Chapter 1

Overview of Windows 7

In this chapter we'll explore new features and benefits of using Windows 7. You'll learn the differences between Windows 7 and previous client operating system software. We'll also examine the Windows 7 architecture.

All of the Windows 7 features are explained in greater detail throughout this book. This chapter is just an overview of many of the improvements and features.

This chapter will help us build a good foundation for the rest of this book.

In this chapter, you'll learn how to:

◆ Choose a client operating system

◆ Understand the newest features of Windows 7

◆ Explain the Windows 32-bit and 64-bit architecture

Introducing Windows 7

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

Overview of Windows XP

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

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

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

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

Windows XP made it easy to keep your machine up-to-date with the ability to schedule Windows updates with the Microsoft website (this feature is also included with Windows 7).

Automatic updates allows users to ensure that their machines are always running with the latest security patches and also with the latest versions of the XP system files.

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

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

Windows XP Service Pack 3

With the release of Windows XP Service Pack 3 (SP3), the operating system obtained some new benefits over the basic XP system. First, SP3 includes all previous service pack fixes and patches. It also includes all required security fixes. The following features are some of the enhancements of using SP3:

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

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

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

Overview of Windows Vista

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

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

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

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

Gadgets are mini-applications that allow you to easily perform and see some useful functions such as a clock, a slide show, an Internet feed, a calendar, weather reports, a stocks feed, currency exchange, and so forth. Many downloadable gadgets are available from Microsoft's website. Gadgets will be explained in detail in Chapter 5, ''Managing the Windows Desktop.''

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

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

FIGURE 1.2
Windows Vista Firewall
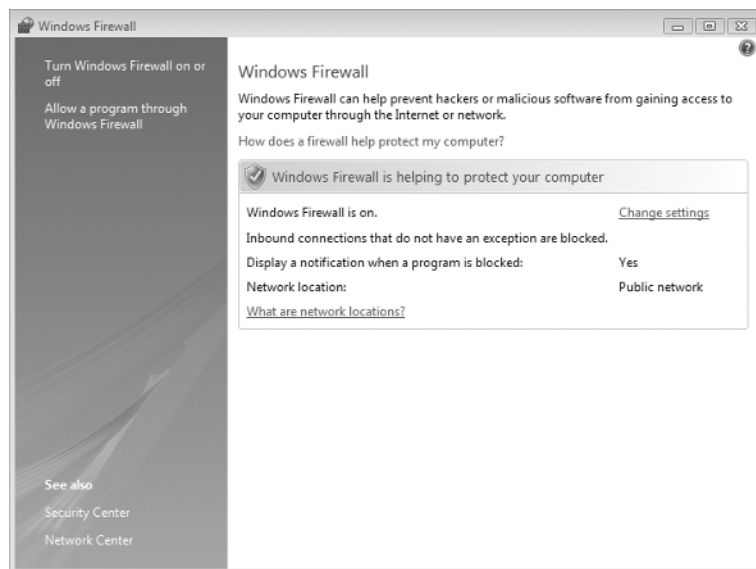
This improved version helps protect your computer system by restricting operating system resources if they operate in an unusual way. For example, let's say that you have an application that uses a particular port number to function properly. If that application tries to use a different port, the system stops the application, thus protecting other computer systems from possible problems. Windows 7 also includes the Windows Firewall.

Windows Vista User Account Control   Introduced with Windows Vista and Windows Server 2008, the User Account Control (UAC) allows a standard user to perform many functions without an Administrator account.

Windows Search   Windows Search, also included with Windows 7, allows you to search files or applications quickly and easily from anywhere in Windows Vista. One of the nice features of Windows Search is that when you begin typing in your search, all files, folders, and applications that have those letters start to appear. For example, if you start typing **No**, all files starting with *no*, including *notepad*, appear.

Live Icons   If you have a compatible video adapter and choose to run Windows Aero (also included with Windows 7), you have the ability to use live icons. Live icons are icons that show you what's in the application or folder when you hover your mouse over the icon.

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

TABLE 1.1:   Hardware Requirements (Non-network Installation)

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

PROCESSORS WITH WINDOWS VISTA

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

Now that we've looked at Windows XP and Windows Vista, it's time to look at some of the features of Windows 7.

Microsoft Vista did not take off the way that Microsoft had anticipated. Vista got a bad reputation from the get-go due to its high-end machine requirements. To allow Vista to run properly, you needed a dual-core processor and a beefed-up machine.

Many smaller IT departments did not even have dual-core processors in their servers, and they were not able to purchase all new client machines. In addition, Vista took much more hard disk space compared to its earlier cousin, XP. Therefore, many organizations held off installing Vista.

Microsoft heard the masses and started building a new operating system. What they came up with is now called Windows 7. Microsoft Windows 7 is the newest version of Microsoft's client operating system software. Microsoft has taken the best of XP and Vista and combined them into its latest creation.

Microsoft currently offers six versions of the Windows 7 operating system:

◆ Windows 7 Starter

◆ Windows 7 Home Basic

◆ Windows 7 Home Premium

◆ Windows 7 Professional

◆ Windows 7 Enterprise

◆ Windows 7 Ultimate

WINDOWS 7 REQUIREMENTS

I discuss in detail the Windows 7 hardware requirements in Chapter 2, ''Installing Windows 7.''

New Features in Windows 7

Windows 7 has improved on many of the problems that were plaguing Windows Vista. Windows 7 has a much faster boot time and shutdown compared to Windows Vista. It is also easier to install and configure.

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

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

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

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

FIGURE 1.3
Windows 7 Taskbar

Jump Lists   Jump Lists are a new feature to the Windows lineup. They allow you to quickly access files that you have been working on. For example, if you have the Microsoft Word icon in the taskbar, you can right-click it and it will show you all the recent files that you have been working with.

Another advantage to using Jump Lists is that you can preset certain applications, like Windows Media Player. For Internet Explorer, you could view all the recent websites that you have visited.

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

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

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

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

Windows XP Mode   Microsoft realizes that many organizations are running Windows XP. Also, many of these same organizations run older applications on these Windows XP systems. This is where Windows XP Mode comes into play. Windows XP Mode gives an organization that chooses to upgrade to Windows 7 the ability to run older Windows XP applications on their new system.

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

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

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

Device Stage   Device Stage is new to the Windows operating systems family. Device Stage enables you to connect a compatible device to your PC and a picture of the device appears. Device Stage allows you to easily share files between devices and computers.

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

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

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

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

FIGURE 1.4
Internet Explorer 8 lets you work faster and more efficiently.

Some of the new features of IE8 include:

Instant Search   This feature lets you quickly access search requests without typing the entire search criteria. As you start typing in the search request, you'll see suggestions for your search.

The advantage to the Instant Search is that it will also use your browsing history to narrow down the suggestions. After you see what you're looking for, you can make your selection without having to finish the query.

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

Microsoft Accelerators can be used for email, searching, and so forth. Also other websites like eBay and Facebook offer Accelerators for their services.

Web Slices   Web Slices are instances on a website that you want to access without accessing the site. For example, say you want to get stock quotes, sports scores, or auction items without visiting the sites; this is the advantage of using Web Slices. As the information that you are watching changes, the updates will show immediately.

🌐 **Real World Scenario**

CHOOSING AN APPROPRIATE OPERATING SYSTEM

Your client wants to stay on the leading edge of technology, but they may not have the money to replace all of their equipment. In this case, you have to convince the client that it is better to slowly migrate their equipment.

Try presenting a timeline to your customers that shows the migration to Windows 7. Your clients will be happy and that gives you the time needed to perform the migration.

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

Windows 7 Architecture

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

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

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

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

32-Bit vs. 64-Bit

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

Think of a large highway that has 32 lanes. Vehicles can travel on those 32 lanes only. When traffic gets backed up, they can only use these lanes, and this can cause traffic delays. But now think of a 64-lane highway and how many more vehicles can travel on that highway. This is an easy way of thinking of how 32-bit and 64-bit processors operate.

The problem here is that if you have a 32-lane highway, you can't just set up 64 vehicles on this highway and let them go. You need to have the infrastructure to allow for 64 vehicles by having 64 lanes. This is the same with computers. Your computer has to be configured to allow you to run a 64-bit processor.

So what does all of this mean to the common user or administrator? Well, it's all about RAM. A 32-bit operating system can handle up to 4 GB of RAM and a 64-bit processor can

handle up to 16 exabytes of RAM. The problem here is that Windows and most motherboards can't handle this much RAM.

None of this is new — 64-bit is just starting to become accepted with Windows, but other operating systems, like Apple, have been using 64-bit processors for many years.

So, should you switch all of your users to 64 bit? The answer is no. Most users do not need to have large amounts of RAM, and the real problem here is that many manufacturers do not have 64 bit–compliant components.

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

MEASUREMENT UNITS USED IN PROCESSORS

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

The Bottom Line

Choose a client operating system.   Choosing the right client operating system is a task that all IT professionals will have to face. The proper operating system is dependent on the client's hardware and job function.

Master It   You are a consultant who needs to set up a new Windows Server 2008 network for one of your clients. The end-user machines must be able to work on the new network, but new equipment is not possible due to financial constraints. How should you determine which operating systems will go on each machine?

Understand the newest features of Windows 7.   There are many new features in Windows 7, among them a new Windows Taskbar and Jump Lists, Preview pane, Windows Touch, XP Mode, simpler home networking, and Device Stage.

Master It   You are a consultant who needs to quickly set up a home network for one of your clients. Which operating system would you use?

Explain the Windows 32-bit and 64-bit architecture.   The terms 32-bit and 64-bit refer to the CPU, or processor. The number represents how the data is processed. It is processed as 2^{32} or 2^{64}. The larger the number, the larger the amount of data can be processed at any one time.

Master It   How do you decide which operating system, 32-bit or 64-bit, you want to assign to your users?