

INSTALLING AND UPGRADING WINDOWS

5



Installing and upgrading are processes that a common technician should know as a task. These processes start by analyzing the pre-installation tasks. In like manner, this chapter presents the different methods of installing Windows XP, Windows Vista and Windows 7.

The upgrading and recovering a disc part goes along with the installation section of this book.

In this chapter, you will learn how to :

- Install an operating system using the most appropriate method
- Perform different types of installation
- Activate the installed operating system
- Make Partition on a Hard disc drive
- Upgrade an operating system installed
- Recover a disc

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. 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.



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.

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.



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 4-1 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.

The menu gives users some time (typically 30 seconds) and will automatically boot to the default operating system. In Figure 5-1, 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.



Dual-boot Systems

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.

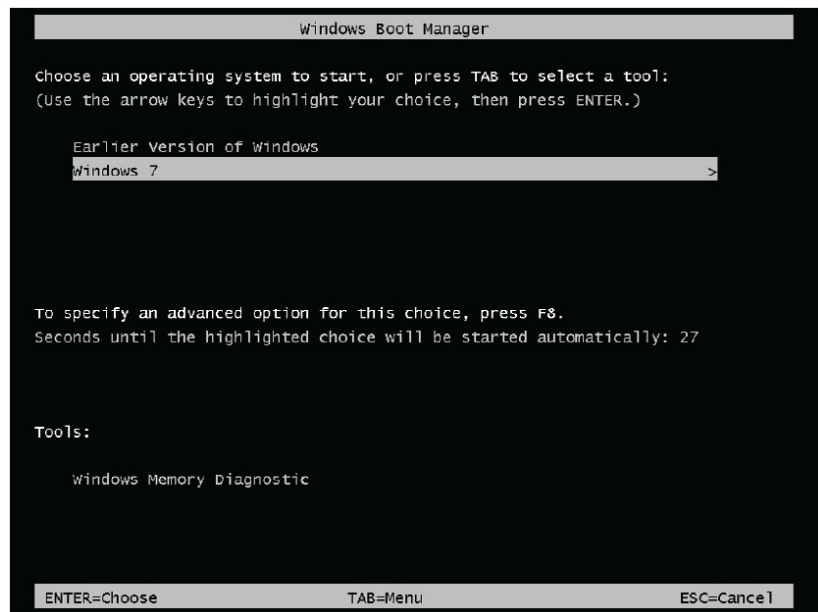


Figure 5-1 Dual-boot menu.

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.

File Systems

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 5-1.

Table 5-1 Installing Windows on FAT32 or NTFS

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

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.

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.



Programs and applications

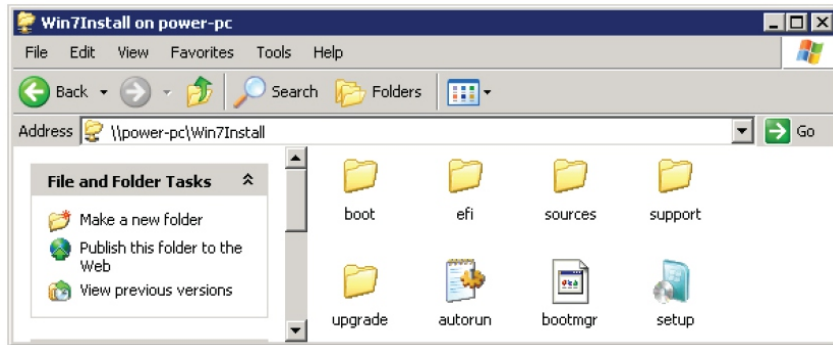
If your system doesn't boot to the DVD by default, you'll need to configure your BIOS to boot to the DVD first.

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 5-2 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.



Programs and applications

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`.

Figure 5-2 Connecting to a share over the network.

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.

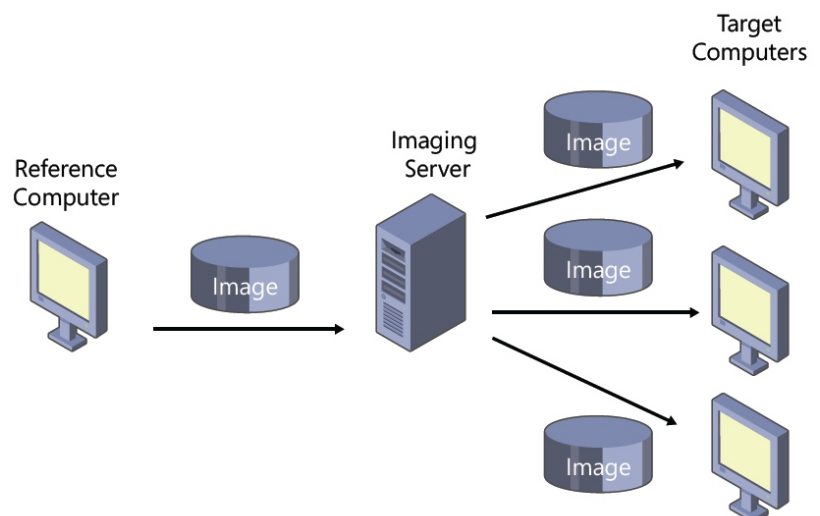
A drawback to this installation method is that it can consume a lot of network bandwidth. If the network is already busy, this added network traffic can slow network performance down for all users.

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 5-3 shows an overview of this process.

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.



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.

Figure 5-3 Installing Windows with imaging.

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



Imaging

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

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.

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 5-4 shows the Sysprep tool with the recommended settings to prepare a system for imaging.

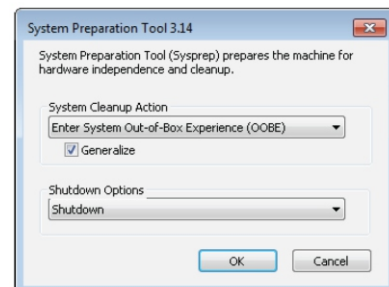


Figure 5-4 Running the system preparation (Sysprep) tool.



Running Sysprep

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.



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.

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Chapter 5

Laboratory Manual

INSTALLING AND UPGRADING WINDOWS



Laboratory Activities

- 5.01 Installing/Upgrading Considerations
- 5.02 Using Windows Easy Transfer
- 5.03 Upgrading a Windows Operating System
- 5.04 Performing a Clean Installation of Windows 7
- 5.05 Performing a Clean Installation of Windows XP
- 5.06 Post-Installation Tasks: Drivers and Updates

Chapter Analysis and Written Test

Lab Activity 5.01 Installing/Upgrading Considerations

Your client has asked you to upgrade his system to Windows 7 Professional 64-bit. He's currently running Windows Vista Business 64-bit, and everything works fine. He has the documentation that came with his system, which states that it has an ASUS P5E Deluxe motherboard. He isn't sure how fast the processor is, but he does know that the system has 1 GB of memory. Where do you start the planning process?

Learning Objectives

In this exercise, you'll become more familiar with using the Internet to help answer pre-installation questions.

At the end of this lab, you'll be able to

- access the Microsoft Support Web site
- determine the minimal requirements for a system installation
- determine whether to perform an upgrade installation or a clean installation

Lab Materials and Setup

The materials you need for this lab are

- a working PC
- a notepad and pencil

Let's Get the Lab Started

The first step in a successful Windows installation or upgrade is to determine whether the hardware meets the requirements of the new operating system. Your first stop in this process is the Microsoft Support Web site, found at <http://support.microsoft.com/findsolutions/>.

Microsoft has invested massive amounts of energy and time in building its Support Web site. Digging through all of the articles on the huge number of Web pages can be overwhelming, this site's usefulness is indeed true. Question that directly concerns a Windows operating system (or any Microsoft product, for that matter), one can check this site first, and surely find the things that you wanted to know. Searching for answers to a problem or question in the website, usually yields two or three new, sometimes unrelated results. As you do it frequently your search techniques will improve significantly. Most PC techs consider the Microsoft Support Web site an invaluable tool and resource.

Step 1 You'll first need to make sure that your client's computer is capable of running Windows 7 Professional 64-bit. To do this, you will need to attain a copy of the Windows 7 Upgrade and click Next.

When the file is downloaded, double-click it to start the installation process, and then follow the onscreen prompts to install the Upgrade Advisor. When it's finished installing, it should start up automatically, so just click the Start Check button and wait for it to complete.

Once the scan completes, it will show you detailed results of the scan (see Figure 5-1). This will tell you whether or not your system is Windows 7-capable. Further down the page, you can click on a set of links to view details about the system requirements, device compatibility, and program compatibility.