for Vista, but the XP window is similar. Click **Install updates** and follow directions on-screen.

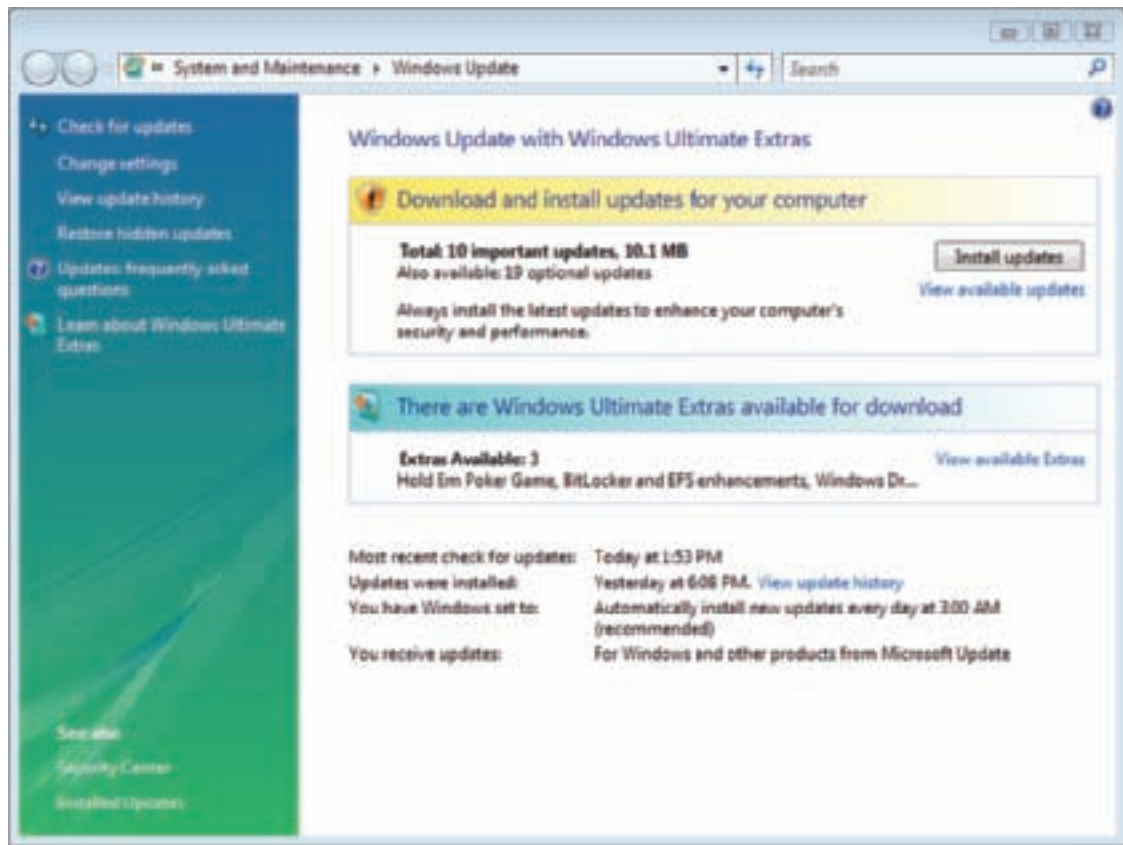


Figure 12-33 Download and install updates for your computer
Courtesy: Course Technology/Cengage Learning

If your Windows setup DVD or CD is old, or the PC hasn't been updated in a while, Windows selects the updates in the order you can receive them, and will not necessarily list all the updates you need on the first pass. After you have installed the updates listed, go back and start again until Windows Updates tells you there is nothing left to update. If Windows requests a restart after an update, do that before you install more updates. It might take two or more passes to get the PC entirely up to date.

So far, Microsoft has released two major service packs for Windows Vista. When the update process is ready to install a service pack, you'll see it listed as the only update to download and install. It will take some time and a reboot to complete the process of installing a service pack. Only the latest service pack for an OS will install because the latest service pack includes all the content from previous service packs.

CONFIGURE AUTOMATIC UPDATES

During the Vista installation, you were asked how you want to handle Vista updates. To verify or change this setting, in the left pane of the Windows Update window, click **Change settings**. From the Change settings window, shown in Figure 12-34, you can decide how often, when, and how you want Vista to install updates. The recommended setting is to allow Vista to automatically download and install updates daily. However, if you are not always connected to the Internet, your connection is very slow, or you want more control over which updates are installed, you might want to manage the updates differently.

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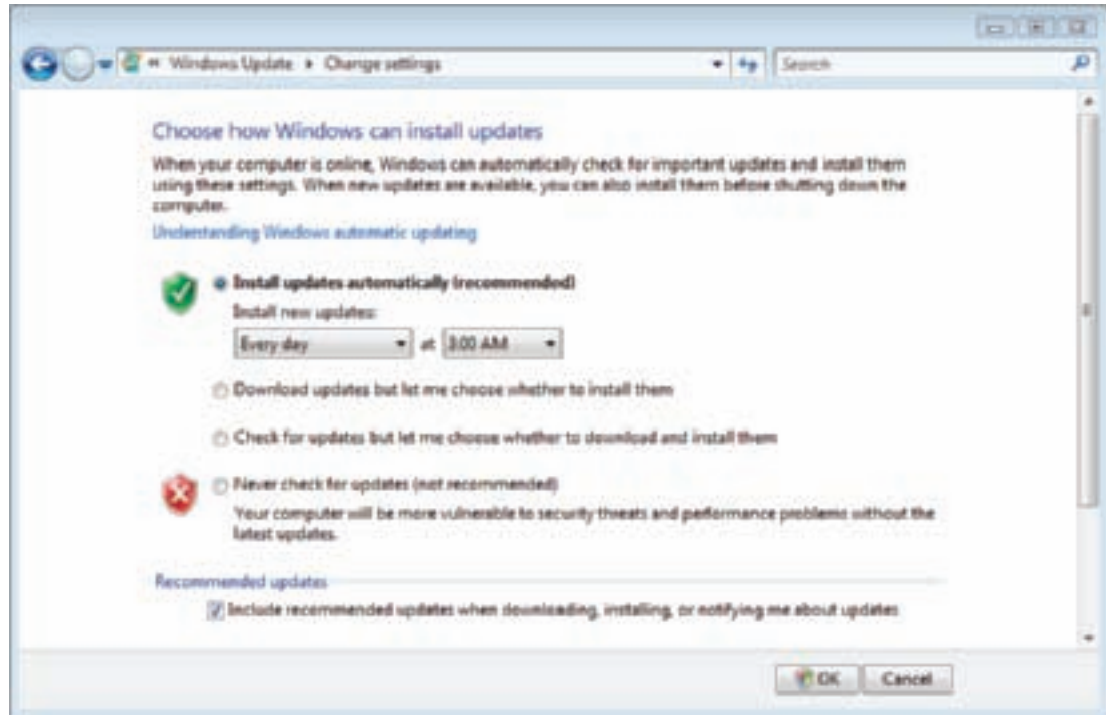


Figure 12-34 Manage how and when Vista is updated
Courtesy: Course Technology/Cengage Learning

CONFIGURE VISTA COMPONENTS

When Vista is first installed, by default, it turns certain software components on and others off. To see how these features are set and change these settings, from Control Panel, click **Programs**. The Programs window appears, as shown in Figure 12-35. Click **Turn Windows features on or off** and respond to the UAC box. The Windows Features dialog box opens. To expand groups of items, click the plus sign beside a check box. Generally, the features are set as they should be. However, to meet specific user needs, you might need to turn on Telnet client, Telnet server, FTP server, or some similar seldom-used Windows feature. To get more information about an item, search for it in Windows Help and Support. Check or uncheck a feature to turn it on or off. Click **OK** when you're done.

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INSTALL HARDWARE

You're now ready to install the hardware devices that were not automatically installed during the installation. As you install each device, reboot and verify that the software or device is working before you move on to the next item. Most likely, you will need to do the following:

- ▲ Use the CD that came bundled with the motherboard to install the drivers for the motherboard. If you were not able to connect to the network earlier in the installation process, it might be because the drivers for the network port are not installed. Installing the drivers on the motherboard CD can solve the problem.
- ▲ Even though Windows has embedded video drivers, install the driver CD that came bundled with the video card to use all the features the card offers.
- ▲ Install the printer. To install a local USB printer, all you have to do is plug in the USB printer, and Windows will install the printer automatically. How to install other types of printers is covered in Chapter 22.

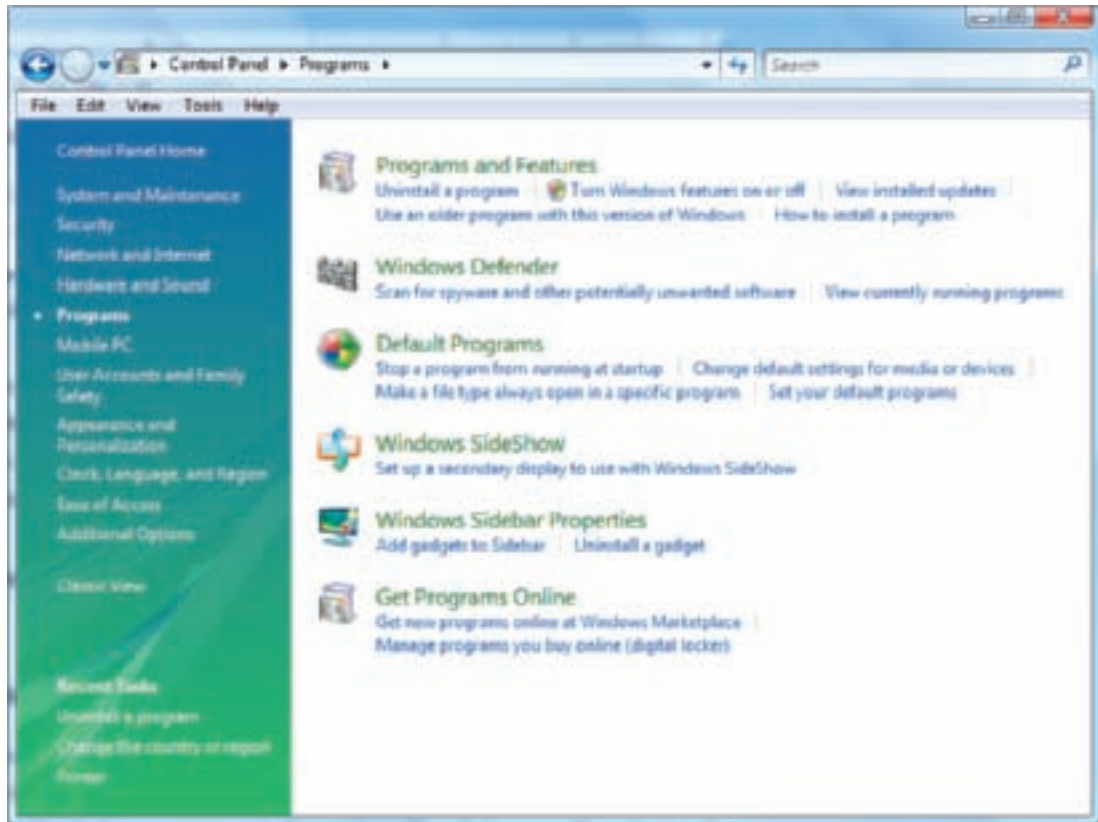


Figure 12-35 Use the Vista Programs window to manage installed software
 Courtesy: Course Technology/Cengage Learning

Recall that the primary tool for managing hardware in Windows is Device Manager. To access Device Manager, click **Start**, right-click **Computer**, and click **Properties** on the shortcut menu. In the System window that appears, in the left pane, click **Device Manager** (see Figure 12-36), and respond to the UAC box. Use Device Manager to uninstall devices, update drivers, and troubleshoot problems with devices.

To install a new hardware device, always read and follow manufacturer directions for the installation. Sometimes you are directed to install the drivers before you connect the device, and sometimes you will first need to connect the device. When you first connect a new device, the Found New Hardware Wizard launches to step you through the installation. However, you can cancel the wizard and run the installation program on the CD that came bundled with the device. If errors occur when installing the drivers, try the installation while the system is booted into Safe Mode. Recall that to boot to Safe Mode, press **F8** during startup and select **Safe Mode with Networking** from the boot options menu.

INSTALL APPLICATIONS

To install applications, insert the setup CD or DVD, and follow directions on-screen to launch the installation routine. For software downloaded from the Internet, open Windows Explorer and double-click the program filename to begin the installation. If the install process gives errors, try starting the installation by right-clicking the program filename and selecting **Run as administrator** from the shortcut menu (see Figure 12-37). You'll then need to respond to the UAC box, which might require you to enter an administrator password. (Running an application as an administrator is sometimes called a secondary logon.)

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If an application gives errors after it is installed, try to change the environment in which it runs. To do that, use Windows Explorer to locate the executable program file. The file has an .exe file extension, and will most likely be in a subfolder of the \Program Files folder. Then, right-click the filename and select **Properties** from the shortcut menu. The program properties

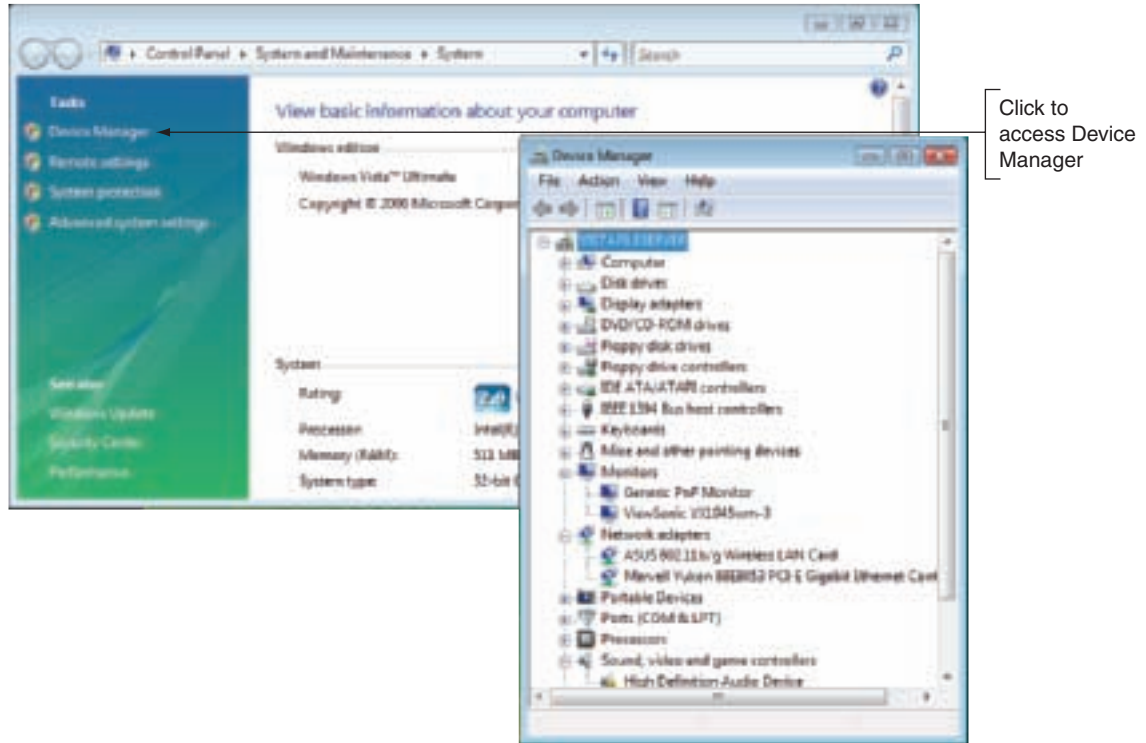


Figure 12-36 Access Device Manager from the System window
Courtesy: Course Technology/Cengage Learning

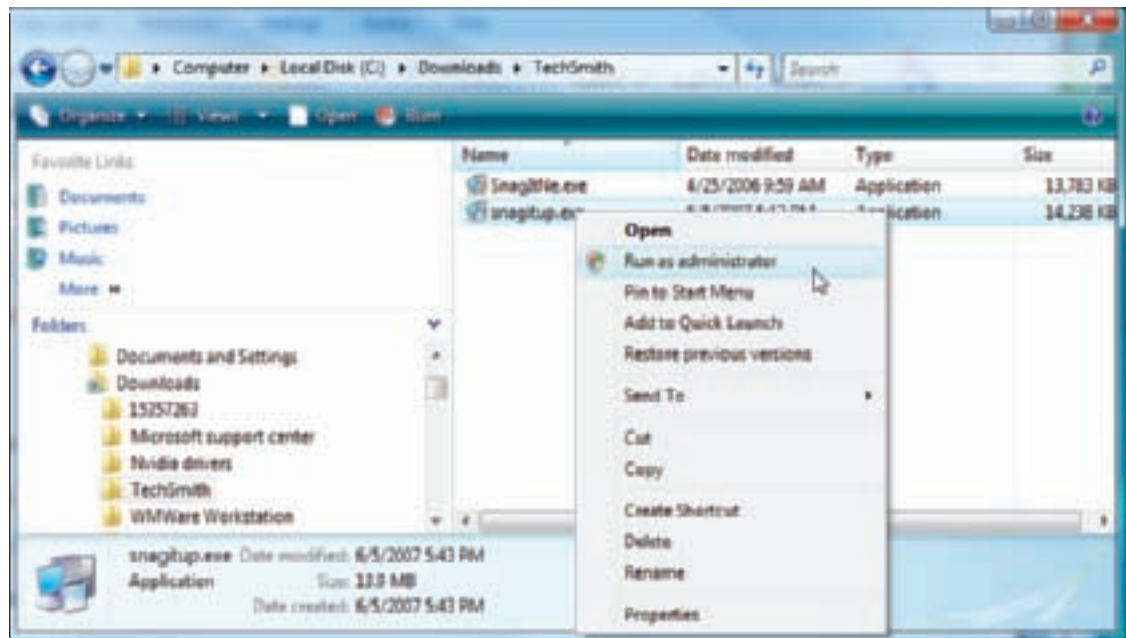


Figure 12-37 Execute a program using administrative privileges
Courtesy: Course Technology/Cengage Learning

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window opens. Click the **Compatibility** tab (see Figure 12-38). If the program was written for an older OS, check **Run this program in compatibility mode for** and select the OS, as shown in the figure. You can also try checking **Run this program as an administrator**. But only try one option at a time and restart the system after each change. If you still get errors, try running the installation routine while the system is booted into Safe Mode.



Figure 12-38 Change the environment under which a program runs
Courtesy: Course Technology/Cengage Learning

For all of the 64-bit versions of Vista, as well as the one 64-bit version of Windows XP, here's one more tip that might help when programs refuse to install or later the program runs with errors. By default, 64-bit Vista and XP install 64-bit programs in the \Program Files folder and install 32-bit programs in the \Program Files (x86) folder (see Figure 12-39). However, 32-bit programs might give errors when installed in this second folder. To correct the problem, uninstall the program and perform the installation routine again. During the installation, you are given the opportunity to select the folder to hold the program files. Change the selection to another folder that you have created. For example, some application developers suggest you create a folder named \Program Files x86 to install their 32-bit applications using 64-bit Windows Vista or XP.

If you still have problems with the program or its installation, look for solutions at the Microsoft Web site at support.microsoft.com. Search on the error message, application name, or symptom of the problem. Also search the Web site of the application developer for help with error messages. Be sure you have downloaded and installed all Windows patches because these sometimes resolve problems with applications.

In Windows Vista, use the Programs window to manage software, including installed applications and Windows components. From Control Panel, click **Programs**. The list of tools to manage installed programs appears in the right pane of the Programs window shown in Figure 12-40.

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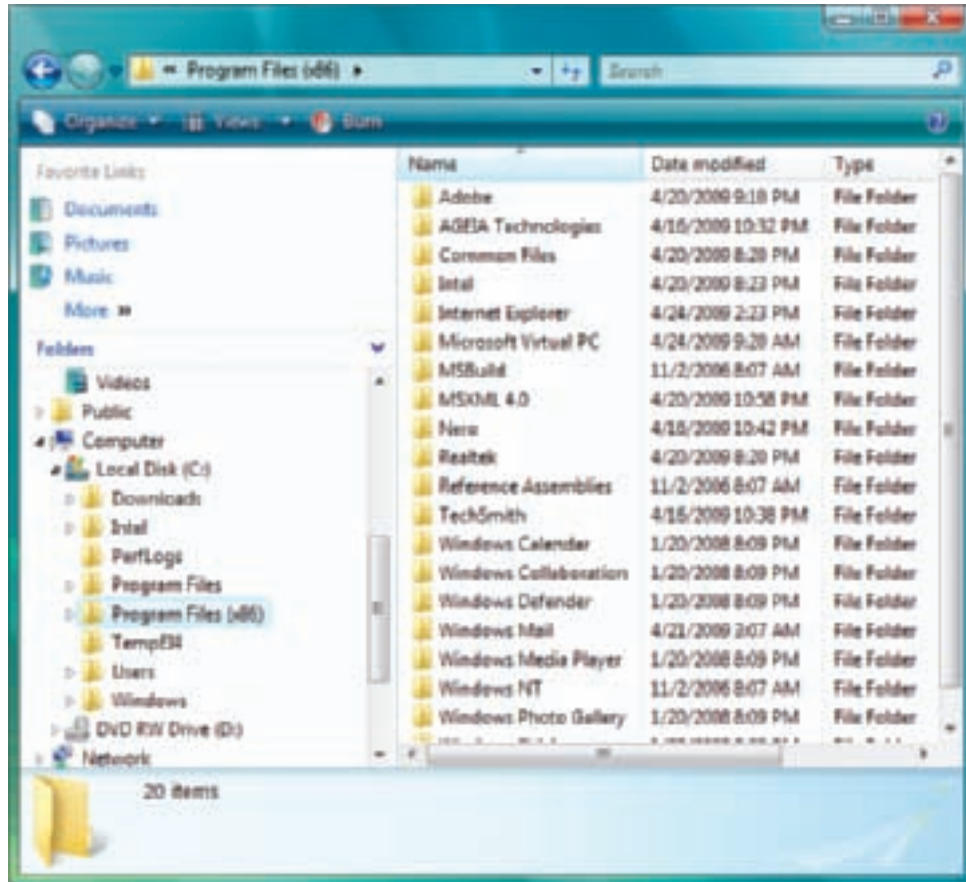


Figure 12-39 Two folders to hold program files using a 64-bit version of Vista
Courtesy: Course Technology/Cengage Learning

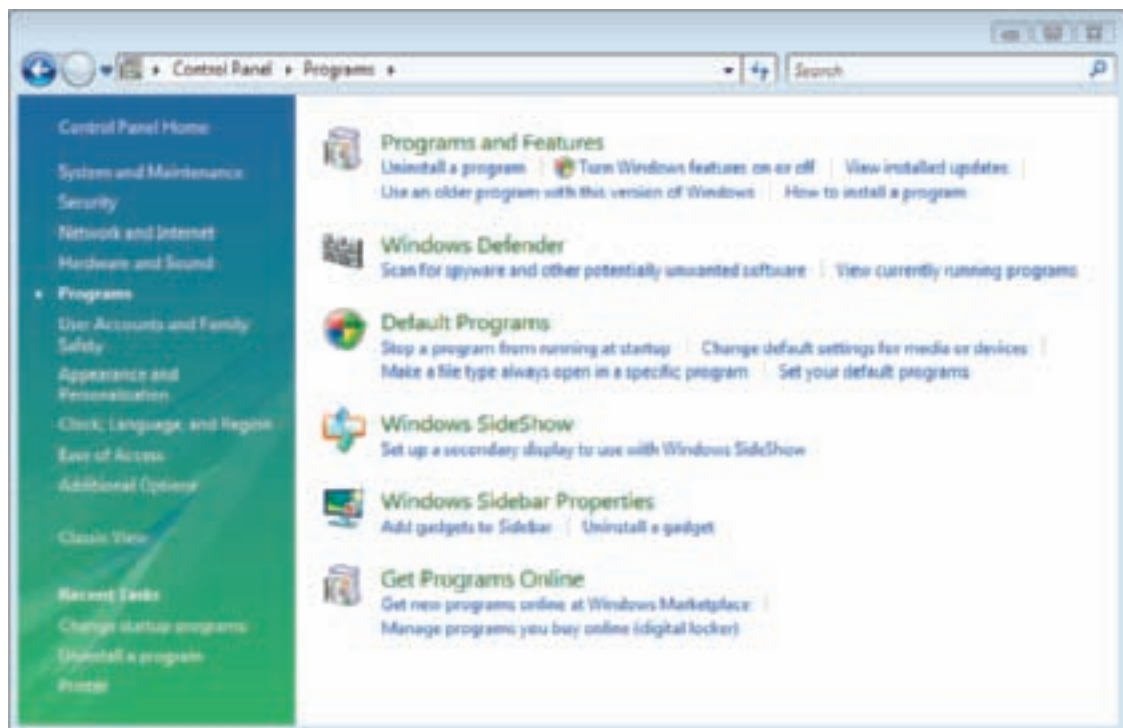


Figure 12-40 Manage software on your PC using the Programs window
Courtesy: Course Technology/Cengage Learning

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To see a list of installed programs, under Programs and Features, click **Uninstall a program**. The Programs and Features window shown in Figure 12-41 appears. Select a program from the list. Based on the software, the buttons at the top of the list will change. For example, in Figure 12-41, the SnagIt8 software offers the option to Uninstall, Change, or Repair the software.

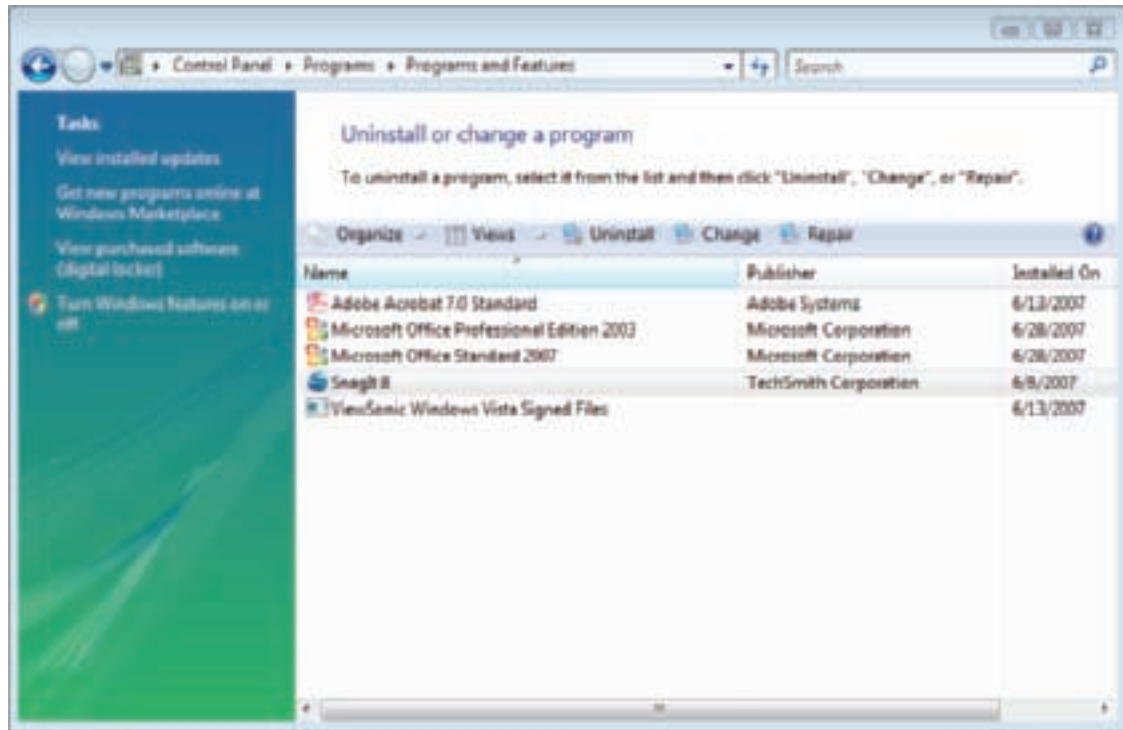


Figure 12-41 Select a program from the list to view your options to manage the software
Courtesy: Course Technology/Cengage Learning

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You should now have Windows Vista configured and functioning as you want it. To finish up, do one last restart and verify that everything is working and looking good. After you have verified everything, it's a good idea to back up the entire volume on which Vista is installed. How to perform a complete PC backup is covered in the next chapter.

HOW TO INSTALL WINDOWS XP


This section explains the steps to install Windows XP as a clean install (with and without another OS already installed), as an upgrade, and in a dual-boot environment. Before we get into the step-by-step instructions, here are two important tips about installing XP:

- ▲ You can use two programs to install Windows 2000 or 32-bit versions of Windows XP: Winnt.exe and Winnt32.exe. Winnt.exe is the 16-bit version of the setup program and Winnt32.exe is the 32-bit version. Both are located in the \i386 folder on the CD. You can use Winnt.exe for a clean install on a computer running MS-DOS, but not to perform an upgrade. Use Winnt32.exe for a clean install or an upgrade on a computer running Windows. Regardless of whether you use Winnt.exe or Winnt32.exe, the program executed is called Setup in Windows documentation. In addition, if you boot from the Windows 2000/XP CD, the Setup.exe program in the root directory of the CD is launched, which displays a setup menu.

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- ▶ When installing 64-bit Windows XP, the installation folder on the setup CD is named \AMD64. The \i386 folder is still present, however, and contains files used during the installation. To install 64-bit Windows XP, you must perform a clean installation (not an upgrade) by booting from the setup CD. After the installation, Windows installs 64-bit applications in the \Program Files folder and installs 32-bit applications in the \Program Files (x86) folder.
- ▶ An error might occur during the installation if files that are using a folder structure that exceeds 256 characters are stored on the hard drive. To get around this problem, if you have a path (folders and filenames) that exceeds 256 characters, move these folders and files to another media such as a USB drive or another computer on the network. Later, you can restore the folders and files to the hard drive. After the installation, you might find these folders and files still on the hard drive although filenames might be truncated.

Now let's see how to perform a clean install of XP.

 **Notes** When installing Windows from across the network to a remote PC, you can only do a clean install. In this situation, run Winnt32.exe on the local Windows computer to perform a clean install on the remote PC.

WINDOWS XP CLEAN INSTALL WHEN AN OS IS NOT ALREADY INSTALLED

Follow these general directions to perform a clean install of Windows XP on a PC that does not already have an OS installed:

1. Boot from the Windows XP CD, which displays the menu shown in Figure 12-42. Note that this menu might change slightly from one Windows XP release to another. Press **Enter** to select the first option. If your PC does not boot from a CD, go to a command prompt and enter the command `D:\i386\Winnt.exe`, substituting the drive letter of your CD-ROM

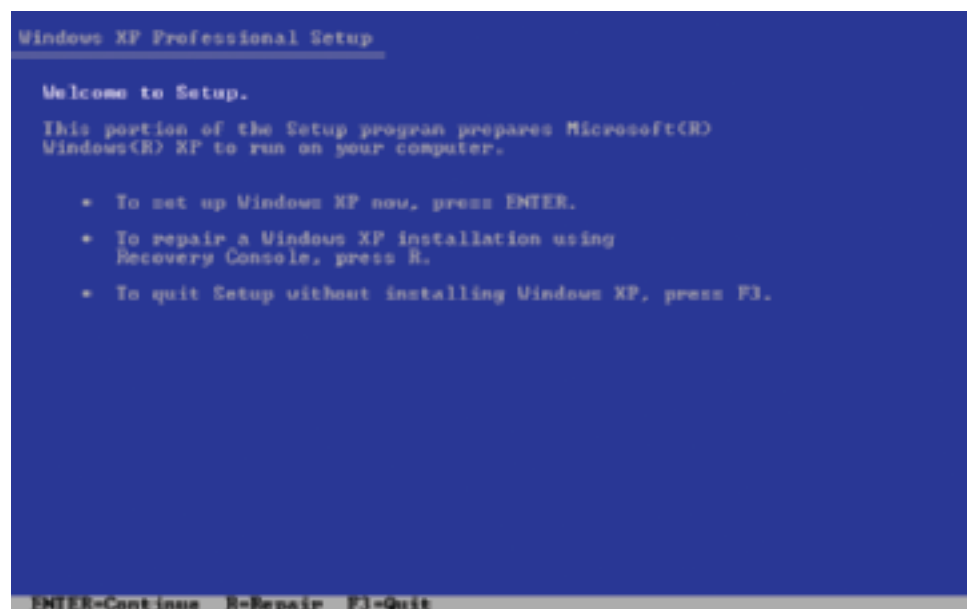


Figure 12-42 Windows XP Setup opening menu
Courtesy: Course Technology/Cengage Learning

drive for D, if necessary. (The path might vary depending on the release of Windows XP.) The End-User License agreement appears. Accept the agreement by pressing F8.

- Setup lists all partitions that it finds on the hard drive, the file system of each partition, and the size of the partition. It also lists any unpartitioned free space on the drive. From this screen, you can create and delete partitions and select the partition on which you want to install Windows XP. If you plan to have more than one partition on the drive, create only one partition at this time. The partition must be at least 2 GB in size and have 1.5 GB free. However, if you have the space, make it much larger so all applications can be installed on this partition—say about 10 GB. After the installation, you can use Disk Management to create the other partitions. Figure 12-43 shows an example of the list provided by Setup when the entire hard drive has not yet been partitioned.

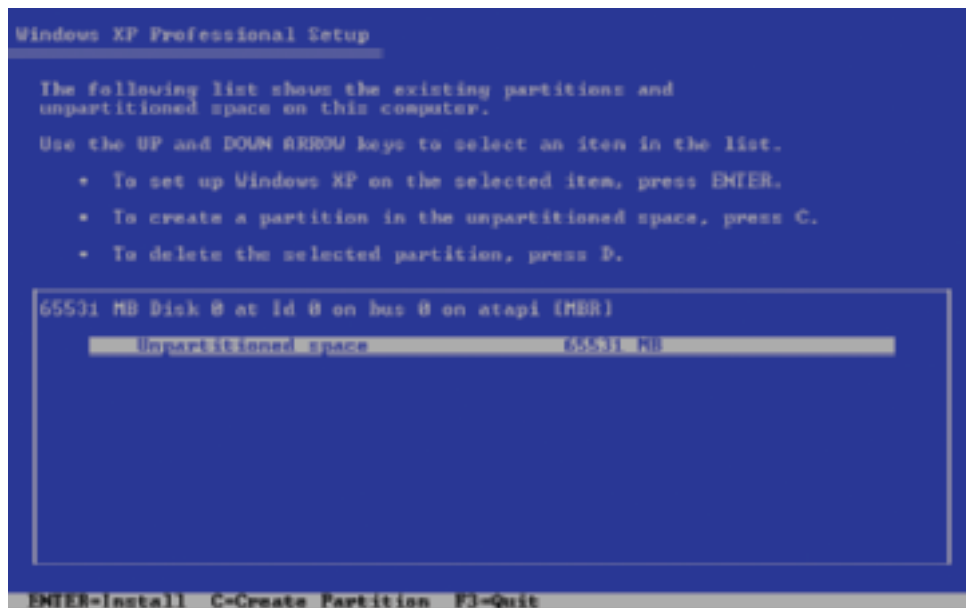


Figure 12-43 During Setup, you can create and delete partitions and select a partition on which to install Windows XP
Courtesy: Course Technology/Cengage Learning


- If you created a partition in Step 2, Setup asks which file system you want to use to format the partition, NTFS or FAT. If the partition is at least 2 GB in size and you select FAT, Setup automatically uses the FAT32 file system. Select a file system for the partition. The Setup program formats the drive, completes the text-based portion of setup, and loads the graphical interface for the rest of the installation. The PC then restarts.
- Select your geographical location from the list provided. Windows XP will use it to decide how to display dates, times, numbers, and currency.
- Enter your name, the name of your organization, and your product key.
- Enter the computer name and the password for the local Administrator account. If you are joining a domain, the computer name is the name assigned to this computer by the network administrator managing the domain controller.



Notes It is very important that you remember the Administrator password. You cannot log on to the system without it.


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7. Select the date, time, and time zone. The PC might reboot.
8. If you are connected to a network, you will be asked to choose how to configure your network settings. The Typical setting installs Client for Microsoft Networks, File and Printer Sharing, and TCP/IP using dynamically assigned IP addresses. The Custom setting allows you to configure the network differently. If you are not sure which to use, choose the Typical setting. You can change them later. How networks are configured is covered in Chapter 17.
9. Enter a workgroup or domain name. If you are joining a domain, the network administrator will have given you specific directions on how to configure user accounts on the domain.

 **Notes** During a normal Windows XP installation, setup causes the system to reboot three times.

WINDOWS XP CLEAN INSTALL WHEN AN OS IS ALREADY INSTALLED

For an XP clean install on a PC that already has an OS installed, follow these general directions:

 **A+ Exam Tip** The A+ 220-701 Essentials exam expects you to know how to do a Windows Vista/XP/2000 clean install and an upgrade to Windows Vista/XP/2000.

1. Close any open applications. Close any boot management software or antivirus software that might be running in the background.
2. Insert the Windows XP CD in the CD drive. Autorun launches the opening window shown in Figure 12-44. Your screen might look different depending on the release of Windows XP you are using. (If the opening window does not appear, you can start the installation by using this command in the Run dialog box: `D:\i386\winnt32.exe`, where you substitute the drive letter of your CD drive for D, if necessary.)
3. Select the option to **Install Windows XP**. On the next screen, under Installation Type, select **New Installation**. Read and accept the licensing agreement. The installation process works the same as in the preceding procedure, picking up with Step 2.



Figure 12-44 Windows XP Setup menu
Courtesy: Course Technology/Cengage Learning

UPGRADE TO WINDOWS XP

When performing an upgrade to Windows XP, follow these general directions:

1. Clean up the hard drive: Erase unneeded or temporary files, empty the Recycle Bin, defragment the drive (use Windows 9x/Me or Windows 2000 Disk Defragmenter), and scan the drive for errors (use Windows 9x/Me ScanDisk or Windows 2000 Chkdsk).
2. If you do not have the latest BIOS for your motherboard, flash your BIOS.
3. Back up important files.
4. Scan the hard drive for viruses, using a current version of antivirus software.
5. If you have a compressed hard drive, decompress the drive. The only exception is that if you are using Windows NT file compression on an NTFS drive, you do not need to decompress it.
6. Uninstall any hardware or software that you know is not compatible with Windows XP, and for which you have no available upgrade. Reboot the system.
7. You're now ready to do the upgrade. Insert the Windows XP Upgrade CD in the CD drive. The Autorun feature should launch the Setup program, with the menu shown in Figure 12-44. Select the option to **Install Windows XP**.
8. If the Setup menu does not appear, you can enter the Setup command in the Run dialog box. Use the command `D:\i386\winnt32.exe`, where you substitute the drive letter of your CD-ROM drive for D, if necessary. Also, the path on your setup CD might be different, depending on the OS release you are using.
9. On the next screen, under Installation Type, select **Upgrade**. The menu gives you two options:
 - ▲ *Express Upgrade*. This upgrade uses existing Windows folders and all the existing settings it can.
 - ▲ *Custom Upgrade*. This upgrade allows you to change the installation folder and the language options. Using this option, you can also change the file system to NTFS.
10. Select the type of upgrade, and accept the licensing agreement.
11. Select the partition on which to install Windows XP. If the drive is configured as FAT and you want to convert to NTFS, specify that now. Note that Windows XP has an uninstall utility that allows you to revert to Windows 98 if necessary. This uninstall tool does not work if you convert FAT to NTFS.
12. Setup does an analysis of the system and reports any compatibility problems. Stop the installation if the problems indicate that you will not be able to operate the system after the installation.
13. For an upgrade from Windows 98 or Windows Me to Windows XP, the Setup program converts whatever information it can in the registry to Windows XP. At the end of the installation, you are given the opportunity to join a domain. For Windows NT and Windows 2000 upgrades, almost all registry entries are carried forward into the new OS; the information about a domain is not requested because it is copied from the old OS into Windows XP.



Notes When upgrading to Windows XP, it is best to install NTFS at the same time you install the OS from the setup CD, though you can convert a FAT file system to NTFS after Windows is installed. To convert a FAT32 volume to an NTFS volume, first back up all important data on the drive and then use this command at a command prompt: **convert D: /FS:NTFS**, where D: is the drive to be converted. Keep in mind that the program requires some free space on the drive. If it doesn't find enough free space, the program terminates.

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DUAL BOOT USING WINDOWS XP

You can configure Windows XP to set up a dual boot with another operating system. Start the installation as you would for a clean install on a PC with another operating system already installed. When given the opportunity, choose to install Windows XP on a different partition than the other OS. Windows XP recognizes that another OS is installed and sets up the startup menu to offer it as an option for booting.



Notes When setting up a dual boot, always install the older operating system first, because the last operating system installed manages the dual boot. A newer OS will be aware of how an older operating system boots, but an older OS will not know how a newer OS boots and will not manage the boot correctly.

WHAT TO DO AFTER THE XP INSTALLATION

After you have installed XP, you need to do the following:

1. *Verify you can access the network and the Internet.* To access the network, click **Start**, **My Network Places**. If you don't see network resources, try rebooting the PC. Use Device Manager to verify that the network card is installed and functioning with no errors. You might need to install device drivers for the network card or for the motherboard network port.



A+ Exam Tip If you don't see My Network Places on the Start menu, you can add it. Right-click **Start** and select **properties**. On the **Start Menu** tab of the Taskbar and Start Menu Properties box, click **Customize**. In the Customize Start Menu box, click the **Advanced** tab. Check **My Network Places** and click **OK** twice to close both boxes.

2. *Activate XP.* You cannot boot the PC using XP if it is not activated after the 30-day trial period is up. Using Windows XP, you cannot change or view the product key unless you are in the process of activating XP. The first time you log on to the system after the installation, the Activate Windows dialog box appears showing three options (see Figure 12-45). If you use the first option and have an Internet connection, activation takes place immediately without your further involvement.
3. *Install Windows updates and service packs.* The process works the same as it does in Vista, which is discussed earlier in the chapter.
4. *Configure automatic updates.* To control how XP automatically deals with updates, click **Start**, right-click **My Computer**, and click **Properties**. In the System Properties window, click the **Automatic Updates** tab (see Figure 12-46).

You'll want to make these automatic update settings according to how the PC connects to the Internet and user habits. For an always-up broadband connection (such as cable modem or DSL), select **Automatic (recommended)** and choose to automatically download and install updates every day. If the PC doesn't have an always-up Internet connection (such as dial-up), you might want to select **Notify me but don't automatically download or install them**. This option works better if a user doesn't want to be bothered with a long and involved download when the PC first connects to the ISP using a slow dial-up connection. Discuss the options with the user. Make sure the user understands that if the update process is not fully automated, he or she needs to take the time to do the updates at least once a week.

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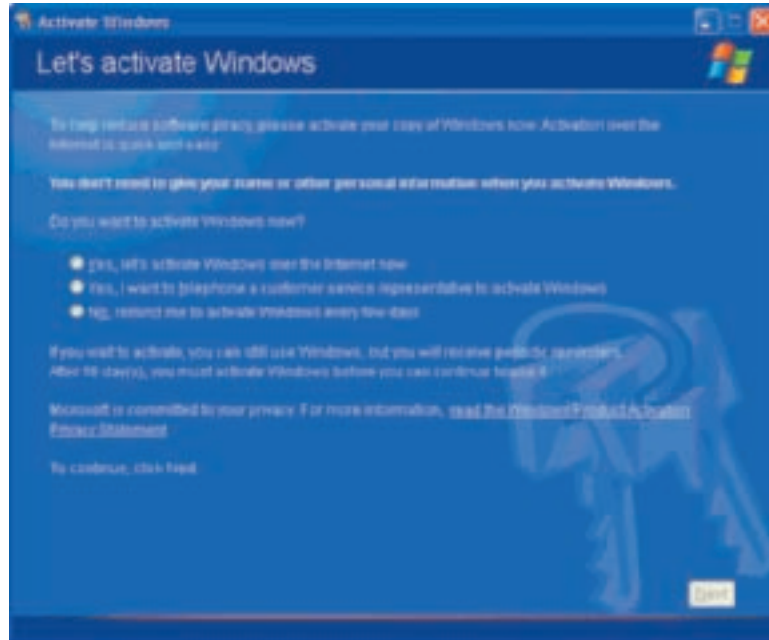


Figure 12-45 Product activation is a strategy used by Microsoft to prevent software piracy
Courtesy: Course Technology/Cengage Learning



Figure 12-46 Set Automatic Updates for automatic and daily updating
Courtesy: Course Technology/Cengage Learning

5. *Install and configure XP components.* Windows XP offers additional components that are not installed during the Windows installation. To install an XP component, open the Add or Remove Programs applet in Control Panel. Click **Add/Remove Windows Components**, as shown in Figure 12-47. Then check a component you want to install and click **Next**. Follow the directions on-screen.
6. *Install hardware and applications.* Hardware and applications install as they do under Vista.

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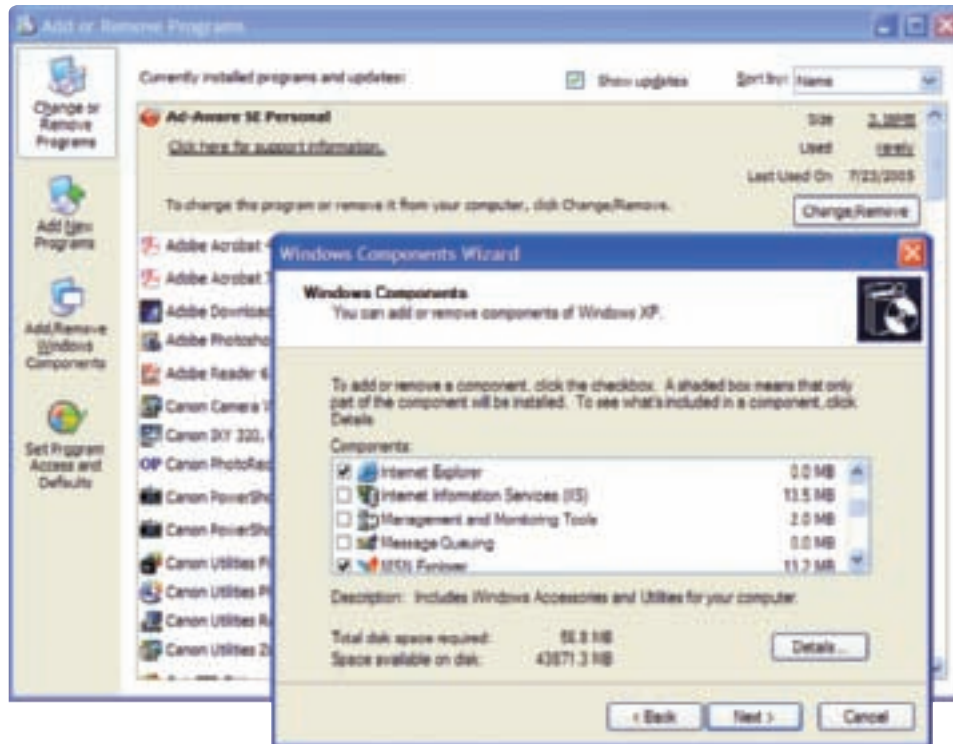


Figure 12-47 Add or remove Windows components using the Add or Remove Programs applet
Courtesy: Course Technology/Cengage Learning

HOW TO INSTALL WINDOWS 2000

Microsoft no longer supports Windows 2000, so you should never be called on to install it on a new PC. However, occasionally you might need to reinstall 2000 on a PC because the hard drive has been replaced or the Windows 2000 installation is corrupted. In these situations, you will be performing a clean installation of the OS and not an upgrade.

Notes If you are having problems with Windows Setup detecting your hard drive, the problem might be out-of-date BIOS. Try flashing BIOS and then attempting the Windows installation again. Chapter 5 gives more information about flashing BIOS.

CLEAN INSTALLATION OF WINDOWS 2000

The Windows 2000 package comes with documentation and a CD. For United States distributions, the package includes a floppy disk to provide 128-bit data encryption. (This disk was not included in distributions to other countries because of laws that prohibited 128-bit data-encryption software from leaving the United States.)

If your PC is capable of booting from a CD, then insert the CD and turn on the PC. The Welcome to Setup screen appears (see Figure 12-48). Press **Enter** to begin the installation. On the next screen, press **F8** to accept the end-user license agreement (EULA). Then skip to Step 6 in the following list of steps. However, if your PC does not boot from a CD and you have a clean, empty hard drive, first create a set of Windows 2000 setup disks to boot the PC and to begin the installation. The remaining installation is done from the CD.

**A+ Tip**

The A+ 220-701 Essentials exam expects you to know how to perform a clean install of Windows 2000 Professional.

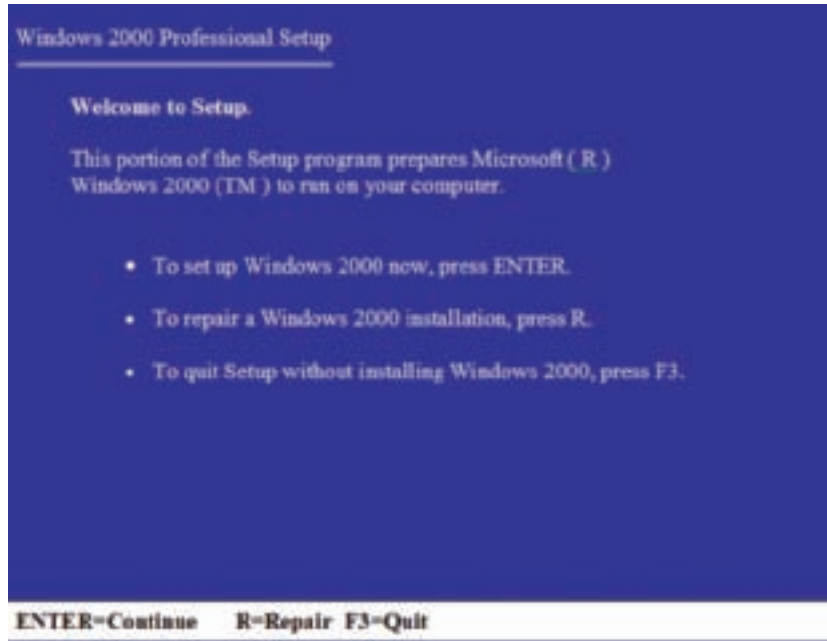


Figure 12-48 Windows 2000 setup screen after booting from the setup CD
Courtesy: Course Technology/Cengage Learning

To make the four setup disks, follow these directions:

1. Using a working PC, format four floppy disks.
2. Place the Windows 2000 CD in the CD drive and a formatted floppy disk in the floppy disk drive. For Windows 9x/Me, click **Start**, then **Run**, and enter this command in the Run dialog box (substitute the letter of the CD-ROM drive for D: and the letter of the floppy drive for A:, if necessary):

`D:\bootdisk\makeboot.exe A:`
3. Insert new disks in the drive as requested. Label the disks Windows 2000 Setup Disks 1, 2, 3, and 4.
4. Now begin the Windows 2000 installation. Boot the PC from the first setup disk created earlier. You will be asked to insert each of the four disks in turn and then asked to insert the Windows 2000 CD.
5. The Windows 2000 license agreement appears. Accept the agreement and the Welcome screen appears, as shown in Figure 12-49. Select **Install a new copy of Windows 2000** and click **Next**. On the next screen, accept the license agreement. The setup process is now identical to that of booting directly from the CD. Save the four setup floppy disks in case you have future problems with Windows 2000.
6. Windows 2000 searches the hard drive for partitions and asks which partition to use. If a partition needs to be created, Setup asks you which file system to use. If the partition is larger than 2 GB, and you select the FAT file system, then Windows 2000 automatically formats the drive using the FAT32 file system rather than the FAT16 file system.

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Figure 12-49 Using the Setup Wizard, you can do an upgrade, do a clean install, or create a dual boot

Courtesy: Course Technology/Cengage Learning

7. During installation, you are given the opportunity to change your keyboard settings for different languages, enter your name and company name, and enter the product key found on the CD case. You are also given the opportunity to enter date and time settings and an administrator password.
8. If Setup recognizes that you are connected to a network, it provides the Networking Settings window to configure the computer to access the network. If you select Typical settings, then Setup automatically configures the OS for your network. If you later discover the configuration is not correct, you can make changes after the installation.
9. At this point in the installation, you are asked to remove the Windows 2000 CD and click **Finish**. The computer then restarts. After Windows 2000 loads, it completes the process of connecting to the network. You are asked questions about the type of network. (For example, does the network use a domain or workgroup?)

CLEAN INSTALL OF WINDOWS 2000 WHEN AN OS IS ALREADY INSTALLED

To do a clean install of Windows 2000 when an OS is already installed, do the following:

1. Insert the Windows 2000 CD in the CD-ROM drive. If your PC detects the CD, a window opens with the message “This CD-ROM contains a newer version of Windows than the one you are presently using. Would you like to upgrade to Windows 2000?” Answer **No**. The Install Windows 2000 window appears (see Figure 12-50). If the setup routine does not launch automatically, start the installation by entering the command `D:\i386\winnt32.exe` in the Run dialog box. Substitute the drive letter of the CD drive for D:, if necessary.
2. In the install window in Figure 12-50, click **Install Windows 2000**. The Windows Setup Wizard opens, as shown in Figure 12-49. Select **Install a new copy of Windows 2000 (Clean Install)**. Windows displays the license agreement and asks you to accept it. Enter the product key from the back of the CD case, and you will be given the opportunity to select special options. After a reboot, the installation continues as described earlier.

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Figure 12-50 Windows 2000 Setup window
Courtesy: Course Technology/Cengage Learning

Notes During installation, Windows 2000 records information about the installation to a file called Setuplog.txt. This file can be useful when troubleshooting any problems that occur during installation.

>> CHAPTER SUMMARY

- ▲ Windows can be purchased as the less expensive OEM version or the more expensive retail version. The OEM version can only be installed on a new PC for resale.
- ▲ Editions of Vista are Vista Starter, Home Basic, Home Premium, Business, Enterprise, and Ultimate.
- ▲ Editions of XP are Home Edition, XP Professional, Media Center Edition, Tablet PC Edition, and XP Professional x64 Edition.
- ▲ Windows Vista can be purchased using 32-bit or 64-bit code. The retail version of Vista Ultimate comes with two DVDs: a 32-bit DVD and a 64-bit DVD.
- ▲ A 32-bit OS cannot address as much RAM as a 64-bit OS. The ability to use more RAM is one reason to use a 64-bit OS.
- ▲ You can purchase the less expensive upgrade version of Windows if the new Windows OS has an upgrade path allowed using your older version of Windows.
- ▲ Before purchasing Windows, make sure your system meets the minimum hardware requirements and all the hardware and applications will work under the OS.
- ▲ You can start a Windows installation by booting from a CD or DVD, USB drive, or other boot media. You can also install the OS from files stored on another computer on the network.
- ▲ Windows can be installed directly from the CD or DVD, as an unattended installation, from an image, from a hidden recovery partition, or from recovery CDs. You can also repair an existing installation using processes defined by each OS.
- ▲ Windows can be installed as an upgrade, a clean installation, or in a dual boot environment with another OS.

- ▲ During the Windows installation, you decide which drive and partition will hold the OS. In some cases, you also decide which file system to use for the Windows volume.
- ▲ A Windows computer can use a workgroup or domain configuration to join a network. Using a workgroup, each computer on the network is responsible for sharing its resources with other computers on the network. In a domain, the domain controller manages network resources.
- ▲ Of all Windows user accounts, the administrator account has the most privileges and rights. It can create user accounts and assign them rights.
- ▲ Microsoft uses product activation to prevent the use of its software products, including Windows Vista and XP, on more than one computer.
- ▲ After the installation, verify you have network access, activate Windows, install any Windows updates or service packs, verify automatic updates is configured correctly, install and configure Windows components, install hardware and applications, create user accounts, and verify user data.

>> KEY TERMS

For explanations of key terms, see the Glossary near the end of the book.

Active Directory	loadstate	Windows Vista Business
administrator account	local account	Windows Vista Enterprise
answer file	peer-to-peer (P2P)	Windows Vista Home Basic
boot loader menu	product activation	Windows Vista Home Premium
boot partition	scanstate	Windows Vista Starter
client/server	sysprep.exe	Windows Vista Ultimate
disk cloning	system partition	Windows XP Home Edition
distribution server	unattended installation	Windows XP Media Center
domain	User State Migration Tool	Edition
drive imaging	(USMT)	Windows XP Professional
dual boot	Windows Anytime Upgrade	Windows XP Tablet PC Edition
global account	Windows Easy Transfer	workgroup

>> REVIEWING THE BASICS

1. Which is the least expensive edition of Vista that can use the Aero user interface?
2. Which three editions of Vista allow you to join a domain on a network?
3. Are there any editions of Vista that do not include the Network and Sharing Center?
4. Which edition of Windows XP supports 64-bit applications?
5. Which was the first Windows OS to come with Internet Explorer embedded in the OS?
6. What is the maximum amount of RAM that 32-bit Vista Ultimate can address?
7. What is the maximum amount of RAM that 64-bit Vista Home Premium can address?
8. Can you perform an upgrade installation of Windows XP Professional to Windows Vista Home Premium?
9. Can you use the upgrade DVD of Windows Vista Home Premium to perform a clean install on a PC that already has Windows XP Professional installed?
10. What is the minimum amount of RAM needed to install Windows Vista?

11. How much space on the hard drive does it take to install Windows Vista?
12. If you are trying to set up a dual boot between Windows XP and Windows Vista, which OS do you install first?
13. How do you start the process to reinstall an OS on a laptop computer using the backup files stored on a recovery partition?
14. What are examples of two applications that can create virtual machines?
15. If you suspect a PC is infected with a virus, why is it not a good idea to perform an upgrade installation of Windows rather than a clean install?
16. Explain the difference between the Windows boot partition and the Windows system partition.
17. What is the minimum number of partitions required in a system to set up a dual boot with Windows XP and Windows Vista?
18. What is the name of the domain controller database used by Windows Server 2008?
19. What are the two commands used by the User State Migration tool?
20. To use the User State Migration tool, how must a computer connect to the network?
21. Can you install Vista as an upgrade to Windows XP if you boot the system using the Vista DVD?
22. What file system does Vista use for the Windows volume?
23. Are you required to enter the product key during the Vista installation? During the XP installation?
24. After a Windows installation, what is the easiest way to determine that you have Internet access?
25. How many days do you normally have after a Vista or XP installation to activate the OS?
26. In which folder does Vista Home Premium, 64-bit version, install 32-bit programs?
27. In which folder does Vista Home Premium, 64-bit version, install 64-bit programs?
28. What mode of operation can be used to correct a problem with a Windows 98 application installed on a Windows Vista computer?
29. What is the difference between the two installation programs, Winnt.exe and Winnt32.exe?
30. What is the maximum character length of a path (folders and filenames) that will carry forward into a Windows XP installation?

>> THINKING CRITICALLY

1. You are planning an upgrade from Windows XP to Windows Vista. Your system uses a network card that you don't find listed on the Microsoft Windows Vista list of compatible devices. What do you do next?
 - a. Abandon the upgrade and continue to use Windows XP.
 - b. Check the Web site of the NIC manufacturer for a Windows Vista driver.
 - c. Buy a new network card.
 - d. Install a dual boot for Windows XP and Windows Vista and only use the network when you have Windows XP loaded.

2. You have just installed Windows Vista and now attempt to install your favorite game that worked fine under Windows XP. When you attempt the installation, you get an error. What is your best next step?
 - a. Purchase a new version of your game, one that is compatible with Windows Vista.
 - b. Download any service packs or patches to Windows Vista.
 - c. Reinstall Windows XP.
3. If you find out that one of your applications is not supported by Windows Vista and you still want to use Vista, what can you do to solve this incompatibility problem?
4. Is it possible to install Windows Vista on a system that does not have a DVD drive? Explain your answer.

>> HANDS-ON PROJECTS

PROJECT 12-1: Preparing for Windows Vista

Use the Microsoft Web site www.microsoft.com/windows/compatibility to research whether a home or lab PC that does not have Windows Vista installed qualifies for Vista. Fill in the following table and print the Web pages showing whether each hardware device and application installed on the PC qualify for Vista.

Hardware Device or Application	Specific Device Name or Application Name and Version	Does It Qualify for Windows Vista?
Motherboard or BIOS		
Video card		
Modem card (if present)		
Sound card (if present)		
Printer (if present)		
Network card (if present)		
CD-ROM drive (if present)		
DVD drive (if present)		
SCSI hard drive (if present)		
Other device		
Application 1		
Application 2		
Application 3		

PROJECT 12-2: Preparing for an Upgrade

On a PC with Windows XP or an earlier version of Windows installed, access the Microsoft Web site (www.microsoft.com) and locate and run the Vista Upgrade Advisor to find out if the PC is ready for a Windows Vista installation. Make a list of any hardware or software components found incompatible with Vista, and draw up a plan for getting the system ready for a Vista upgrade.

PROJECT 12-3: Updating Windows

On a Windows Vista or XP system connected to the Internet, click **Start, All Programs, and Windows Update**. Click **Check for updates**. This takes you to the Microsoft Web site, which searches your system and recommends Windows updates. Print the Web page showing a list of recommended updates. For a lab PC, don't perform the updates unless you have your instructor's permission.

PROJECT 12-4: Install and Run Microsoft Virtual PC

Go to the Microsoft Web site (www.microsoft.com) and download Virtual PC. Install Virtual PC on your computer. Use it to install either Windows XP or Vista. You do not have to activate the OS and you will have 30 days to use it before it will not work. You can use the installation in the next 30 days as you work through the projects using Windows XP or Vista in the next few chapters of this book.

PROJECT 12-5: Installing Windows Components

Using Windows XP, log on with Administrator privileges and install a Windows component. What component did you install? List the steps you used to install the component.

PROJECT 12-6: Using the Internet for Problem Solving

Access the support.microsoft.com Web site for Windows Vista or XP support. Print one article from the Knowledge Base that addresses a problem when installing Windows Vista or XP.

PROJECT 12-7: Installing Windows Vista or XP



Caution

This project will erase everything on your hard drive. Do not do it if you have important data on the hard drive.

Prepare your hard drive for a clean installation of Windows Vista or XP by formatting the hard drive. Follow the instructions in the chapter to install Windows Vista or XP. Write down each decision you had to make as you performed the installation. If you get any error messages during the installation, write them down and list the steps you took to recover from the error. How long did the installation take?

>> REAL PROBLEMS, REAL SOLUTIONS

REAL PROBLEM 12-1: A Corrupted Windows Installation

As a PC support technician for a small organization, it's your job to support the PCs, the small network, and the users. One of your coworkers, Jason, comes to you in a panic. His Windows Vista system won't boot, and he has lots of important data files in several locations

on the drive. He has no idea in which folder some of the files are located. Besides the applications data he's currently working on, he's especially concerned about losing e-mail addresses, e-mail, and his Internet Explorer Favorites links.

After trying everything you know about recovering Windows Vista, you conclude the OS is corrupted beyond repair. Based on what you have learned in this and previous chapters, list the steps you would take to reinstall Windows Vista and recover all the data that Jason needs.

REAL PROBLEM 12-2: Troubleshooting an Upgrade

Your friend, Thomas, has upgraded his Windows 2000 desktop computer to Windows XP. After the installation, he made many unsuccessful attempts to connect to the Internet using his dial-up modem. The modem just refuses to work, and he has turned to you for help. He tells you the internal modem came installed on the original PC and is a Smart Link 56K modem by Uniwill Computer Corporation. Do the following to plan your troubleshooting approach:

1. List the questions you should ask Thomas to help diagnose the problem.
2. List the steps you would take if you were sitting at the computer solving the problem.
3. What do you think is the source of the problem? Explain your answer.