CHAPTER 12

Installing and Updating Windows Operating Systems

A common task that any A+ technician needs to know is how to install or upgrade Windows. Chapter 11, "Introducing Windows Operating Systems," mentions some of the basic requirements for different versions of Windows. In this chapter, you'll learn about different methods of installing Windows, and supported upgrade paths.

Exam 220-802 objectives in this chapter:

- 1.1 Compare and contrast the features and requirements of various Microsoft Operating Systems.
  - Upgrade paths – differences between in place upgrades, compatibility tools, Windows upgrade OS advisor
- 1.2 Given a scenario, install, and configure the operating system using the most appropriate method.
- Boot methods
  - USB
  - CD-ROM
  - DVD
  - PXE
- Type of installations
  - Creating image
  - Unattended installation
  - Upgrade
  - Clean install
  - Repair installation
  - Multiboot
  - Remote network installation
  - Image deployment

- Load alternate third party drivers when necessary
- Workgroup vs. Domain setup
- Time/date/region/language settings

- 1.4 Given a scenario, use appropriate operating system features and tools.
  - Other
    - User State Migration tool (USMT), File and Settings Transfer Wizard, Windows Easy Transfer
- 4.6 Given a scenario, troubleshoot operating system problems with appropriate tools.
  - Common symptoms
    - RAID not detected during installation

REAL WORLD **HAVE YOU EVER INSTALLED AN OPERATING SYSTEM?**

Teaching IT classes over the years, I've been a little surprised at how many students have never installed an operating system from scratch. I realize it seems daunting if you've never done it before, but it's not a difficult task.

Also, after you install one operating system, you'll find that it is relatively easy to install any operating system. For example, after you've installed Windows 7, you'll find it's easy to install Server 2008 R2 when it comes time to expand your knowledge.

I strongly encourage you to actually go through the steps of an installation to experience it. If you don't have a spare system, install one of the free virtualization products such as Microsoft Virtual PC or Windows Virtual PC and install a 32-bit version of Windows in a virtual environment. There's no substitute for experience.

Installing and Upgrading Windows

When a new operating system is released, it's common to upgrade existing systems to take advantage of the new capabilities. In some cases, organizations perform clean installations of the new operating system. Before starting, it's important to ensure that the hardware is compatible. Chapter 11, "Introducing Windows Operating Systems," listed the system requirements for different operating systems. For example, Windows 7 requires at least 1 GB of RAM for 32-bit systems and at least 2 GB of RAM for 64-bit systems.

It's important to know the difference between a clean install and an upgrade. The following sections go a little deeper, but briefly, the primary differences are as follows:

- **Clean install.** Windows is installed as a fresh installation. It does not include any applications or settings from previous installations. Windows 7 calls this a Custom installation.

- **Upgrade.** This is an installation on a system with an existing operating system. Supported programs and settings in the previous operating system will be included in the new installation.

NOTE **PROGRAMS AND APPLICATIONS**

The terms *programs* and *applications* mean same thing. For example, Internet Explorer is a program that is also called an application. End users commonly refer to them as programs, but IT professionals often call them applications. You'll see the term applications used in the A+ objectives most often.

Clean Install

An installation is often referred to as a clean installation. This helps emphasize the point that the installation starts fresh.

Applications and settings from any previous installation are not included in the new installation. For example, if a user had the game "Age of Empires" installed on Windows and then did a new installation, the game would not be included in the custom installation.

There are two types of new installations:

- **Bare metal installation.** This is an installation on a system with no software or operating system on it. For example, if a system's hard drive failed and had to be replaced, you could do a bare metal installation after replacing the hard drive.
- **Install on existing system.** If the system already has an operating system installed, you can perform a clean install over it. None of the applications that worked in the previous operating system will work in this new installation. In some instances, it is possible to preserve the previous operating system and create a dual-boot system.

Dual-Boot System

A *dual-boot* system is one that can boot to multiple operating systems. For example, you can have a system running Windows XP and then do a custom install of Windows 7 on the same computer. When you're done, the system can boot to either Windows XP or Windows 7.

NOTE **MULTIBOOT SYSTEM**

It is possible to add multiple operating systems to a computer, making it a multiboot system. However, you'll often hear technicians refer to systems as dual-boot systems even if they can boot to three or more operating systems.

After creating the dual-boot system, users will see a screen similar to Figure 12-1 when they boot. They can use the Tab key to choose which operating system to start. If they choose Earlier Version Of Windows, it will boot to that version of Windows. If they choose Windows 7, it will boot to Windows 7.

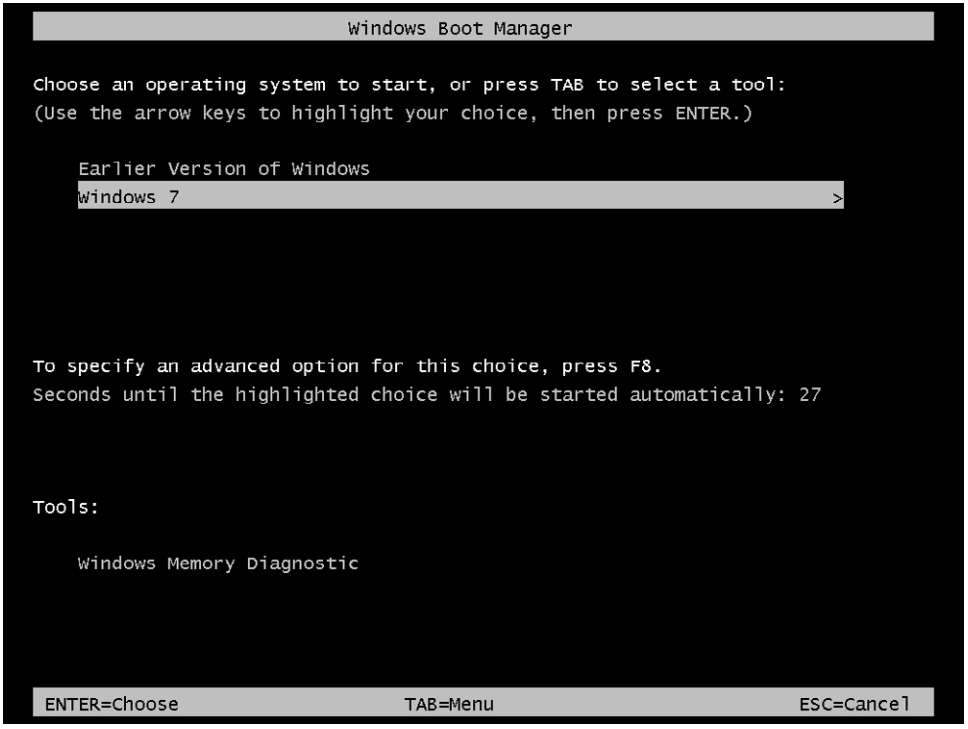


FIGURE 12-1 Dual-boot menu.

The menu gives users some time (typically 30 seconds) and will automatically boot to the default operating system. In Figure 12-1, the default operating system is Windows 7, and it will boot to Windows 7 in 27 seconds. The user can press the Tab key or use the Up and Down Arrows to select different choices, and then press Enter to start it.

There are two important rules you need to follow when using any dual-boot system:

- Always install operating systems on different partitions.
- Always install the newer operating system last.

EXAM TIP

Dual-boot systems should always be installed on different partitions, and newer operating systems must be installed after earlier operating systems. If these rules aren't followed, one or both of the operating systems will stop working.

If you install two operating systems on the same partition, they will corrupt files on the other operating system when they are booted. For example, if Windows 2000 is running on the C partition and you installed Windows XP on the same partition, Windows XP would corrupt Windows 2000 after you booted into it once or twice. If you were able to boot into Windows 2000, it would corrupt Windows XP.

If you install Windows 7 on the same partition as in previous installation, it will detect the previous installation and move data and settings to a folder named Windows.old. You won't be able to boot to the previous operating system anymore. If you're running Windows XP on the C partition, you can install Windows 7 on the D or E partition as long as it exists.

The second point to remember when creating a dual-boot system is to install the newer operating system first. A newer operating system is aware of the older operating system and preserves critical files. However, an older operating system isn't aware of newer operating systems and often corrupts critical files.

For example, if you install Windows XP first and Windows 7 last, Windows 7 recognizes Windows XP and preserves critical files needed by Windows XP. However, if you install Windows XP after Windows 7, it doesn't recognize files needed by Windows 7 and deletes or overwrites them. In many cases, Windows 7 will no longer be bootable. There are advanced methods to fix Windows 7 after installing Windows XP, but they can be avoided by installing Windows 7 last.

Upgrade

An upgrade will include files, settings, and applications from the previous installation. For example, if you have Microsoft Office on a Windows Vista Ultimate installation and you upgrade to Windows 7 Ultimate, Windows 7 would also include Microsoft Office. You wouldn't have to reinstall Microsoft Office.

An upgrade is often the easiest path for many users. The system retains most of the functionality of the previous operating system but gains the additional features of the newer operating system. However, there are limitations on what systems can be upgraded. The "Upgrade Paths to Windows 7" section later in this chapter provides more information.

When upgrading an earlier operating system to Windows 7 on the same partition, Windows 7 retains data from the previous installation in a folder named Windows.old. You can copy data from the Windows.old folder to anywhere else on your system.

EXAM TIP

The Windows.old folder holds data from a previous installation of Windows. It includes the Windows folder, the Program Files folder, and user profiles. The user profiles include data that a user might have stored, such as documents, music files, and more. If the previous installation was Windows XP, profiles are in the Windows.old\Documents and Settings folder. If the previous installation was Vista or Windows 7, the profiles are in the Windows.old\Users folder.

When you're satisfied that you no longer need the data in the Windows.old folder, you can delete the folder by using Disk Cleanup. Click Start, type in **Disk Cleanup**, and press Enter to start this program. Select Previous Windows Installation(s) and click OK to delete the folder.

File Systems

Chapter 16, "Understanding Disks and File Systems," covers file systems in more depth, but in short, there are two file systems you should understand when installing an operating system. Both of the following file systems provide access to files and folders stored on disks:

- **FAT32.** The File Allocation Table (FAT) 32-bit file system is a basic file system. It does not include security features such as the ability to assign permissions to files and folders. Technicians sometimes refer to FAT32 as simply FAT. However, FAT refers to an older 16-bit version of FAT, and FAT32 refers to the 32-bit version. Most USB flash drives and USB external drives use FAT32.
- **NTFS.** The New Technology File System (NTFS) is the preferred file system for Windows. It provides increased security and reliability compared to FAT32. You can assign permissions to files and folders, and it has additional features that improve its performance.

All versions of Windows support both FAT32 and NTFS for reading and writing files. However, some versions of Windows cannot be installed on FAT32 drives, as shown in Table 12-1.

TABLE 12-1 Installing Windows on FAT32 or NTFS

	Install on FAT32	Install on NTFS
Windows XP	Yes	Yes
Windows Vista	No	Yes
Windows 7	No	Yes

Quick Check

1. **What is not included in a new installation of Windows that is included in an upgrade?**
2. **What is a computer that can boot to two different operating systems called?**
3. **On which file system(s) can you install Windows 7?**

Quick Check Answers

1. **Existing applications and settings.**
2. **Dual-boot computer.**
3. **NTFS only. However, Windows 7 can read FAT/FAT32 disks after the installation.**

Methods of Installation

There are several methods you can use to install a copy of Windows. The three primary types of installations are as follows:

- With installation media such as a CD or DVD
- Over the network
- Using images

Each of the preceding methods allows you to install Windows on a computer with an existing operating system or on a new computer. However, even if you're installing it on a system with an existing operating system, it doesn't mean that it's an upgrade. Applications needed by the user will still need to be installed.

EXAM TIP

When preparing for the A+ certification, you should understand the basic methods of installing Windows. This includes installing Windows with installation media, performing an installation over the network, and using images.

Installation Media—CD or DVD

If you purchase a retail copy of Windows, it comes on a bootable CD or DVD with all the files you need. You can place the CD or DVD into your system, turn it on, and start the installation.

EXAM TIP

If your system doesn't boot to the DVD by default, you'll need to configure your BIOS to boot to the DVD first.

The "Installing Windows 7" section later in this chapter includes steps you can follow to install Windows 7 from scratch. During the installation, you can configure your hard drives by partitioning or formatting them as desired.

Remote Network Installation

In some cases, it's more convenient to install Windows over the network. You first copy all of the installation files to a folder on a server and then share the folder. Users can then connect to the network share and start the installation.

For example, you can copy the entire contents of the Windows 7 installation DVD onto a network share and install systems from there. Figure 12-2 shows a Windows XP system connected to a network share named Win7Install on a computer named power-PC. After connecting, users can double-click Setup to start the installation.

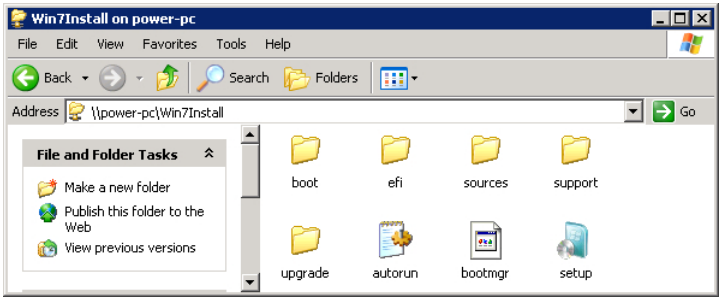


FIGURE 12-2 Connecting to a share over the network.

> ***NOTE*** **UNIVERSAL NAMING CONVENTION**
>
> **The path to a network share is *serverName**shareName*, also known as the Universal Naming Convention (UNC). If the server is named power-pc and the share name is Win7Install, the path is \\power-pc\Win7Install.**

Each system still needs a valid license key to activate it. However, the contents of the DVD are not tied to the license key, so a single DVD can be used with multiple license keys.

A drawback to this installation method is that it can consume a lot of network bandwidth. If the network is already busy, this added network traffic can slow network performance down for all users.

Image Deployment

A very common method of installing Windows today is with imaging. It saves a lot of time and reduces the cost of deploying systems. An *image* is a snapshot of a system, and after this snapshot is captured, it can be deployed to multiple systems.

For example, an administrator might need to install Windows 7 on 30 new computers. The administrator could do all 30 computers individually or could use imaging to speed up the process. Figure 12-3 shows an overview of this process.

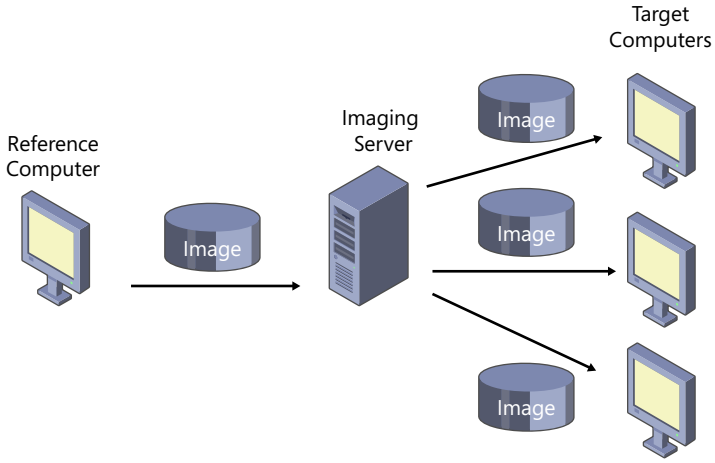


FIGURE 12-3 Installing Windows with imaging.

The administrator first installs Windows 7 onto a reference computer and then installs applications, such as Microsoft Office, based on the needs of the users. The administrator configures security and desktop settings and then tests the system to ensure that it works. After preparing the system, the administrator captures the image and stores it either on a server or on an external drive. After this image is captured, the administrator can deploy it to multiple computers.

NOTE **IMAGING TOOLS**

There are many tools you can purchase to create images, such as Symantec's Ghost. However, you can also use free tools provided by Microsoft, such as the Windows Automated Installation Kit (WAIK) or Windows Deployment Services (WDS). The WAIK includes the imagex and dism command-line tools that you can use to capture, manipulate, and deploy images. WDS is installed on a server.

It is common to store the image on an imaging server, but it's also possible to store the image on an external USB drive or even a DVD if the image is small enough. The administrator can then deploy these images to multiple systems.

After deploying the images, some setup is still required. For example, you can't have 100 computers all named Computer1, so each system needs to have a unique computer name. However, it is possible to automate this process.

EXAM TIP

Imaging is a valuable tool to deploy Windows to multiple systems. It reduces the time needed to configure and deploy systems, reducing overall costs.

All Windows 7 Installations Use Images

It's worthwhile pointing out that all Windows 7 installations actually use images. If you have a Windows 7 installation DVD, you can look in the sources folder and find the Install.wim file. This is a Windows Image file, and it includes all the files needed for different Windows 7 editions. For example, the Install.wim file normally includes images for Windows 7 Home Premium, Professional, and Ultimate.

There are separate Install.wim files for 32-bit versions and 64-bit versions of Windows 7. However, an installation DVD will be either a 32-bit version or a 64-bit version, so you won't have both versions on the same DVD.

Image files in the Install.wim file are the same types of images that can be created by using Microsoft tools such as WAIK or WDS.

PXE Clients

Many desktop systems include *preboot execution environment* (*PXE,* pronounced as *pixie*) components that are used during the imaging process. These systems include a network interface card (NIC) and Basic Input/Output System (BIOS) that can be configured to boot the system by using the NIC. That is, the system boots without any operating system on the disk drive. Instead, it connects to an imaging server over the network and downloads an image.

The overall steps of a PXE boot are as follows:

1. The system is turned on. Sometimes the user needs to press F12 to start the PXE boot process after it is turned on.
2. The system queries a Dynamic Host Configuration Protocol (DHCP) server for an IP address and other network configuration data.
3. The system contacts an imaging server.
4. An image is downloaded and installed onto the client. In some cases, this can be a predetermined image for the computer. In other cases, the user is prompted to log on and choose from a selection of images.

EXAM TIP

The two requirements for a PXE client are the PXE-aware NIC and BIOS that can be configured to boot via the NIC.

Installing from a USB

It's also possible to create a bootable USB flash drive and then copy the image onto the USB. A DVD holds 4.7 GB of data, so an 8-GB or larger USB flash drive will easily hold the data needed to boot from the USB and the image.

Sysprep

One of the potential problems with imaging is that you can have multiple computers with identical settings that should be unique. For example, the operating system identifies computers with a security identifier (SID), and the SID must be unique. If you have two or more computers with the same SID, you'll have problems. Similarly, computers need different computer names, although it's much easier to change the name of a computer than it is to change a computer's SID.

The *system preparation (Sysprep)* tool helps you avoid these problems by preparing a system for imaging. After you install Windows 7 on a reference computer, install appropriate applications, and configure it, you run Sysprep. Sysprep sanitizes the computer by removing the SID along with other unique settings.

You can find the Sysprep program in the C:\Windows\System32\Sysprep folder by default. Figure 12-4 shows the Sysprep tool with the recommended settings to prepare a system for imaging.

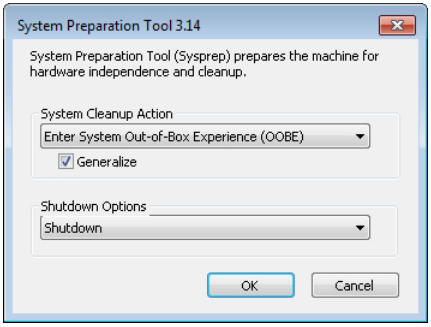


FIGURE 12-4 Running the system preparation (Sysprep) tool.

EXAM TIP

Sysprep must be run on Windows-based systems before capturing the image. It can be run from the GUI or from the command line. The typical command from the command line is Sysprep /oobe /generalize /shutdown.

The System Out-Of-Box Experience (OOBE) option, with the Generalize check box selected, resets the required settings to prepare the system for imaging. After running this, the system is shut down and the image is ready to be captured.

When you deploy this image to a system and boot it up, many of the settings will be automatically re-created for the new system. The installation program prompts the user to answer questions for other settings, such as the primary user name and the name of the computer.

Unattended Installation with Answer Files

You can use answer files to perform unattended installations. When an *answer file* is used, the installation program looks for the information it needs from it instead of prompting the user for the answer. If the answer isn't there, the installation program prompts the user for the answer.

The answer file can include all the answers so that the entire installation is automated. It's also possible to include the answers for part of the installation and prompt the user for other information. For example, an answer file could include information needed to format the hard drive as a single formatted partition but not include other information. The user won't be prompted to configure the drive but will be prompted to provide other answers.

You can use answer files when installing the operating system with installation media or over the network. You can also create an answer file to be used with images so that after an image is deployed, these settings are automatically answered without any user action.

The WAIK includes the System Image Manager (SIM), and the SIM is used to create answer files. The SIM has a lot of functionality. It can be used to add drivers and applications to an answer file, and administrators can configure many more details of Windows 7 installations by using this feature. For example, if administrators want to ensure that games are not included in an installation of Windows 7 Ultimate, they can specify this in the answer file. Many of the choices made available by using an answer file are not available when manually installing Windows 7.

Recovery Disc or Factory Recovery Partition

Many computer vendors provide a method for users to return their system to the way it was when it left the factory. This is very useful if the operating system becomes corrupted and can no longer boot. Sometimes the vendor provides a recovery CD or DVD, and other times the vendor installs a recovery partition.

Both methods allow the user to recover the system if Windows is no longer bootable. The differences are as follows:

- **Recovery Disc.** This is a bootable CD or DVD. It includes an image that can be reapplied to the computer to return it to its original configuration.
- **Recovery Partition.** The recovery partition is a partition on the hard drive. It holds all the files needed to recover the system if the system fails. This partition is often hidden, but instructions from the vendor show how to use it to recover the system.

IMPORTANT **POSSIBLE LOSS OF DATA WHEN USING RECOVERY DISC OR RECOVERY PARTITION**

In most cases, using the recovery disc or recovery partition will remove all data on the user's system. You should try to recover any data from the system before using one of these methods.

Quick Check

1. **What are the three primary methods of installing Windows?**
2. **What do you run to prepare a Windows-based system before capturing an image of it?**

Quick Check Answers

1. **With installation media, over the network, or with images.**
2. **Run Sysprep.**

Upgrade Paths to Windows 7

When considering upgrading a Windows operating system today, the primary system to which you'll upgrade is Windows 7. You can't buy retail versions of Windows XP or Windows Vista systems anymore, but Windows 7 is available. With that in mind, it's important to understand which operating systems can be upgraded to Windows 7 and which can't.

Two key points to remember are as follows:

- You can upgrade Windows Vista to Windows 7.
- You cannot upgrade Windows XP directly to Windows 7.

If desired, you can upgrade Windows XP to Windows Vista and then upgrade Windows Vista to Windows 7. However, most IT professionals recommend performing a clean install. You'll have to reinstall applications after the install, but you can migrate user data and settings from Windows XP to Windows 7.

NOTE **DATA MIGRATION TOOLS**

The two tools used to migrate user data and settings are the Windows Easy Transfer tool and the User State Migration Tool. Both are discussed later in this chapter.

Table 12-2 lists the available upgrade paths from earlier versions of Windows. If an upgrade path is not available, you must do a clean installation of Windows 7.

TABLE 12-2 Windows 7 Upgrade Paths

	Upgrade to Home Premium	Upgrade to Professional	Upgrade to Ultimate
From Windows XP	No	No	No
From Windows Vista Home Premium	Yes	Yes	Yes
From Windows Vista Business	No	Yes	Yes
From Windows Vista Ultimate	No	No	Yes
From 32-bit to 64-bit	No	No	No
From 64-bit to 32-bit	No	No	No

Note that when you're doing an upgrade from Windows Vista to Windows 7, you can upgrade only to a comparable edition or higher. For example, you can upgrade Vista Home Premium to Windows 7 Professional or Ultimate. You cannot upgrade Vista Ultimate to Windows 7 Home Premium because Home Premium is a step down from Ultimate. Likewise, you can't upgrade a consumer version of Windows 7 to a business version (that is, from Windows 7 Ultimate to Windows 7 Enterprise).

Upgrade vs. Upgrade

Upgrade means two different things depending on the context. One is related to the purchase price, and the other is related to how Windows can be installed.

Operating systems can be purchased at full retail price or at a reduced upgrade price if a user is running a qualified earlier version. For example, if users are running Windows 2000, XP, or Vista, they can purchase and install the upgrade version of Windows 7 at a reduced cost. The only difference between this version and the full retail version is that this version checks to ensure that users have an earlier version of Windows. If they don't have a qualifying version of Windows, they need to purchase the retail version at full price.

However, when doing the installation, they can do an upgrade only from Windows Vista to Windows 7. If they are running Windows 2000 or XP, the actual installation will be a clean install, not an upgrade.

Windows Anytime Upgrade

You can use *Windows Anytime Upgrade* to upgrade some editions of Windows 7 to a higher edition. This is primarily targeted at home users who decide that they want to increase the capabilities of Windows 7 installed on their systems. For example, if users are running

Windows 7 Home Premium edition and want to upgrade to the Ultimate edition, they can use Anytime Upgrade to do so.

> ***NOTE*** **ANYTIME UPGRADE AVAILABILITY**
>
> **Anytime Upgrade is available only for Windows 7 at this time. It was available for Windows Vista when Vista was being sold. However, Anytime Upgrade is no longer available for Windows Vista.**

Table 12-3 shows the available paths for Anytime Upgrades.

TABLE 12-3 Anytime Upgrade Paths

	Upgrade to Premium	Upgrade to Professional	Upgrade to Ultimate
From Windows 7 Starter	Yes	Yes	Yes
From Windows 7 Home Premium	No	Yes	Yes
From Windows 7 Professional	No	Yes	Yes

> ***EXAM TIP***
>
> **Windows Anytime Upgrade allows users to upgrade to a higher edition of Windows 7. Users purchase a license key, and the upgrade is completed without the installation DVD or downloading files.**

The upgrade process usually only takes about 10 minutes, and it doesn't require any additional installation media. Users can complete the process online by purchasing a new license key, or they can purchase a retail key at a store and enter it on their computers.

Any installation of Windows 7 includes all the appropriate files to enable all the features. However, some features are enabled or disabled based on the Windows 7 edition. When a computer is upgraded with Windows Anytime Upgrade, the additional features are enabled.

If you want to get more information about the Windows Anytime Upgrade, you can watch this short video: *http://windows.microsoft.com/en-US/windows7/help/videos/getting-more-out-of-your-pc-with-windows-anytime-upgrade*.

Repair Installation

In some extreme cases, Windows will no longer boot. One way to fix it is to complete a repair installation, sometimes called a *repair-in-place* upgrade. This reinstalls Windows and repairs any corrupted files. During the process, it is possible to upgrade the operating system from an earlier edition to a new edition. This will work only if the upgrade path is supported, as shown in Table 12-2.

A repair installation should be completed only when all other methods have been exhausted. Chapter 17, "Troubleshooting Windows Operating Systems," covers some tools you can use to troubleshoot and repair a system before trying this.

NOTE **LICENSE KEY NEEDED**

A repair-in-place upgrade is also called a repair installation. You'll need the installation CD or DVD as well as the license key to complete the installation.

When performing a repair installation on Windows 7, the upgrade process will attempt to save existing data in the Windows.old folder. You can often retrieve data from this folder after the repair, but don't count on it. You should first attempt to back up any data before attempting the repair.

Quick Check

1. **Can you upgrade Windows XP to Windows 7?**
2. **Can you upgrade a 32-bit edition of Vista to a 64-bit edition of Windows 7?**

Quick Check Answers

1. **No; this upgrade path is not supported.**
2. **No; you cannot upgrade 32-bit editions to 64-bit editions.**

Windows 7 Upgrade Advisor

If you're considering an upgrade to Windows 7 on an existing system, you might want to verify that your system doesn't have any compatibility issues. The *Windows 7 Upgrade Advisor* is a free tool that you can use to check a system. You can access the site to download it by clicking the Check Compatibility Online link from the initial Windows 7 installation screen. You can also download it from here: *http://windows.microsoft.com/en-us/windows/downloads/upgrade-advisor*.

NOTE **ONLINE UPGRADE ADVISOR**

You can also find the upgrade advisor from Microsoft's download site (*http://www.microsoft.com/download/*) by searching on Windows Upgrade Advisor. You can use this same method to find many free downloads provided by Microsoft.

If you're running the Upgrade Advisor on Windows XP, the installation wizard will ensure that .NET Framework 2.0 is installed. If it isn't installed, the installation wizard will prompt you for approval and will then download and install it.

After installing the Upgrade Advisor, you can run on it the system from the Start, All Programs menu. The advisor will check all devices that are connected to your system and turned on, so it's important to ensure that you have connected them and turned them on before starting the check.

Compatibility Tools

The following two websites are useful when checking compatibility for a Windows-based system:

- **Windows Compatibility Center.** This site lists hardware and software that is compatible with Windows. You can access it here: *http://www.microsoft.com/windows/compatibility*.
- **Windows Logo'd Products list (LPL)**. This site lists hardware devices that have been verified to work with different versions of Windows. It was previously known as the hardware compatibility list (HCL). You can access it here: *https://sysdev.microsoft.com/*.

If you want to get more information on software and hardware compatibility, check out this video: *http://windows.microsoft.com/en-US/windows7/help/videos/software-and-hardware-compatibility-in-Windows-7*.

Installing Windows 7

A simple job interview question might be, "Have you ever installed Windows 7?" You want to be able to reply, "Yes." It's not difficult, but you should be aware of what you'll see during the installation. This section describes the process.

Selecting Time/Date/Region/Language Settings

The first screen you'll see when installing Windows 7 is shown in Figure 12-5. You are prompted to choose settings based on where you're installing Windows 7.

FIGURE 12-5 Choosing the installation settings.

You'll normally have only one choice for the Language To Install field. However, the Time And Currency Format and the Keyboard Or Input Method fields will have multiple choices.

The time and currency format affects how the time, date, and currency are displayed. For example, July 4, 2013, using English (United States), is displayed as 7/4/2013. The same date, using English (Australia), is displayed as 4/07/2013. Keyboards have alternate keys to support different languages, and there are also several alternate layouts available. These settings can also be manipulated by using the Region And Language applet in the Control Panel after the installation completes.

During the installation, you'll also be prompted to verify the correct time and date and to set the time zone. If you want to modify this later, you can use the Date And Time applet in the Control Panel.

Choosing the Install Method

When installing Windows 7 from the installation DVD, you'll have two options, Upgrade or Custom (Advanced), as shown in Figure 12-6. You'll choose Upgrade if you're upgrading from an operating system that is included in the upgrade path. Custom (Advanced) is used for new installations.

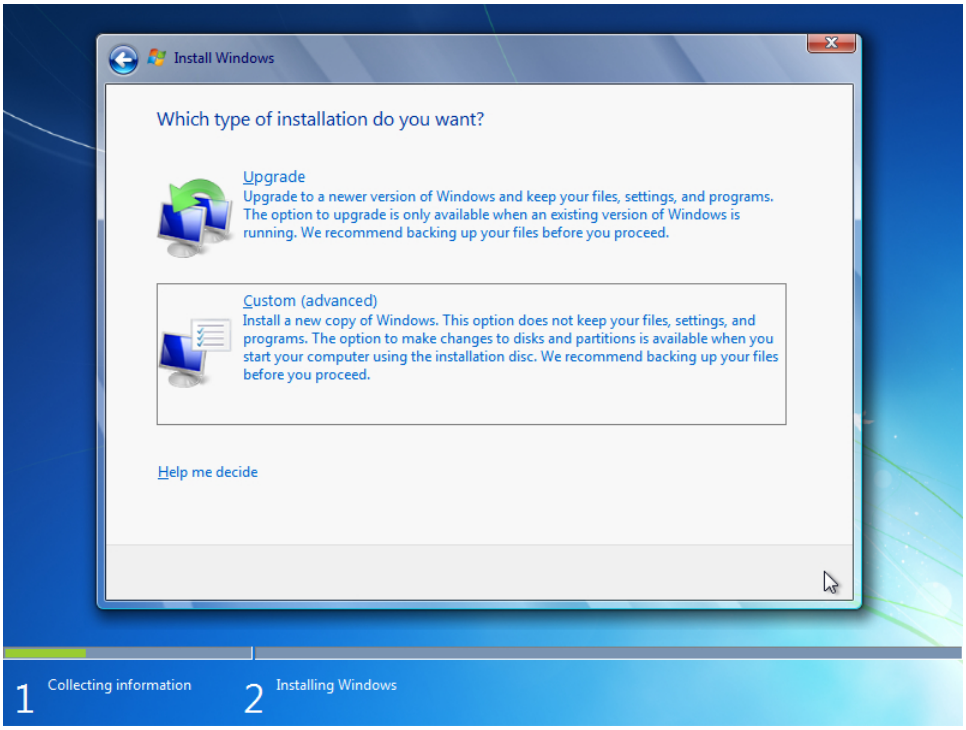


FIGURE 12-6 Choosing the type of installation.

You can also choose where to install the operating system. Most of the time, you'll have only a single disk, but sometimes you will want to create additional partitions. For example, if you plan on creating a dual-boot system, you'll need at least two partitions. Additionally, some people like to have one partition for the operating system and another partition for data. The installation program gives you several options for configuring the hard drive.

Drive Options

When installing Windows 7, you are prompted to identify where you want to install Windows. If you have a single drive with a single partition, the choice is clear; select it and move on. However, if you have multiple drives or multiple partitions on a drive, you'll have more choices. Additionally, you might want to manipulate existing drives and partitions during the installation.

Figure 12-7 shows the options that will appear if you click Drive Options (Advanced) on the Where Do You Want To Install Windows? screen.

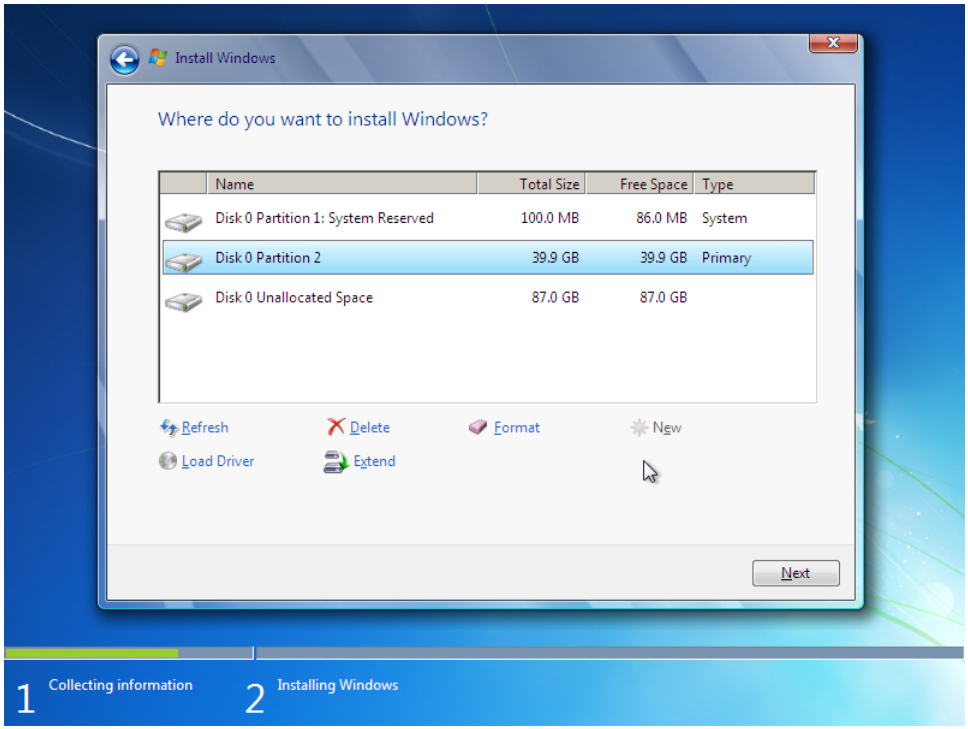


FIGURE 12-7 Manipulating partitions.

EXAM TIP

If your disk drive is not recognized by the installation program, you can load the required drivers by clicking Load Driver. This is often required if your system is using a hardware-based redundant array of independent disks (RAID) subsystem and the RAID is not detected during installation. Chapter 16 covers RAID configurations in more detail.

Figure 12-6 shows two partitions and 87 GB of unallocated space on the drive. The hard drive shown in the figure started as a single 127-GB disk listed as Disk 0 Unallocated Space. I clicked New and entered 40960 to create a partition of about 40 GB in size. The installation program also created the 100-MB system partition (described in the next section).

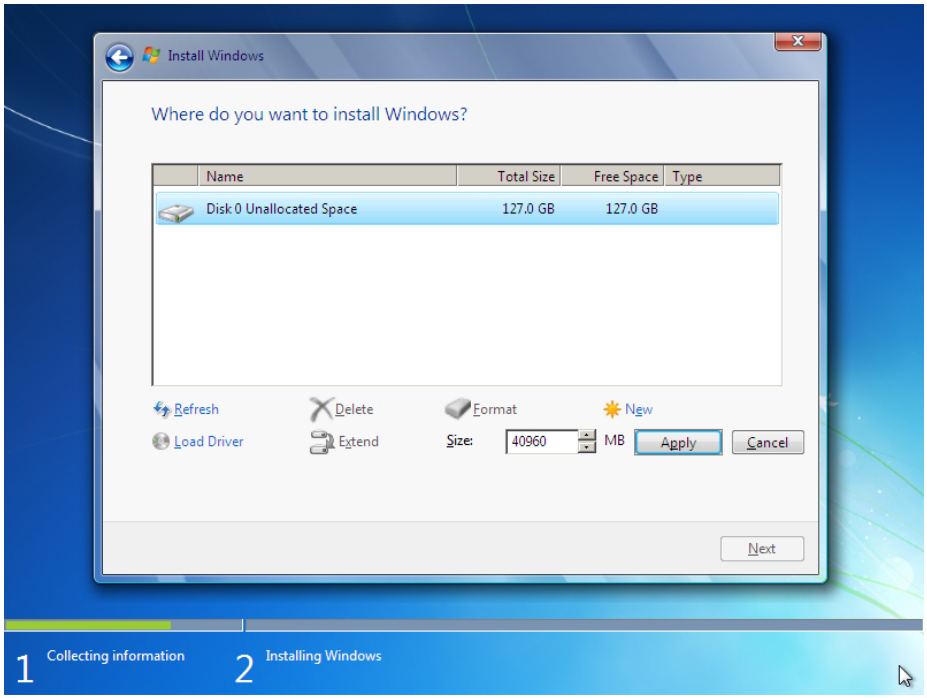
You have multiple options available to manipulate the hard drive, including the following:

- **Load Driver.** If your hard drive is not recognized, it might be that Windows 7 doesn't have a driver for it. For example, if your system is using a hardware-based RAID system, it might not be recognized until you load the driver. Drivers can be loaded from a floppy disk, CD, DVD, or USB flash drive.
- **Delete.** Choose this to delete an existing partition. All data and files on the partition will be lost, so be careful when choosing this option. The space from the deleted partition will be reported as unallocated space.

- **Extend.** You can extend an existing partition onto unallocated space. For example, in Figure 12-7, partition 2 is about 40 GB. You can extend this to include any amount of the 87 GB of unallocated space.
- **Format.** This option will format the partition with NTFS, and doesn't give you any options. All data on this partition will be lost.
- **New.** If your drive has unallocated space, you can click the unallocated space, select New, and create a partition. This gives you the option of choosing the size of the partition.
- **Refresh.** After making a modification to a drive, you might need to click Refresh to show the changes.

You can use the following steps to manipulate partitions. These steps assume that your hard drive is a single hard drive without any allocated space.

1. Click Drive Options (Advanced).
2. Click New.
3. In the Size text box, enter the desired size of the partition. For example, in the following graphic, I entered 40960 for a size of about 40 GB.



4. Click Apply.

5. If you want to delete a partition, do the following:
   A. Select the partition and click Delete.
   B. Review the warning and click OK. All the data on the partition will be deleted, and space from this partition will be added to the unallocated space.

IMPORTANT **DELETING OR FORMATTING A PARTITION DELETES ALL THE DATA ON THE PARTITION.**

You will not be able to recover data after deleting or formatting the partition.

6. If you want to format a partition, do the following:
   A. Select a partition and click Format.
   B. A warning appears indicating that any data stored on the partition will be lost. Review the warning and click OK. The partition is formatted with NTFS.
7. If you want to extend a partition to included unallocated space, do the following:
   A. Select a partition and click Extend.
   B. Enter the size that you want the partition to be after it is extended in the Size text box. The text box defaults to the maximum size. If you want to include all the unallocated space, leave this text box unchanged.
   C. Click Apply. A dialog box appears indicating that this is not a reversible action. Review the information and click OK.
   D. The partition will be resized to the size you specified, and the unallocated space will decrease by that amount.

System Reserved Partition

If there is unallocated space on a drive, Windows 7 often creates an additional 100-MB partition during the installation. This system partition doesn't have a drive letter but instead is listed as a system partition. In Figure 12-7, you can see the system partition listed first as Disk 0 Partition 1: System Reserved.

This partition started as an unallocated 127-GB disk. I clicked New and entered 39960 to create a partition, and the installation program automatically created the 100-MB system partition.

This partition is reserved for the following:

- **System boot files.** The partition includes bootmgr, bootsect.bak, and the boot folder. These files are used during the boot of the system. If the system partition is not created during the install, Windows 7 stores these files in the system partition.
- **BitLocker drive encryption.** This reserved space ensures that BitLocker can later be enabled on the system.

- **Windows Recovery Environment (WinRE).** The WinRE can be used to recover from many system errors after a failure.

The system partition isn't always created. For example, if you are installing Windows 7 on a system with another operating system as a dual-boot system, the installation program does not create the system partition. Similarly, if the drive does not have any unallocated space available, the install program does not create the system partition.

If the system partition was created during the installation of Windows 7, it should not be deleted. If a user does manage to delete it, you can recover the system by using Windows 7 recovery procedures and the installation DVD. If you want to ensure that the system partition isn't created, you can format your drive using 100 percent of the space before starting the installation of Windows 7.

> ***NOTE*** **ACCESSING COMMAND PROMPT DURING INSTALL**
>
> **An advanced method that you can use to prevent the system partition from being created is to have diskpart available at the command prompt. You can access the command prompt from within the installation program by pressing Shift+F10. Chapter 14, "Using the Command Prompt," covers the command prompt in more detail.**

Performing a Clean Install

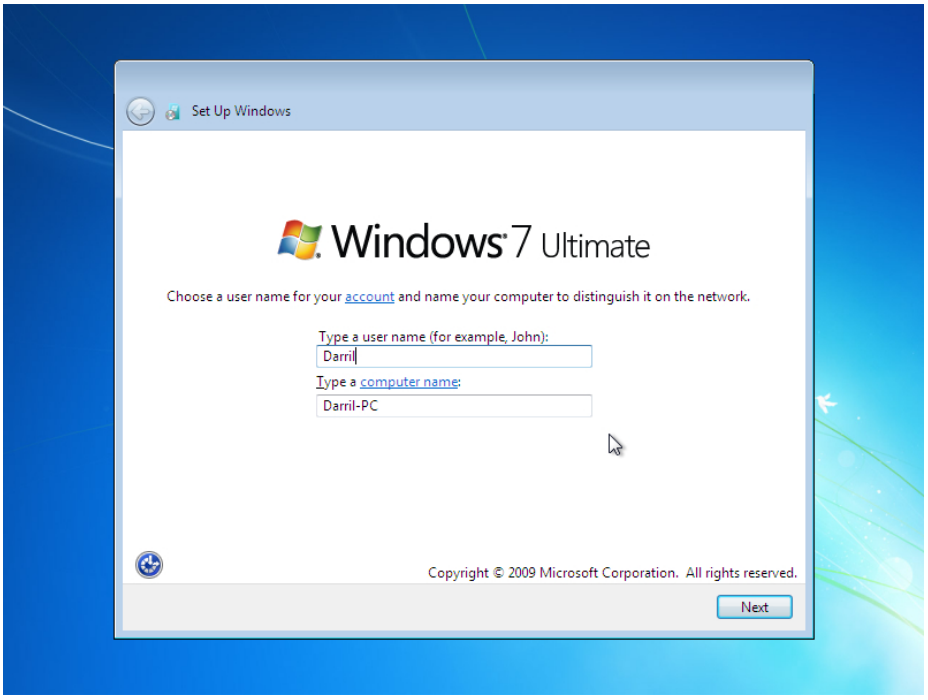
You can complete a clean installation of Windows 7 Ultimate with the following steps:

1. Place the installation DVD into the DVD drive and start the system. If the system is not configured to boot to the DVD, you might need to change the BIOS settings as described in Chapter 2, "Understanding Motherboards and BIOS."
   - **A.** If you're running another Windows-based system, you can also start the installation from within the operating system. Place the DVD into the DVD drive.
   - **B.** Browse to the DVD and double-click the setup program.
2. An installation screen will appear, similar to Figure 12-5. Select the appropriate language, time and currency format, and keyboard or input method based on your location. Click Next.
3. Click Install Now.
4. The Microsoft Software License Terms screen appears. Review the license terms and select I Accept The License Terms. Click Next.
5. When prompted to select an Upgrade or a Custom (Advanced) installation, click Custom (Advanced).
6. You'll be prompted to choose where to install Windows. You can manipulate the drive partitions by clicking Drive Options (Advanced) as mentioned in the "Drive Options"

section earlier in this chapter. Select the drive and partition where you want to install Windows 7 and click Next.

Windows 7 will begin the installation. It copies files to your system, starts installing them, and restarts on its own. This process can take some time, but it does not require any interaction until the Set Up Windows screen appears.

7. When the Set Up Windows screen appears, enter a user name. The name of the computer will be created automatically by appending the user name with -PC as shown in the following graphic. However, you can enter a different computer name if desired.



8. Click Next.

9. On the Password page, enter a password in the Type A Password (Recommended) text box and in the Retype Your Password text box.

> ***NOTE*** **PASSWORDS PROVIDE SECURITY**
>
> **You can skip the password, but as a security precaution, it's recommended to use a password to protect your user account from other users.**

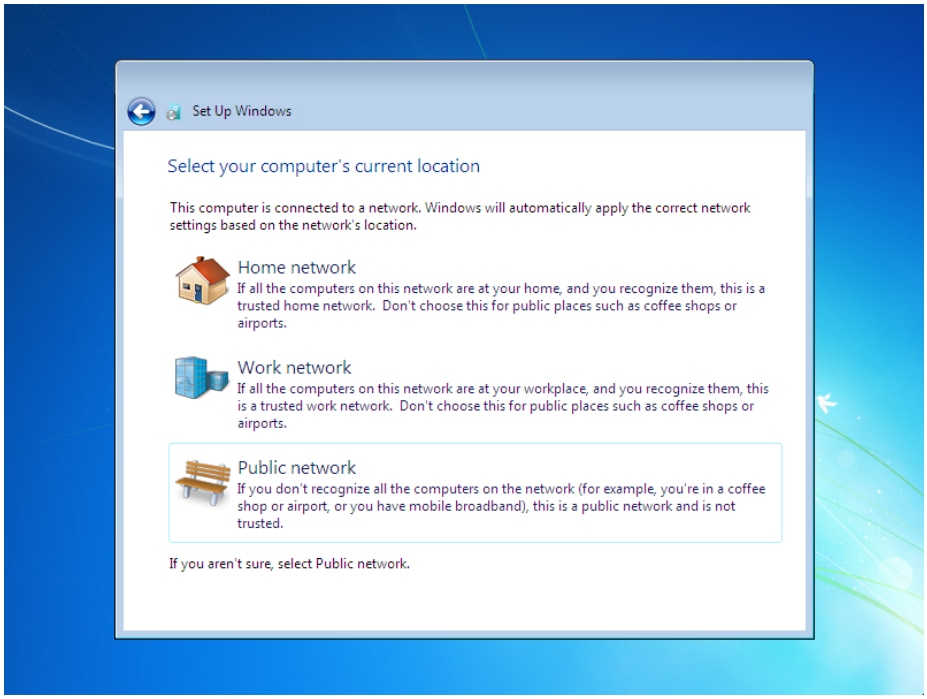
10. Type a word or phrase in the Type A Password Hint text box. If you forget your password, Windows will show you your hint.

11. On the Windows Product Key page, enter your product key. Click Next.

12. On the Update page, you can select Use Recommended Settings, Install Important Updates Only, or Ask Me Later. The recommended settings will automatically install updates and are the easiest settings for many uses. Select the option you want.

13. On the time and date page, select your time zone and click Next.

14. If your computer is connected to a network, you'll be prompted to choose your computer's location, as shown in the following graphic. Click on your location.



15. If you're connected to a home network that has a homegroup, you'll be prompted to enter the homegroup password. If you know it, you can enter the password here and click Next. If you don't want to join the homegroup, you can click Skip.

MORE INFO **CHAPTER 24, "CONNECTING AND TROUBLESHOOTING A NETWORK"**

Homegroups are explained further in Chapter 24, and networking concepts are presented in the Chapters 18 through 24. Also, your system will be automatically configured in a workgroup named WORKGROUP, but this can be changed. Chapter 18, "Introducing Networking Components," includes information about workgroups and domains, including steps to join a workgroup or a domain.

16. Windows 7 will complete the setup, and your desktop will appear. If you chose the recommended settings for updates, updates will automatically be downloaded. If prompted to restart the computer, click Restart Now.

Activation

Microsoft operating systems use an activation program. This helps verify to users that their copy of Windows is genuine. It also ensures that Windows has not been used on more computers than the Microsoft Software License Terms allow.

Windows 7 needs to be activated within 30 days after installation and can be activated over the Internet or by phone. Most installations are configured to automatically activate Windows when the users are online. Automatic activation begins trying to activate Windows three days after the user logs on for the first time.

The activation program pairs the activation key with details on the computer hardware. If you need to reinstall Windows 7 on the same computer, you can use the same key. However, if you try to install it on a different computer, the activation key will not work.

NOTE **HARDWARE REPLACEMENT MAY REQUIRE REACTIVATION**

If a hardware failure requires you to make a significant hardware change, you might need to reactivate the system. This can usually be completed over the Internet, but in some cases, users must call Microsoft to reactivate the system after replacing hardware.

Quick Check

1. **How can you add drivers for a disk drive during an installation of Windows 7?**
2. **What does the 100-MB partition created during some installations of Windows contain?**

Quick Check Answers

1. **Select Load Driver from the Drive Options screen.**
2. **System boot files, space for BitLocker, and the Windows Recovery Environment (WinRE).**

Upgrading Windows Vista

If you are upgrading Vista to Windows 7, you can start the installation program after booting into Windows Vista. Place the installation DVD into the drive, and if it doesn't start automatically, browse to the DVD and double-click the setup program.

This works very much like the clean installation of Windows 7 but with a couple of differences. First, instead of choosing Custom (Advanced) on the installation screen, you'll choose Upgrade. Second, the upgrade will try to keep all of the applications, settings, and data intact.

You should ensure that the current service pack is applied to Windows Vista before upgrading. Windows Service Pack 2 was released in April 2009, and it's unlikely that another service pack will be released for Windows Vista. Therefore, apply Service Pack 2 to Vista before upgrading.

> ***NOTE*** **BACK UP DATA BEFORE AN UPGRADE**
>
> **An upgrade is considered a risky operation. Everything will usually work fine, but things can go wrong. It's important to back up all important data before starting an upgrade.**

Migrating User Data

When you install a new operating system for a user who had a previous computer, the user often wants to keep data and settings from the previous installation. There are two valuable tools you can use to capture this information from the older version of Windows and reapply it the new version of Windows: Windows Easy Transfer and User State Migration Tool.

Each of these tools can capture a wide variety of data and settings, including the following:

- Files and folders
- User accounts and profiles
- Multimedia files such as photos, music, and videos
- Email files such as Outlook data files, including email, contacts, and calendar events
- Settings for Windows, applications such as Internet Explorer, and other programs

Each of these tools is described in the following sections.

> ***NOTE*** **MIGRATION NOT NEEDED FOR UPGRADE**
>
> **If you're doing an upgrade, there is no need to migrate the user data and settings. This information will be migrated to the newer version as part of the upgrade process.**

One of the tasks that these programs perform is to move the files and folders to locations that Windows 7 understands. For example, in Windows XP, the user profiles are stored in C:\Documents and Settings by default. In Windows 7, they are stored in C:\Users. If you migrate user accounts and profiles from Windows XP to Windows 7, the migration tool moves them to the C:\Users folder on Windows 7.

Windows Easy Transfer

You can use *Windows Easy Transfer* to transfer files and settings from one computer to another. For example, you can transfer files and settings from Windows XP to Windows 7, from Windows Vista to Windows 7, or even from one computer running Windows 7 to another computer running Windows 7.

Windows Easy Transfer enables you to migrate information by using one of the following methods:

- **An Easy Transfer cable.** This is a special cable that plugs into the USB port of the two computers. You can purchase it on the web or in an electronics store. It allows you to transfer files directly between the old computer and the new computer.
- **A network.** If the computers are connected to each other in a network, you can transfer the files over the network.
- **An external hard disk or USB flash drive.** You can transfer the files to an external disk or a flash drive connected to the old computer. You can later connect the drive to new computer and transfer the files from the drive.

Windows Easy Transfer is included in Windows 7. However, if you are migrating data from Windows XP or Windows Vista, you'll first need to download and install the appropriate Windows Easy Transfer tool onto that system.

For example, if you want to capture data from Windows XP, you can download Windows Easy Transfer for XP and install it on the Windows XP–based computer. Free versions are available for 32-bit and 64-bit Windows XP and for 32-bit and 64-bit Windows Vista. Go to the Windows download site (*http://www.microsoft.com/download*) and search for *Windows Easy Transfer for Windows XP* or *Windows Easy Transfer for Windows Vista,* based on your needs.

EXAM TIP

Windows Easy Transfer can capture data from Windows XP, Windows Vista, and Windows 7. It replaces the Files And Settings Transfer (FAST) wizard used with Windows XP.

You can start the Windows Easy Transfer tool on Windows 7 by clicking Start, All Programs, Accessories, System Tools, and selecting Windows Easy Transfer. Because this tool can access files and folders for all users on the system, you must have administrative access to run it.

This tool automatically selects files in the Documents, Music, and Pictures folder, and also gives you the option of selecting additional files and folders. Figure 12-8 shows the

screen you can use to select or deselect categories such as Documents or Music. If you click Advanced on this page, you can select individual files and folders to migrate.

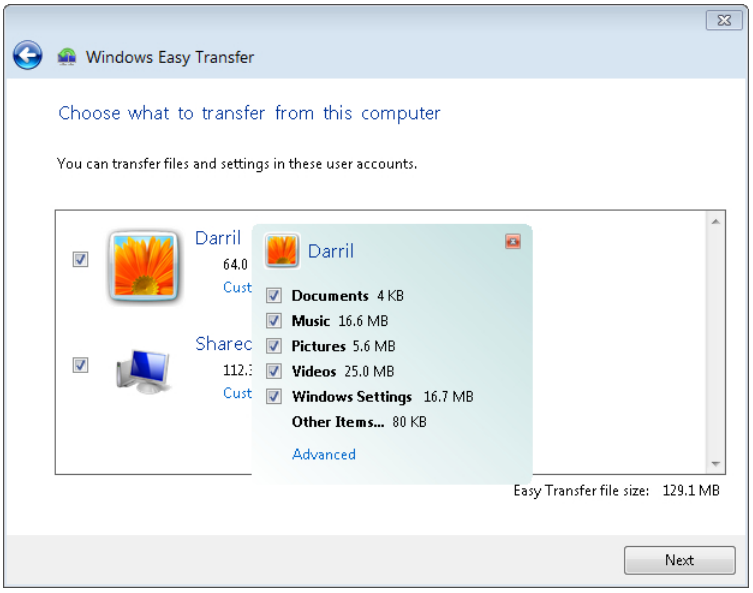


FIGURE 12-8 Windows Easy Transfer.

After you've run this program, you can view any reports it has created by running the Windows Easy Transfer Reports. The report identifies any files or settings that weren't transferred.

The Windows Easy Transfer tool doesn't transfer applications. However, if the application is installed on both the old and the new operating systems, it can transfer settings for the application. For example, if a user had specific settings for Microsoft Word, these settings would be migrated.

EXAM TIP

Windows Easy Transfer is used to transfer files and settings from earlier editions of Windows to Windows 7. It is easy to use when migrating a single user's computer, such as in a home or small office environment. You must be logged on with an administrative account to run it.

You can view a video of the Windows Easy Transfer tool in action here: *http://windows.microsoft.com/en-US/windows7/help/videos/transferring-files-and-settings-from-another-pc*.

User State Migration Tool

The *User State Migration Tool (USMT)* is a tool you can use to save user data and settings in larger environments. It includes the following two primary tools that run from the command line:

- **Scanstate.** *Scanstate* scans a system for data and settings on the computer and stores it in a migration file. You can store this migration file on an external USB drive or on a network share, as long as the computer can access the share.
- **Loadstate.** *Loadstate* reads the data from the migration file and loads it into the new operating system. You run loadstate after replacing the computer or completing a new installation.

The USMT is more difficult to run than the Windows Easy Transfer tool. However, a valuable benefit of running commands from the command line is that they can be scripted. That is, the command can be placed into a batch file and then run via automated methods.

Scanstate can capture a wide variety of data and settings, just like the Windows Easy Transfer tool. However, scanstate provides administrators with more options. Administrators can configure additional files to restrict what information is migrated or to include additional data.

Additionally, you can use scanstate to capture data from the Windows.old folder. That is, if Windows.old was created during the installation, you can use scanstate and loadstate to migrate data after you've installed Windows 7 over the older operating system.

EXAM TIP

The USMT is used to migrate data and settings in a business or enterprise environment. Scanstate captures information, and loadstate restores it. You need to use a version that is compatible with the newer operating system.

The USMT is included in the WAIK, available as a free download from the Windows download site (*http://www.microsoft.com/download*). Search for *Windows Automated Installation Kit Windows 7*.

File And Settings Transfer Wizard

The File And Settings Transfer (FAST) wizard is included in Windows XP. It was designed to migrate user files to Windows XP from another Windows XP system or from older operating systems such as Windows 2000 or Windows ME. You cannot use this to transfer files to Windows Vista or Windows 7. Instead, you need to use Windows Easy Transfer or the USMT.

You can access FAST by clicking Start, All Programs, Accessories, System Tools, and selecting Files And Settings Transfer Wizard.

Quick Check

1. Name two tools used for migrating user data and settings to Windows 7.
2. When running loadstate and scanstate, what will capture user data and settings?

Quick Check Answers

1. Windows Easy Transfer, and the User State Migration Tool (USMT).
2. Scanstate.

Chapter Summary

- A clean install does not include any applications or settings from a previous installation.
- An upgrade will include compatible applications and settings from a previous installation.
- Installation methods include using installation media, installing over the network, and using images.
- Before capturing an image, you must run Sysprep to remove any settings that need to be unique, such as the SID.
- You can upgrade Windows Vista to a comparable edition or higher of Windows 7.
- You cannot upgrade Windows XP to Windows 7. You cannot upgrade 32-bit versions to 64-bit versions.
- Windows Anytime Upgrade allows users to upgrade Windows 7 editions to editions with additional features.
- You can manipulate installed drives during an installation. This includes creating, extending, formatting, and deleting partitions.
- If the Windows 7 installation program doesn't recognize the drive, you can click Load Driver to load a driver. Drivers can be loaded from a floppy disk, CD, DVD, or USB flash drive.
- The Windows 7 installation often creates a 100-MB hidden system partition during the installation. This partition includes system boot files, space for BitLocker, and the WinRE, and it should not be deleted.
- Windows Easy Transfer allows you to migrate user data and settings from previous installations of Windows to Windows 7. Data can be transferred by using an Easy Transfer cable, over the network, or via an external hard disk or USB flash drive.

- USMT includes two tools used to migrate user data and settings in larger environments. Scanstate captures the user's data and settings from a previous installation. Loadstate will load this information onto Windows 7.

Chapter Review

Use the following questions to test your knowledge of the information in this chapter. The answers to these questions, and the explanations of why each answer choice is correct or incorrect, are located in the "Answers" section at the end of this chapter.

1. A user wants to create a dual-boot system running Windows XP and Windows 7. What is important to remember? (Choose two.)
   - **A.** Install Windows XP first.
   - **B.** Install Windows 7 first.
   - **C.** Install both operating systems on different partitions.
   - **D.** Install both operating systems on the same partition.
2. What is the difference between a clean installation and an upgrade?
   - **A.** A clean install includes applications and settings from previous installations.
   - **B.** An upgrade includes applications and settings from previous installations.
   - **C.** A clean installation starts by formatting the hard drive.
   - **D.** There is no difference; they are the same.
3. A user is running Windows XP and wants to upgrade to Windows 7. Is this possible?
   - **A.** Yes; the user can do an upgrade directly to Windows 7.
   - **B.** Yes, as long as the file system is formatted with NTFS.
   - **C.** Yes, as long as both versions are 32-bit versions.
   - **D.** No; XP cannot be directly upgraded to Windows 7.
4. A user has completed a clean installation on a single-partition system running Windows XP. The user wants to access data files that were stored in the user's My Documents folder. Is this possible?
   - **A.** No; existing files are deleted during a clean installation.
   - **B.** Yes; these file locations were not modified at all.
   - **C.** Yes; these files are in the Windows.old folder.
   - **D.** Yes; the user can reinstall Windows XP to access the older data files.

5. You are tasked with installing Windows 7 onto several systems within a network. How can you do this without carrying the installation media to each computer?
   - **A.** Create an image of the installation media and copy it to a bootable DVD.
   - **B.** Copy the contents of the installation DVD to a USB flash drive and install Windows 7 from this drive.
   - **C.** Copy the contents of the installation DVD to a USB external drive and install Windows 7 from this drive.
   - **D.** Copy the contents of the installation DVD to a network location and install Windows 7 from this drive.
6. You want to install Windows 7 with several applications onto 25 existing computers in your network. What can make this job easier?
   - **A.** Installation using the installation DVD.
   - **B.** Installation over the network.
   - **C.** Installation using images.
   - **D.** Installation using the USMT.
7. You are installing Windows 7 on a system, but the hard drive is not recognized. What should be done?
   - **A.** Replace the hard drive.
   - **B.** Install drivers for the hard drive from the Drive Options page of the installation program.
   - **C.** Reformat the hard drive from the Drive Options page of the installation program.
   - **D.** Repartition the hard drive from the Drive Options page of the installation program.
8. You are upgrading a home user's computer from Windows XP to Windows 7. What tool can you use to capture the user's data and settings?
   - **A.** File and Settings Transfer (FAST)
   - **B.** Windows Easy Transfer
   - **C.** USTM
   - **D.** Windows backup

Answers

1. **Correct Answer:** A, C
   - **A. Correct:** Windows XP should be installed first, and Windows 7 second.
   - **B. Incorrect:** If Windows 7 is installed first, Windows XP will overwrite key files needed by Windows 7 and Windows 7 won't be bootable.
   - **C. Correct:** Both operating systems should be installed on different partitions to prevent each from interfering with the other.
   - **D. Incorrect:** If they are installed on the same partition, they will modify and corrupt files in the other operating system.
2. **Correct Answer:** B
   - **A. Incorrect:** In a clean installation, the user must reinstall all the applications.
   - **B. Correct:** An upgrade includes compatible applications and settings from the previous operating system.
   - **C. Incorrect:** A clean installation can start with a freshly formatted operating system, but it can also be installed on an existing partition without the partition being formatted.
   - **D. Incorrect:** There are significant differences between a clean install and an upgrade.
3. **Correct Answer:** D
   - **A. Incorrect:** It is not possible to upgrade Windows XP directly to Windows 7, but it can be upgraded to Windows Vista and then to Windows 7.
   - **B. Incorrect:** Windows 7 requires NTFS for an installation, but XP still can't be upgraded to Windows 7.
   - **C. Incorrect:** You can upgrade 32-bit versions only to 32-bit versions, but XP cannot be upgraded to Windows 7.
   - **D. Correct:** You cannot upgrade Windows XP directly to Windows 7.
4. **Correct Answer:** C
   - **A. Incorrect:** Existing files are not deleted during a clean installation unless the drive is reformatted.
   - **B. Incorrect:** The files are moved to the Windows.old folder.
   - **C. Correct:** The Windows.old folder holds files from the previous installation, including files in the user's profile, such as the My Documents folder.
   - **D. Incorrect:** Reinstalling Windows XP won't provide access to older data files.

5. **Correct Answer:** D

   A. **Incorrect:** The installation DVD already includes an image of Windows 7 on a bootable DVD. If you create an image of this DVD, you'll still need to carry it to each computer.

   B. **Incorrect:** While it is possible to copy the contents to a bootable USB flash drive and install from there, you'll still need to carry the flash drive to each computer.

   C. **Incorrect:** While it is possible to copy the contents to a USB external drive and install from there, you'll still need to carry the USB drive to each computer.

   D. **Correct:** This step allows you to install Windows 7 from a network location.

6. **Correct Answer:** C

   A. **Incorrect:** Installing it using the DVD takes longer and doesn't address the installation of the applications.

   B. **Incorrect:** Installing it over the network takes longer and doesn't address the installation of the applications.

   C. **Correct:** If you create one image with all the required applications, you can then deploy this image to multiple computers.

   D. **Incorrect:** The User State Migration Tool helps migrate user data and settings, but it won't install Windows 7.

7. **Correct Answer:** B

   A. **Incorrect:** You should replace the hard drive only if it is faulty.

   B. **Correct:** If the hard drive is not recognized, you can install drivers for the hard drive from the Drive Options page of the installation program.

   C. **Incorrect:** You can reformat the hard drive from the Drive Options page, but not if it is not recognized.

   D. **Incorrect:** You can repartition the hard drive from the Drive Options page, but only if it is recognized.

8. **Correct Answer:** B

   A. **Incorrect:** The Files and Settings Transfer (FAST) wizard was used to transfer files to Window XP from earlier operating systems but is replaced with Windows Easy Transfer in Windows Vista and Windows 7.

   B. **Correct:** The Windows Easy Transfer tool can be used to capture and transfer user's data and settings.

   C. **Incorrect:** The User State Migration Tool (USMT, not USTM) can also be used to transfer files and settings, although it is harder to use than Windows Easy Transfer.

   D. **Incorrect:** Windows Backup utilities can be used to back up data, but it will not capture settings.