



# Windows Vista Product Guide

# Disclaimer

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The Windows Vista Product Guide provides a comprehensive overview of the innovative features and functions that make Windows Vista the next-generation Microsoft Windows client operating system and successor to Microsoft Windows XP. This guide also provides information about the benefits Windows Vista offers diverse users, as well as information about the different editions (SKUs, or stock-keeping units) available.

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# Section 1: Introduction to Windows Vista

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## Windows Vista brings clarity to your world so you can focus on what matters most to you

Today's digital world is both exciting and at times overwhelming. Although the tools for managing digital information have grown in capability and richness, they still require you to invest a significant amount of time learning how to use them. And the exciting possibilities technology brings to life are sometimes overshadowed by the frustrations. For example, you need to manually organize your information into folders and use naming conventions that the PC understands. Windows Vista is different. It puts you at the center and adapts to your needs, rather than the other way around. Plus a lineup of products designed with the distinct needs of key audiences in mind—general users, small businesses, and medium and large organizations—ensures that there is a product that meets the needs of you or your organization.

For general users, Windows Vista makes it easier, safer, and more entertaining to use your PC virtually anytime and anywhere. It lets you get things done and get on with life by making it easier and faster than ever to find, use, manage, and share information on a PC or on the Web. The security and health of your PC is automated with features such as Windows Defender that protect you against pop-ups, slow performance, and security threats caused by spyware or other unwanted software. Windows Media Center expands your ability to enjoy and share your television, photos, music, and games—in your living room or around your house—all with the click of a remote control. And you can take it all with you—you're free to enjoy your entertainment and connect and share information with friends or family on the go.

For businesses, Windows Vista helps ensure that your company's PCs are more secure, reliable, and low-cost to deploy and manage. It's built from the ground up for enhanced security and the new security features further protect information-based businesses from unauthorized, accidental, and intentional misuse of intellectual property. This reduces the time and expense associated with enforcing policies and recovering from violations. Windows Vista also helps your organization's efficiency by letting your users find, organize, and share information effectively and connect to people, information, and devices virtually anytime, anywhere.

## Section 2: Windows Vista Editions

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## 2.01 Windows Vista Editions

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Because different kinds of computer users need different features in their operating system, Microsoft offers multiple editions of Windows Vista, each oriented to the needs of specific types of customers.

With Windows XP, Microsoft offered six editions: Home Edition, Media Center Edition, Professional, Tablet PC Edition, Professional x64 Edition and, in selected emerging markets, Starter Edition. Windows XP Home Edition and Windows XP Professional targeted the needs of specific types of customers, while the other editions aligned with specific PC hardware configurations.

The different Windows Vista editions are optimized around key audiences—consumers, small businesses, and medium and large organizations—and usage scenarios within each of these segments. The main goal of the Windows Vista lineup is to more closely align the product offerings with customer demand, rather than forcing customers to make tradeoffs between functionality and form factors. Now, for each major customer segment—consumer, small business, and medium and large business—Microsoft offers at least one entry-level edition and a premium edition.

For consumers in developed markets, Home Basic is the entry-level edition and Home Premium is the more fully-featured, mainstream edition.

Windows Vista Business is the mainstream SKU for businesses of all sizes. Windows Vista Enterprise is the premium business SKU, focusing on the needs of organizations with global, highly complex IT infrastructures. Windows Vista Enterprise is available only to organizations with desktops covered by Software Assurance agreements or with a Microsoft Enterprise Agreement that includes the Windows desktop component.

For the most demanding consumer and small business users who want to take advantage of every available feature in Windows Vista, Microsoft offers Windows Vista Ultimate, which includes all operating system features available across all customer segments. While Windows Vista Ultimate is a valuable offering for a wide variety of customers, the most significant customer audience is the “dual user”—the person who wants to have a single PC for both work and personal activities including digital entertainment. Small business users might also choose it for the advanced data protection capabilities of Windows BitLocker Drive Encryption.

A goal of the Windows Vista SKU strategy is to make key technologies more broadly available. For example, Windows Media Center, a separate product edition of Windows XP, is now included as functionality in the Home Premium and Ultimate editions of Windows Vista. And Tablet PC, also a separate Windows XP edition, is now included as a capability in the Windows Vista Home Premium, Business, Enterprise, and Ultimate editions. One more example is 64-bit computing—with Windows Vista, you no longer need to choose between 32-bit and 64-bit versions. Both versions are available with every product edition except Starter.



The following are summaries of each SKU.

## CONSUMER SKUs

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Windows Vista Home Basic—A world above and beyond Windows XP.

Highlights include:

- Instant Search
- Windows Photo Gallery
- Windows Easy Transfer
- Internet Explorer 7
- Windows Defender

*Windows Vista Home Basic is the safer and easier Windows operating system for your basic home computing needs—from viewing photos to writing email and browsing the Internet. Compared to Windows XP, it is easier to set up and maintain, enables you to quickly find almost everything on your PC and the Internet, and provides more safety and security than any previous version of Windows. And like all editions of Windows Vista, it is compatible with the widest range of software, devices, and services that you use and trust.*



## Windows Vista™ Home Premium

Windows Vista Home Premium—easier, safer, and the best in entertainment—at home and on the go.

It includes all features available in Windows Vista Home Basic, plus:

- Windows Media Center
- Windows Aero user experience
- Windows DVD Maker
- Scheduled and Network Backup
- Next Generation Gaming support
- Tablet (Pen) and Touch support

*Windows Vista Home Premium is the preferred edition of Windows Vista for home desktop and mobile PCs. You'll see the difference with a breakthrough design, easy-to-use search and organization tools, and a safer online experience. The built-in Windows Media Center and new mobility features give you more ways to enjoy your favorite digital entertainment at home or on the go. And like all editions of Windows Vista, it is compatible with the widest range of software, devices, and services that you use and trust.*



## Windows Vista™ Ultimate

Windows Vista Ultimate is the flagship edition of Windows Vista across consumer and small business desktop PCs and mobile PCs. The primary user of Windows Vista Ultimate is the individual, such as a small business owner, who has a single PC to use both at home and at work. This edition includes all of the features available in Windows Vista Home Premium and Windows Vista Enterprise.

*Windows Vista Ultimate is the first operating system that combines the advanced infrastructure of a business-focused operating system, the productivity of a mobility-focused operating system, and the digital entertainment features of a consumer-focused operating system. For users who want their PC to be great for working at home, on the go, and at the office, Windows Vista Ultimate is the no-compromise operating system that provides it all.*

## BUSINESS SKUs



Windows Vista Business is the primary edition of Windows Vista for business desktop and mobile PCs. This offering crosses the small business, mid-sized business, and enterprise segments. This edition includes all the features available in Windows Vista Home Basic (with the exception of a small number of entertainment features), plus:

- Windows Aero user interface
- Windows Tablet PC capability
- Backup and Restore capability such as Complete PC Backup and Automatic File back up as well as Shadow Copy Backup
- Core business features such as Domain Join, Group Policy support, and Encrypting File System
- Small business-specific features such as Fax and Scan and Small Business Resources

*For small businesses, Windows Vista Business helps keep PCs running smoothly and securely, with less reliance on dedicated IT support. For larger organizations, Windows Vista Business provides dramatic new infrastructure improvements, enabling IT staff to spend more time adding strategic value to the business. Windows Vista Business also offers powerful new ways to organize, find, and share information, while helping people stay better connected in the office and on the road.*

### Business SKUs for Software Assurance Customers

Software Assurance customers receive the following benefits:

- Upgrade rights for future versions of Windows
- Rights to Windows Vista Enterprise or Windows Vista Ultimate
- Rights to Windows fundamentals for legacy PCs
- Purchase rights for the Desktop Optimization Pack



Windows Vista Enterprise is the premium edition of Windows Vista for business desktop and mobile PCs. This offering is available only to customers who have their PCs covered by a Microsoft Software Assurance agreement. In addition to including all of the features available in Windows Vista Business, highlights of this edition include:

- Windows BitLocker Drive Encryption
- All worldwide interface languages
- Licensing rights to four virtual operating systems
- Subsystem for UNIX-based Applications (SUA)

*Windows Vista Enterprise is designed for large enterprises and organizations with complex desktop infrastructures. It helps reduce the cost and complexity of deploying and managing PCs, improves reliability and security, and makes it easier to comply with information policies. Windows Vista Enterprise also increases information worker productivity and enables mobile users to stay better connected with customers, partners, and their business in the office or on the road.*



To learn more about the Desktop Optimization Package, please turn to [7.04: Desktop Optimization Package for Software Assurance](#) on page 295.

## Microsoft® Desktop Optimization Pack for Software Assurance

Microsoft Desktop Optimization Pack for Software Assurance is a dynamic desktop solution available to Software Assurance customers, which reduces application deployment costs, enables delivery of applications as services, and allows for better management and control of enterprise desktop environments.

- Advanced application virtualization
- Advanced group policies
- Advanced troubleshooting tools
- Advanced asset management

## CONSUMER SKU FOR EMERGING MARKETS



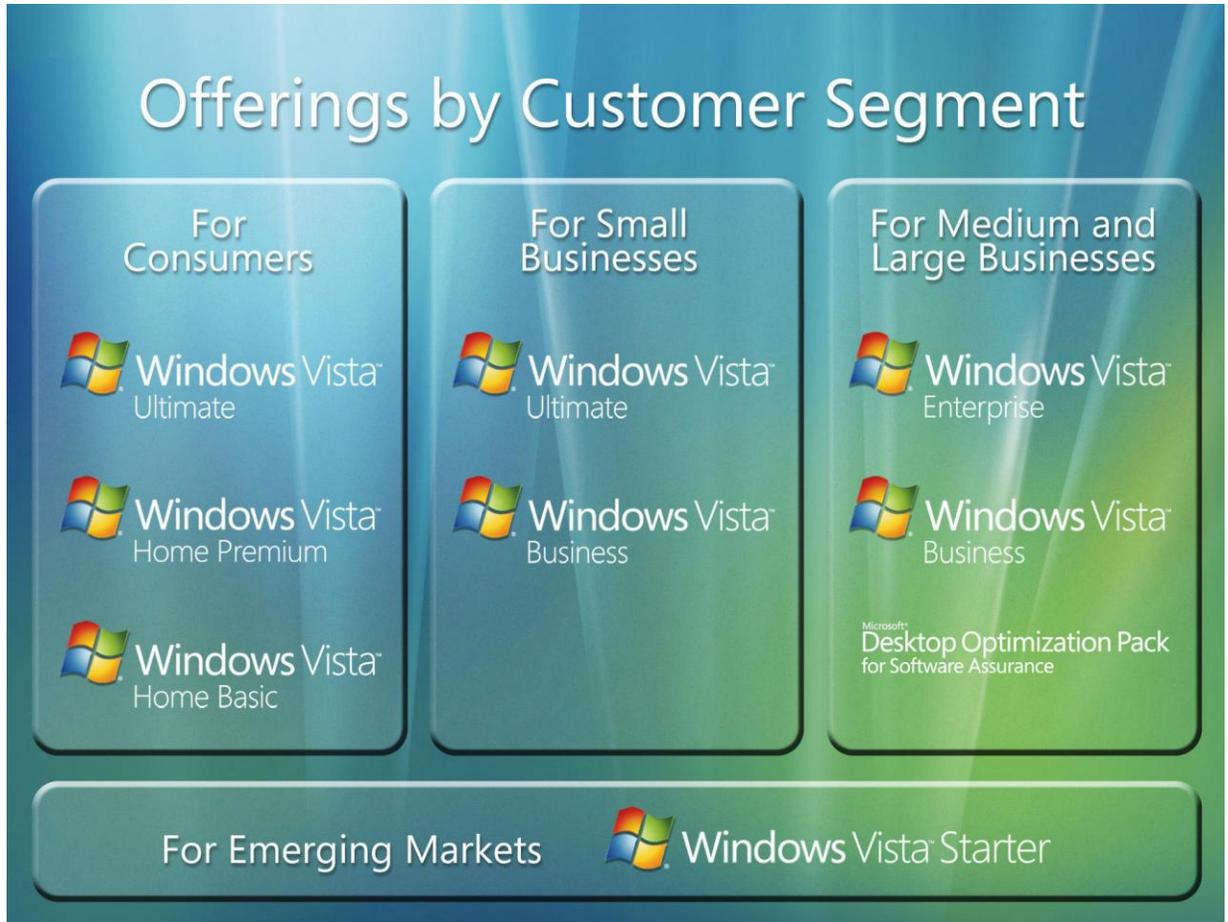
Windows Vista Starter is designed to empower families and entry-level users in selected emerging markets to take advantage of the social and educational benefits of personal computer technology and the Internet. Highlights of this edition include:

- Advances in security and reliability
- Search and Organize innovations
- Windows Vista Basic user interface
- 32-bit only operating system designed specifically for lower-cost computers

*Windows Vista Starter helps families in emerging technology countries be more successful by providing an affordable, easy-to-learn, and easy-to-use computing experience. It is compatible with the latest applications and devices and offers the reliability and security of the Windows Vista family of products.*

## Summary

The following table summarizes the SKUs by customer segment:



The following table summarizes the SKUs by sales channel:

## Offerings by Channel

Channel	Offerings
Packaged Product at Retail (FPP)	<ul style="list-style-type: none"> <li>Windows Vista<sup>®</sup> Ultimate</li> <li>Windows Vista<sup>®</sup> Business</li> <li>Windows Vista<sup>®</sup> Home Premium</li> <li>Windows Vista<sup>®</sup> Home Basic</li> </ul>
OEM Pre-Installed PCs & System Builder PCs	<ul style="list-style-type: none"> <li>Windows Vista<sup>®</sup> Ultimate</li> <li>Windows Vista<sup>®</sup> Business</li> <li>Windows Vista<sup>®</sup> Home Premium</li> <li>Windows Vista<sup>®</sup> Home Basic</li> </ul>
Volume Licensing	<ul style="list-style-type: none"> <li>Windows Vista<sup>®</sup> Business</li> </ul>
SA/EA Offerings	<ul style="list-style-type: none"> <li>Windows Vista<sup>®</sup> Enterprise</li> <li>Microsoft<sup>®</sup> Desktop Optimization Pack for Software Assurance</li> </ul>
Emerging Market Countries in Addition to Mainstream SKUs	<ul style="list-style-type: none"> <li>Windows Vista<sup>®</sup> Starter</li> </ul>

The following table compares the Windows XP SKUs with the Windows Vista SKUs:

## Offerings Comparison

Windows XP Offerings		Windows Vista Offerings	
 Windows XP Media Center Edition	 Windows XP Tablet PC Edition	 Windows Vista Ultimate	 Windows Vista Enterprise
 Windows XP Home Edition	 Windows XP Professional	 Windows Vista Home Premium	 Windows Vista Business
	 Microsoft Windows XP Professional x64 Edition	 Windows Vista Home Basic	
 Microsoft Windows XP Starter Edition		 Windows Vista Starter	

The following quick reference table compares the feature offerings of the different editions of Windows Vista:

## Comparing Offerings

Which Windows Vista Edition is Right for You?	Home Basic	Home Premium	Business	Ultimate
<b>Most secure Windows ever</b> with Windows Defender and Windows Firewall	✓	✓	✓	✓
<b>Quickly find what you need</b> with Instant Search and Windows Internet Explorer 7	✓	✓	✓	✓
<b>Elegant Windows Aero desktop experience</b> with Windows Flip 3D navigation		✓	✓	✓
<b>Best choice for laptops</b> with enhanced Windows Mobility Center and Tablet PC support		✓	✓	✓
<b>Collaborate and share documents</b> with Windows Meeting Space		✓	✓	✓
<b>Experience photos and entertainment in your living room</b> with Windows Media Center		✓		✓
<b>Enjoy Windows Media Center on TVs throughout your home</b> with Xbox 360 and other devices		✓		✓
<b>Help protect against hardware failure</b> with advanced business backup features			✓	✓
<b>Business Networking and Remote Desktop</b> for easier connectivity			✓	✓
<b>Better protect your data against loss or theft</b> with Windows BitLocker Drive Encryption				✓

## 2.02 Windows Vista Editions Feature Table

	Home Basic	Home Premium	Business	Enterprise	Ultimate
<b>Key Features for All Users</b>					
Welcome Center	Yes	Yes	Yes	Yes	Yes
User Account Control	Yes	Yes	Yes	Yes	Yes
Windows Security Center	Yes	Yes	Yes	Yes	Yes
Windows Defender	Yes	Yes	Yes	Yes	Yes
Windows Firewall	Yes	Yes	Yes	Yes	Yes
Internet Explorer 7 Protected Mode	Yes	Yes	Yes	Yes	Yes
Internet Explorer 7 Fix My Settings	Yes	Yes	Yes	Yes	Yes
Anti-phishing in Internet Explorer 7	Yes	Yes	Yes	Yes	Yes
Anti-phishing in Windows Mail	Yes	Yes	Yes	Yes	Yes
Windows Update	Yes	Yes	Yes	Yes	Yes
Service Hardening	Yes	Yes	Yes	Yes	Yes
Performance self-tuning and hardware diagnostics	Yes	Yes	Yes	Yes	Yes
Windows Experience Index	Yes	Yes	Yes	Yes	Yes
Next-generation TCP/IP stack	Yes	Yes	Yes	Yes	Yes
IPv6 and IPv4 support	Yes	Yes	Yes	Yes	Yes
Windows ReadyDrive	Yes	Yes	Yes	Yes	Yes
Windows Display Driver Model (WDDM)	Yes	Yes	Yes	Yes	Yes
Ad hoc backup and recovery of user files and folders	Yes	Yes	Yes	Yes	Yes
Scheduled backup of user files		Yes	Yes	Yes	Yes
Backup of user files to a networked PC or device		Yes	Yes	Yes	Yes
Incremental backup		Yes	Yes	Yes	Yes
Automatic backup scheduling		Yes	Yes	Yes	Yes
Complete PC Backup and Restore (image based)			Yes	Yes	Yes
Shadow Copy (restore previous versions of your documents)			Yes	Yes	Yes
Windows Vista Basic user interface	Yes	Yes	Yes	Yes	Yes

	Home Basic	Home Premium	Business	Enterprise	Ultimate
Windows Aero user experience (glass, dynamic windows, and a smoother-performing desktop)		Yes	Yes	Yes	Yes
Instant Search	Yes	Yes	Yes	Yes	Yes
File tagging	Yes	Yes	Yes	Yes	Yes
Stacking and Group By View.	Yes	Yes	Yes	Yes	Yes
Internet Explorer 7 with RSS feed support, tabbed browsing, and integrated search	Yes	Yes	Yes	Yes	Yes
.NET Framework 3.0	Yes	Yes	Yes	Yes	Yes
Windows CardSpace	Yes	Yes	Yes	Yes	Yes
Windows SuperFetch	Yes	Yes	Yes	Yes	Yes
Windows ReadyBoost	Yes	Yes	Yes	Yes	Yes
I/O prioritization	Yes	Yes	Yes	Yes	Yes
Automatic hard disk defragmentation	Yes	Yes	Yes	Yes	Yes
64-bit processor support	Yes	Yes	Yes	Yes	Yes
Maximum RAM supported with 32-bit system	4 GB	4 GB	4 GB	4 GB	4 GB
Maximum RAM supported with 64-bit system	8 GB	16 GB	128+ GB	128+ GB	128+ GB
Two processors (two processor sockets) support			Yes	Yes	Yes
Years of product support	5	5	10	10	5
<b>Key Features for Home Users</b>					
Windows Mail	Yes	Yes	Yes	Yes	Yes
Windows Calendar	Yes	Yes	Yes	Yes	Yes
Windows Sidebar	Yes	Yes	Yes	Yes	Yes
Windows Photo Gallery—for organizing, editing, printing, and sharing photos and videos	Yes	Yes	Yes	Yes	Yes
Themed slide shows		Yes			Yes
Windows Media Player 11	Yes	Yes	Yes	Yes	Yes
Native DVD playback		Yes			Yes
Windows Media Center—for music, photos, videos, live and recorded TV, and online entertainment		Yes			Yes
Windows Media Center—for recording and watching high-definition TV (U.S. and South Korea only)		Yes			Yes

	Home Basic	Home Premium	Business	Enterprise	Ultimate
Windows Media Center—CableCard support (U.S. only)		Yes			Yes
Support for Media Center Extenders, including Xbox 360		Yes			Yes
Windows Movie Maker	Yes	Yes	Yes	Yes	Yes
Windows Movie Maker HD		Yes			Yes
Windows DVD Maker (Video DVD Authoring and Burning)		Yes			Yes
Games Explorer	Yes	Yes	Yes	Yes	Yes
Updated games	Yes	Yes	Yes	Yes	Yes
New premium games		Yes	Yes*	Yes*	Yes
Parental Controls	Yes	Yes			Yes
Universal game controller support	Yes	Yes	Yes*	Yes*	Yes
Speech Recognition	Yes	Yes	Yes	Yes	Yes
Accessibility Settings and Ease of Access Center	Yes	Yes	Yes	Yes	Yes
<b>Key Features for Business Users</b>					
XPS Document support	Yes	Yes	Yes	Yes	Yes
Small Business Resources			Yes	Yes*	Yes
Windows Fax and Scan			Yes	Yes*	Yes*
Network and Sharing Center	Yes	Yes	Yes	Yes	Yes
Network Diagnostics and troubleshooting	Yes	Yes	Yes	Yes	Yes
Improved wireless networking	Yes	Yes	Yes	Yes	Yes
Wireless network provisioning			Yes	Yes	Yes
Improved peer networking	Yes	Yes	Yes	Yes	Yes
Improved VPN support	Yes	Yes	Yes	Yes	Yes
Improved power management	Yes	Yes	Yes	Yes	Yes
Simultaneous SMB peer network connections	5	10	10	10	10
Windows HotStart	Yes	Yes	Yes	Yes	Yes
Windows Mobility Center	Partial	Partial	Yes	Yes	Yes
Sync Center	Yes	Yes	Yes	Yes	Yes
Offline Folder support			Yes	Yes	Yes

	Home Basic	Home Premium	Business	Enterprise	Ultimate
Windows Tablet PC with integrated pen/digital ink input		Yes	Yes	Yes	Yes
Windows Tablet PC touch screen support		Yes	Yes	Yes	Yes
Windows Tablet PC handwriting recognition improvements		Yes	Yes	Yes	Yes
Windows Tablet PC usability and navigation improvements		Yes	Yes	Yes	Yes
Windows SideShow		Yes	Yes	Yes	Yes
Windows Meeting Space	View only	Yes	Yes	Yes	Yes
Improved file and folder sharing	Yes	Yes	Yes	Yes	Yes
Ad hoc backup and recovery of user files and folders	Yes	Yes	Yes	Yes	Yes
Scheduled backup of user files		Yes	Yes	Yes	Yes
Backup of user files to a network device		Yes	Yes	Yes	Yes
<b>Key Features for IT Professionals</b>					
System image-based backup and recovery			Yes	Yes	Yes
Encrypting File System			Yes	Yes	Yes
Desktop deployment tools for managed networks			Yes	Yes	Yes
Policy-based quality of service for networking			Yes	Yes	Yes
Windows Rights Management Services (RMS) Client			Yes	Yes	Yes
Control over installation of device drivers			Yes	Yes	Yes
Network Access Protection Client Agent			Yes	Yes	Yes
Pluggable logon authentication architecture	Yes	Yes	Yes	Yes	Yes
Windows BitLocker Drive Encryption				Yes	Yes
Support for simultaneous installation of multiple user interface languages				Yes	Yes
All worldwide user interface languages (36 languages total) available				Yes	Yes
Subsystem for UNIX-based applications				Yes	Yes
Application Compatibility features	Yes	Yes	Yes	Yes	Yes
File-based image format (WIM)	Yes	Yes	Yes	Yes	Yes

\* Feature is optional

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## 3.01 First Experience



### Computer setup

Windows Vista significantly simplifies the process of setting up a new computer. Users are asked to complete only the most essential tasks so they can get to their desktop as soon as possible and begin enjoying their new computer. Users can quickly review their language and country settings, and review and accept the Microsoft Windows and computer manufacturer license terms. They then create a user account with their username and password, and personalize their computer with a unique computer name and desktop wallpaper. After selecting automatic updates for Windows to help keep their computer up-to-date, and reviewing their date and time settings, users can view optional offers from the computer manufacturer and begin using their computer immediately.

### Welcome Center

As people begin using a computer for the first time, they typically complete a set of tasks to optimize the computer for their use. Such tasks include connecting to the Internet, adding user accounts for different people, and transferring files and settings from another

computer. Windows Vista includes Welcome Center, a screen that presents all of these tasks in one easy-to-find place so users can easily and quickly set up their computer and do so on their own schedule. Below the tasks for Windows is a pane where the computer manufacturer can list tasks and offers. Welcome Center automatically appears when the computer is used for the first time and can optionally appear on future starts as well.



## 3.02 Windows Easy Transfer

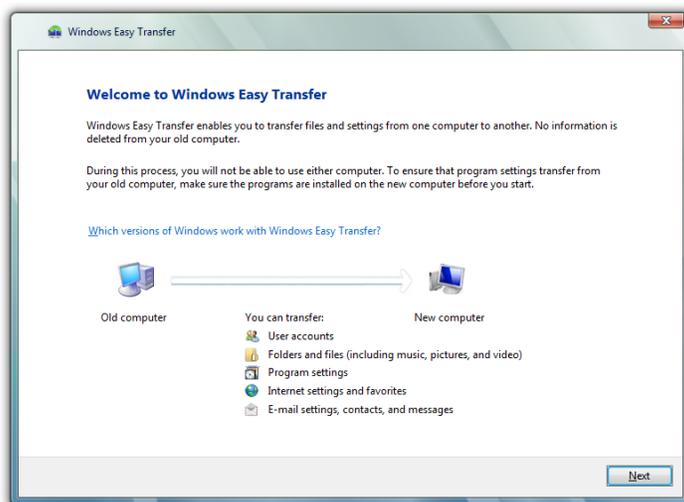


One of the most challenging experiences users have after purchasing a new computer is transferring their personal files, email, data files, media, and settings from their old computer to the new machine. This process can be so complex, time consuming, and daunting that people frequently request help from friends or relatives, and some never succeed in getting all their important data onto the new computer.

Windows Vista significantly simplifies this important process and makes transferring personal data easy and intuitive for mainstream computer users.

Windows Easy Transfer is a wizard that helps you transfer the data that is important to you, including user accounts; files and folders; program data files and settings; email messages, settings, and contacts; photos, music, and videos; Windows settings; and Internet settings. Programs (applications) are not transferred.

You can easily transfer your entire user account or all user accounts on the computer, or you can make custom selections of the data and folders to transfer. Windows Easy Transfer provides a number of ways for you to connect two computers to transfer your data.



These include:



- **Easy Transfer Cable.** This is a special USB cable that is designed to work with Windows Vista and Windows Easy Transfer. You can purchase this cable from selected computer manufacturers and retailers. You simply install a small piece of software on your Windows XP computer and then plug the cable into both computers. Windows Easy Transfer launches automatically and guides you through the transfer process. This is the easiest and fastest method and is recommended if you don't have a network. This solution is supported on Windows XP- and Windows Vista-based computers.
- **Home or small business network.** If you already have a wired or wireless network, this is a great way to transfer all of your data.
- **Removable hard drive.** If you own a removable hard drive, Windows Easy Transfer can copy your data to that drive and then copy data from that drive to your new computer.
- **CD and DVD.** Windows Easy Transfer can use a computer's CD or DVD burner to transfer user data. This is a great solution if you are moving only a small amount of data that can fit onto one disc.

With all of these options, Windows Easy Transfer provides an ideal transfer solution for every type of user. A novice computer user who is looking to replace a Windows XP–based computer with a Windows Vista–based computer can use an Easy Transfer Cable and in a couple of clicks transfer all of his personal data. A more advanced computer user who purchases her third computer can connect it to her home network and then select the specific folders, file types, and settings she wants to transfer.

Windows Easy Transfer enables users to transfer their data to Windows Vista–based computers from computers running Windows XP or Windows Vista. Transferring data to Windows Vista Starter is not supported, but existing users of Windows XP Starter Edition can receive guidance on performing a manual transfer.

### Windows Easy Transfer—Key Features

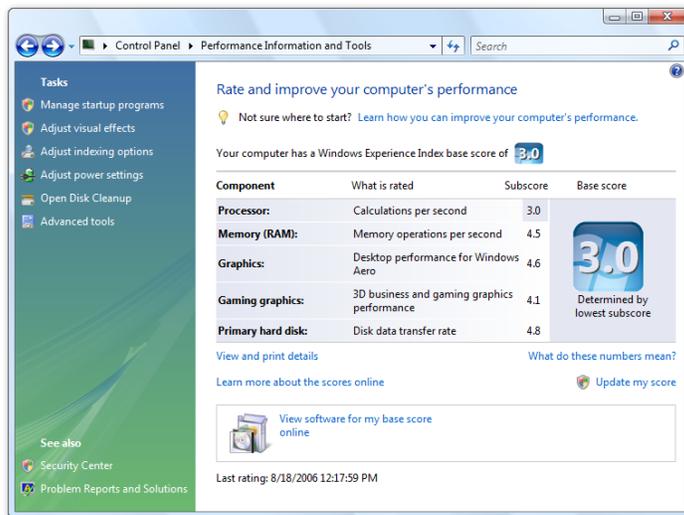
Feature	Brief Description
Network transfer	Users can securely transfer data across a wired or wireless network.
Removable storage	Data can be transferred and temporarily stored on a removable medium such as a CD, DVD, external hard drive, or flash drive.
Support for Easy Transfer Cable	An Easy Transfer Cable can easily connect two computers for data transfer. Plugging in the cable launches the wizard and results in a streamlined experience.
Windows Easy Transfer	Windows Easy Transfer can transfer user data such as user accounts; files and folders; program data file and settings; email messages, settings, and contacts; photos, music, and videos; Windows settings; and Internet settings.

## 3.03 Windows Experience Index



When you do advanced tasks with your PC, the performance capabilities of your PC hardware—the processor, memory, graphics card, and storage—can make a big difference. But understanding these capabilities and how they interact can be challenging.

Windows Vista introduces Windows Experience Index (WEI) to help you understand your PC's performance capabilities, and to ease the task of buying new PCs, hardware, and software.



Windows Experience Index is a simple, numeric system that rates how well your PC can run the performance-oriented features in Windows Vista, such as the new Windows Aero user interface, multiple monitors, high-definition TV, and personal video recording. The numerical rating can also help you match the right software to run on your PC.

The Windows Experience Index rating is determined during the installation of Windows Vista. The rating is computed by running a set of capability tests on five critical

hardware components:

Each test results in a capability score between 1 and 5.9 for the component. Since a PC's performance is limited by the lowest performing component, the overall test result, or "base score," for the PC is determined by the lowest of the five scores.

The rating system is particularly useful for consumers when:

- **Buying a new PC:** The WEI score of a PC can help you determine if it will be able to perform well in its intended use and take advantage of all of the capabilities of Windows Vista.
- **Upgrading a PC:** The WEI scores can be used to determine which PC component would be the most beneficial to upgrade and what performance change you might expect.
- **Buying software:** Microsoft is working with software developers to include the recommended Windows Experience Index score on software packages. When buying new software, consumers will be able to use this score to determine if their PC would be able to run the software well.

Retailers and PC, hardware, and software manufacturers can also use the Windows Experience Index to help customers shopping for PC hardware and software by:

- Displaying the Windows Experience Index of PC and components they sell
- Better inform customers about recommended system requirements needed to run their software

- Enabling customers to compare the performance rating of different products

## 3.04 User Interface: Navigation and Ease of Use



The PC has revolutionized the way we work, learn, play, and communicate. Central to helping people use their PC and manage their information is the user interface, which has evolved dramatically over the last several decades, from a C:\> prompt in MS-DOS to a more user-friendly, functional, and sophisticated interface.

Windows Vista introduces a breakthrough user experience that is visually exciting and intuitively designed to positively change the ways you use your PC, and it's the first Windows operating system that scales the user experience to the hardware capabilities of your computer.

The innovative ways of working with information in Windows Vista help you feel confident in your ability to view, find, and organize information, as well as manage your computing experience.

In particular, three attributes of the Windows Vista user experience stand out:



- New productivity tools bring clarity to the information on your computer. They let you see what's in files without having to open them, find applications and files instantly, navigate efficiently among open windows, and traverse wizards and dialog boxes with more confidence and certainty.
- You can enjoy a rock-solid visual experience, free of flicker, redrawing, hesitation, latency, and visual artifacts.
- Common window elements are refined so you can focus on content rather than on the computing interface, and visual elements are more informative, intuitive, and helpful.

### New user experiences, including the new Windows Aero

Windows Vista offers four levels of user experience—Basic, Windows Classic, Standard, and Windows Aero.

The Basic user experience in Windows Vista is the entry-level desktop experience, which is upgraded and streamlined compared to previous versions of Windows. This user experience features a refined Start Menu that enables you to instantly find and start anything on your PC. With the new, streamlined Explorers and supporting features such as integrated desktop search and Live Icons, you can more easily “see” your data and work with it more effectively. The Basic user experience can be used on any edition of Windows Vista, including Starter, and has no hardware requirements beyond the core Windows Vista system requirements.

Windows Classic includes all of the functionality in the Basic user experience, but with the Windows 2000 look and feel. This experience is available on all product editions, including Windows Vista Starter.

The **standard user** experience in Windows Vista is the mid-range desktop experience, which adds improved performance and reliability to the functionality of the Basic user experience. On computers equipped with graphics hardware that supports the new Windows Driver Display Model (WDDM), the advanced graphics technology in Windows Vista enables smoother window handling, increased stability, and a glitch-free visual experience. Standard will not run on Windows Vista Starter—it is only available for Home Basic edition customers who purchase a PC that is capable of running the Windows Aero experience. Windows Standard has the same performance and stability features as Windows Aero, but lacks all of the more visual features in Aero, like Windows Flip and Flip 3D. Thus, it is not available on Windows Vista Home Premium, Business, Enterprise, or Ultimate product editions.

Building on these advances, **Windows Aero** offers Microsoft Genuine Advantage customers a premium user experience on PCs with graphics hardware that supports WDDM. A noticeable new element of the Aero experience is the professional-looking, transparent glass design, with subtle effects such as dynamic reflections and smooth animations. The glass windows create an open, energizing environment and enable you to better focus on your content rather than on the surrounding interface. Two exciting new Aero features, Windows Flip and Flip 3D, let you confidently manage the windows on your desktop, arranging them in a visually striking yet convenient way. Beyond the new graphics and visual polish, the Windows Aero desktop experience performs as smoothly and professionally as it looks, providing a simple and high-quality experience that both delights and inspires users. Aero is available only on the Home Premium, Business, Enterprise, and Ultimate editions of Windows Vista. (More information about the advances in Windows Aero and user experience hardware requirements is included in the upcoming section on Windows Aero.)

## All Windows Vista User Experiences

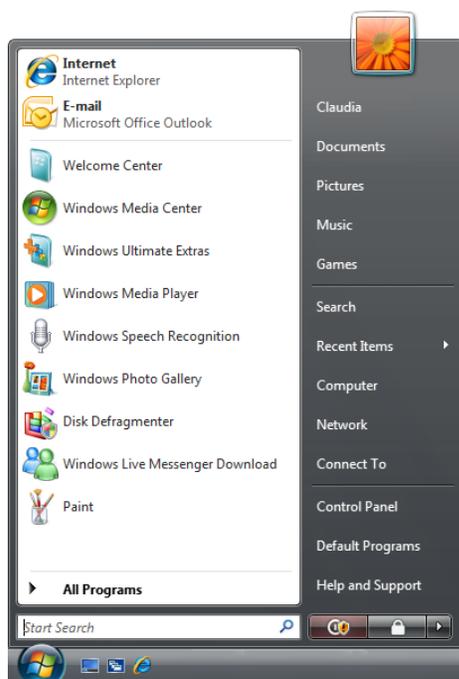
Each version includes the features of the lower version

		Ultimate Enterprise Business Home Premium	Home Basic	Starter
<b>Windows Aero</b> "Premium visuals, highest level of performance & polish"	<ul style="list-style-type: none"> <li>• Transparent Glass</li> <li>• Taskbar Thumbnails</li> <li>• Windows Flip</li> <li>• Windows Flip 3D</li> <li>• Smooth window animations</li> </ul>	✓	✗	✗
<b>Standard</b> "The Basic UI with increased performance"	<ul style="list-style-type: none"> <li>• Desktop Composition (smooth window re-draw)</li> <li>• Increased Stability</li> <li>• User Interface Scaling (higher DPI support)</li> </ul>	✗	✓	✗
<b>Basic</b> "Updated, streamlined"	<ul style="list-style-type: none"> <li>• Redesigned Start Menu</li> <li>• Streamlined Explorers</li> <li>• Live Icons</li> <li>• Preview/Reading Pane</li> <li>• New Wizard/Dialogs</li> </ul>	✓	✓	✓
<b>Windows Classic</b>	<ul style="list-style-type: none"> <li>• Windows 2000 look and feel</li> </ul>	✓	✓	✓

## A more intuitive user experience

For all users, Windows Vista is designed to provide easier access to the applications and information you want. From the Start Menu to the files in your Explorers, you can more easily access what you need and complete tasks more directly. The primary tools you use to navigate and work in Windows Vista are all part of the Basic user interface (as well as higher-level user interfaces). They include:

- **Start Menu.** Streamlined to make browsing (looking for a specific application, file, email, Control Panel applet, or Internet favorite) easier.
- **Explorers.** A streamlined and consistent set of tools for finding, viewing, and managing information and resources.
- **Dialog boxes and wizards.** Redesigned to be clearer and more functional, and easier for developers to customize to optimize the user experience.
- **Programs Explorer and Control Panel.** Programs Explorer (which replaces the Add or Remove Programs control) and Control Panel use the Explorer interface to help you more easily and quickly manage applications and PC settings.



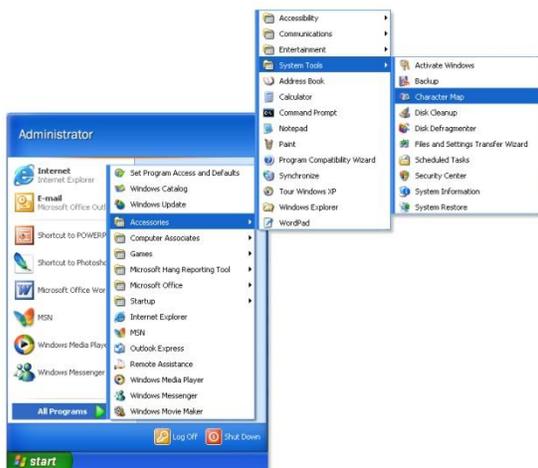
### Start Menu

The Windows Vista Start Menu has been streamlined to help make two tasks faster and easier: looking for a specific application, file, email, Control Panel applet, or Internet favorite; and browsing through All Programs.

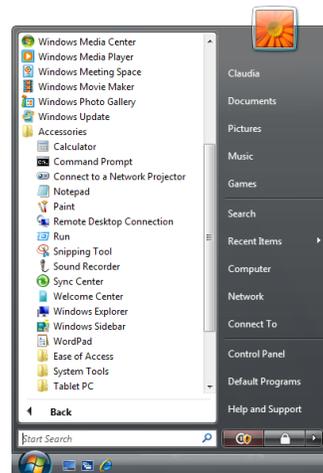
To find a specific application or file, you simply press the Windows key on the keyboard or open the Start Menu and begin typing in the Instant Search field that is always available. As you type, Windows Vista searches filenames, metadata, and the full text of all files instantly, and it displays the choices organized by type of asset, such as applications, Internet files, application files, and email messages.

For example, to find Microsoft Office Excel, you simply type part of the application name—such as *Excel*—in the Instant Search field, and Windows Vista immediately displays a shortcut to Excel (assuming it's installed) and to other relevant links. Windows Vista auto-selects the most appropriate choice as you type, so most often there's no need to select the application from the list of results.

Windows Vista also lets you more quickly display a list of all applications installed on the computer, browse to one, and launch it with a click. In addition to the new yet familiar-looking tree-style navigation, you will notice the greater responsiveness of menus and submenus compared to the delay of a few seconds that sometimes occurs in Windows XP when many applications are installed. Submenus also take up less screen space, making it easier to navigate to the application you want without having to traverse the desktop.



Windows XP Start Menu



Windows Vista Start Menu

## New Windows Vista Explorers

In Windows, Explorers are the main tools used for finding, viewing, and managing information and resources—documents, photos, applications, devices, and Internet



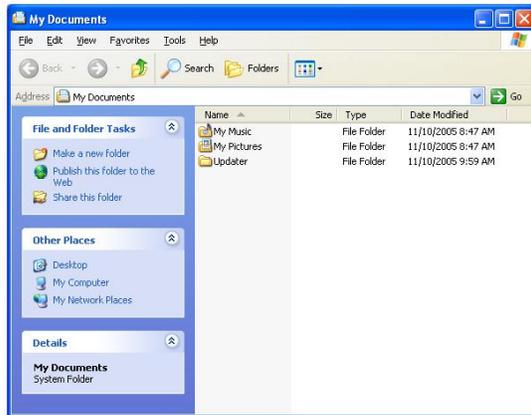
content. By providing a consistent visual and functional experience, the new Windows Vista Explorers empower you to manage your information easily, quickly, and with optimal flexibility and control. This was accomplished by streamlining the menus, toolbars, navigation, and task and preview panes into a single interface that is consistent across all of Windows Vista.

Key elements of the Windows Vista Explorers include:

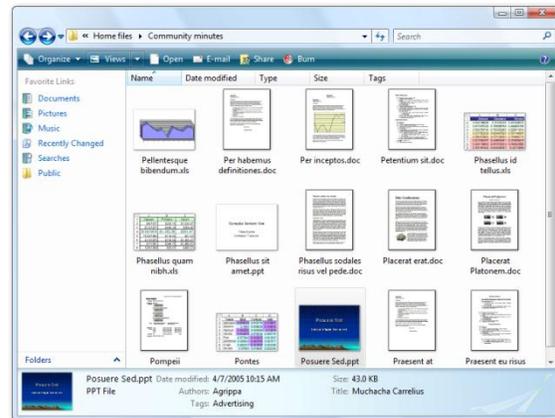
- Instant Search, which is always available and finds files instantly
- Navigation Pane, which contains quick links to the places your documents, pictures, photos, and Search Folders are stored
- Command Bar, which displays tasks appropriate for the files being displayed
- Live Icons, which display a thumbnail of the actual contents of each file
- Details Pane, which provides rich information (metadata) about files, and lets you easily add/edit metadata on those files
- Preview Pane, which allows users to browse a preview of a file's contents in applications that have this feature enabled
- Enhanced Address Bar, title bars, and borders



To learn more about Search Folders, Instant Search, and the Preview Pane, please turn to [3.05: User Interface: Search and Organization](#) on page 44.



Windows XP

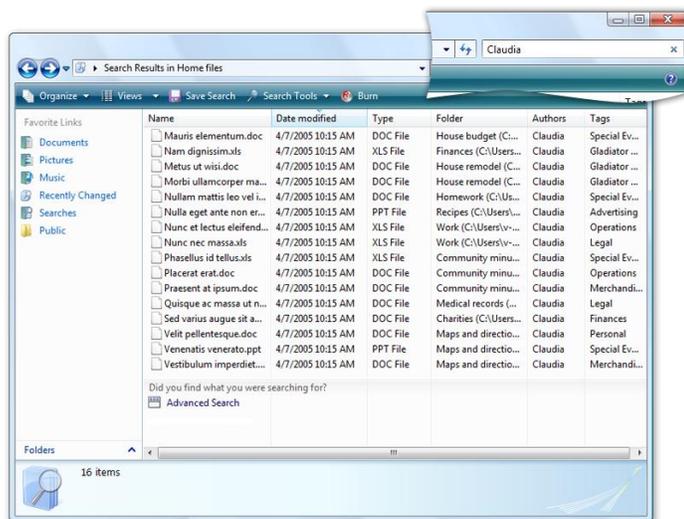


Windows Vista

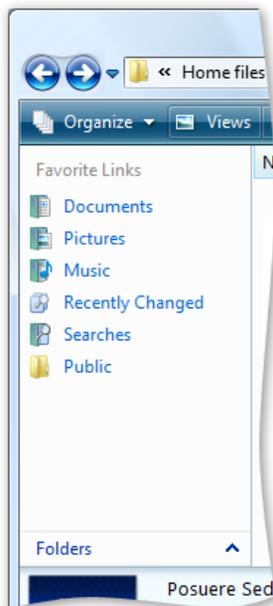
In Windows XP, menus, toolbars, and the Navigation Pane or Task Pane (but not both) are distinct. In Windows Vista Explorers, menus, toolbars, navigation, the Command Bar (formerly the Task Pane), and the new Preview Pane are merged into a single, streamlined interface.

**Instant Search:** Every Explorer window in Windows Vista contains an integrated Instant Search field in which you can enter part of a word, a word, or a phrase. Instant Search

immediately searches filenames, file properties (metadata), and text within each file and returns results literally in an instant. For example, as shown in the illustration, entering the name *Frank* in the Instant Search field results in a list of files related to Frank—files for which Frank is the author or in which Frank is mentioned in the contents of the file or the filename.

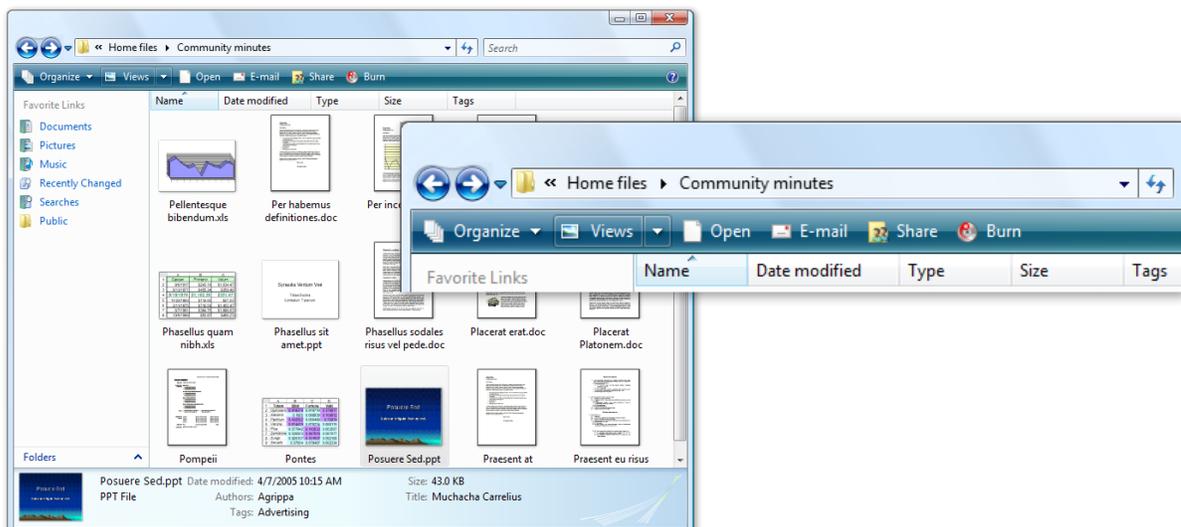


**Navigation Pane and Search Folders:** The Navigation Pane in each Explorer has been redesigned to make it simpler to navigate across your PC and quickly find what you're looking for. The default view of the Navigation Pane is a series of quick links that take you

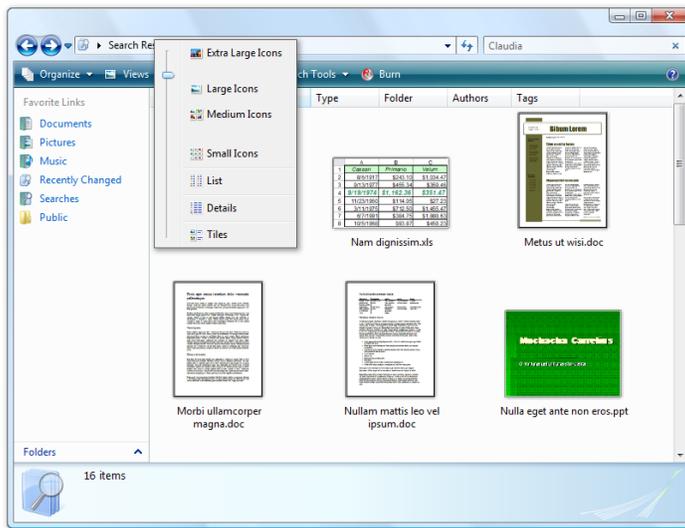


to where your documents, pictures, and music are stored. Additionally, there is a Searches link that lets you see all of the Search Folders on your PC. A traditional folder and its contents have specific addresses on the hard drive. In contrast, a Search Folder is really a saved search that executes the moment you click it. Search Folders can automatically organize your files logically, without moving the physical files on your computer. This makes it easy for you to view your files in many different ways without actually having to worry about where your files are stored on your PC. If you prefer the traditional, folder/tree-based view in the Navigation Pane, you can simply select the folder control found at the bottom of the pane.

**Command Bar:** The new Command Bar displays tasks that are appropriate to the files being displayed in an Explorer. The contents of the Command Bar are based on the contents of the folder. For example, the Documents Explorer contains Command Bar tasks that are appropriate to documents, while the Pictures Explorer contains tasks appropriate to digital images. Unlike in Windows XP and earlier Explorers, both the Command Bar and the Navigation Pane are available simultaneously, so tasks on the Command Bar are always available—you don't need to switch between the Navigation Pane and the Command Bar.

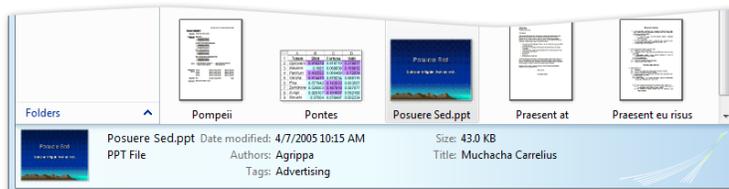


**Live Icons:** Scalable “live” icons in Windows Vista greatly improve on generic system icons. For applications that have this feature enabled, Live Icons provide thumbnail

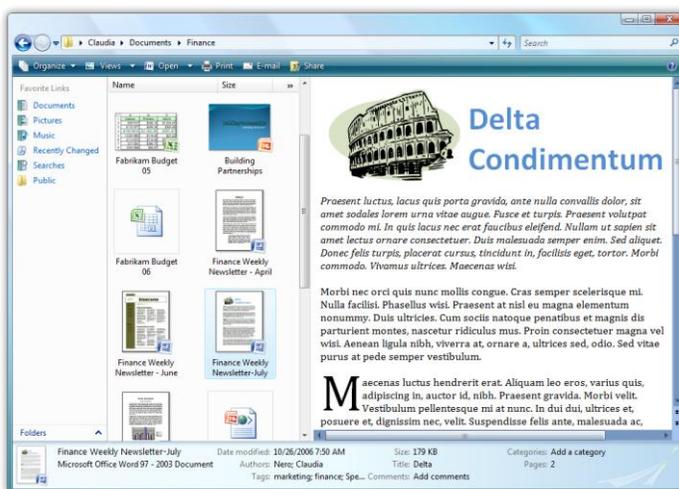


previews of the actual content of a file, rather than just a generic representation of the application associated with that file. You can see rich previews of your files—including the first pages of your documents, your photos, or even album art for your songs—without opening them. This helps you work more efficiently and productively.

**Details Pane:** With the Details Pane, you no longer have to right-click a file to open the Properties dialog box. Instead, a rich set of file properties (metadata) is always visible in the Details Pane. You can also

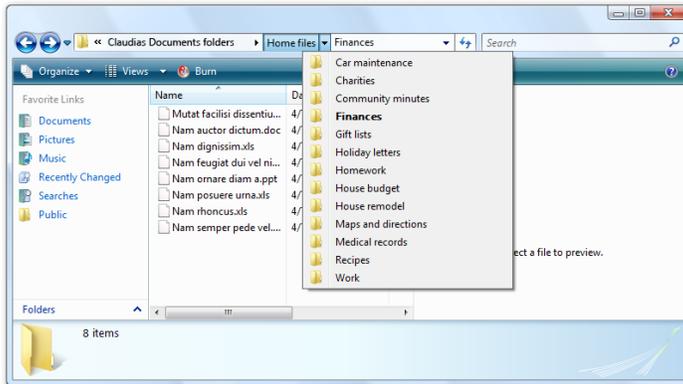


add or edit properties easily, for one or many files directly from the Details Pane.



**Preview Pane:** For an even richer way to preview the contents of documents and media without opening individual files, Explorers such as the Documents Explorer, Music Explorer, and Pictures Explorer provide an optional Preview Pane. In applications that have this feature enabled, you can browse readable views of various documents or preview a few seconds of content in media files. This feature is similar to previewing messages in the Preview pane of Microsoft Office Outlook.

**Address Bar, title bars, and borders:** The enhanced Address Bar features drop-down menus along the current navigation path, enabling you to easily backtrack or navigate forward, anywhere along an address



location. The enhanced Address Bar is particularly useful on Tablet PCs, where you can now navigate precisely with just a few taps of the stylus. Window title bars and borders are wider in Windows Vista, making it easier to grab a border to resize or move a window.

### A More Intuitive User Experience—Key Features

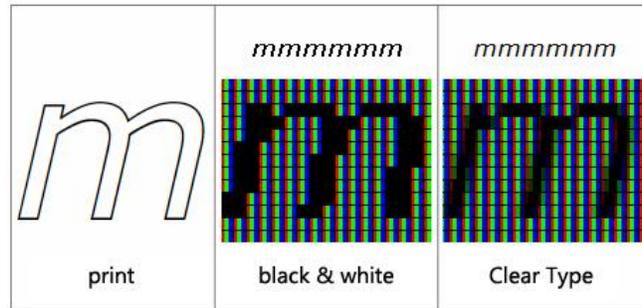
Feature	Brief Description
Command Bar	A new bar that displays contextual, one-click tasks based on the content displayed.
Details Pane	Enables you to view and change metadata on one or more files without having to open the properties context menu.
Documents Explorer	Formerly My Documents, redesigned to enable instant searches, flexible viewing and organization, and easy access to document-centric tasks.
Enhanced Address Bar	Enables users to see physical addresses or past searches used to get to the current view. Also enables Tablet PC users to navigate more easily without the use of a keyboard.
Instant Search	A new search tool that enables fast searches and filtering of any content in view. It also serves as a launch point to larger desktop searches as well as Internet searches.
Live Icons	Live icons, scalable to 256x256 pixels, show the actual first page of a document, the actual photo, a screen capture of a video, or album art for individual songs instead of generic icons.
Music Explorer	Formerly My Music, redesigned to enable instant searches, flexible viewing and organization, and easy access to music-centric tasks.
Navigation Pane	A redesigned feature that allows users to view, navigate, and organize content by the familiar folder/tree method or the new Windows Vista metadata property-based method. Search Folders and traditional folders are located in the same tool.
Pictures Explorer	Formerly My Pictures, redesigned to enable instant searches, flexible viewing and organization, and easy access to photo-centric tasks.
Preview Pane	With supported file formats, users can browse high-fidelity views of various files from directly within an Explorer. Similar to the Preview Pane in Outlook.
Search Explorer	Enables instant searches and flexible viewing of search results from across the entire PC.
View Slider Control	A slider control on the Command Bar that lets the user easily switch between views.



## ClearType

People spend most of their time at the computer reading documents and email and viewing websites. Windows Vista increases the readability of on-screen text with advances in Microsoft's patented ClearType technology.

ClearType takes advantage of the computer industry's shift in screen hardware over the past few years from Cathode Ray Tube (CRT) displays to Liquid Crystal Display (LCD) technology used in desktop and living room flat panel, portable laptop, and Tablet PC displays.



ClearType first shipped in Windows XP, and while it offered some readability improvements for CRT display users, it was not turned on by default due to the low penetration of LCD-based screens on which ClearType provides the most benefit. Because most users tend to stick with default settings, this meant that many people missed out on ClearType's improvements in text readability.

In Windows Vista, ClearType is turned on by default for all users, irrespective of screen type. Since ClearType's introduction, a number of independent research studies have shown conclusively that ClearType improves both comprehension and reading speed by five percent. To put this in perspective, that's equivalent to saving you 24 minutes out of every eight-hour day spent reading on the PC.

To maximize the benefits of ClearType, Windows Vista features new typefaces specifically designed to take advantage of the way ClearType works. The resulting six fonts—Constantia, Cambria, Corbel, Calibri, Candara, and Consolas—all ship with Windows Vista and take screen readability to a new level.



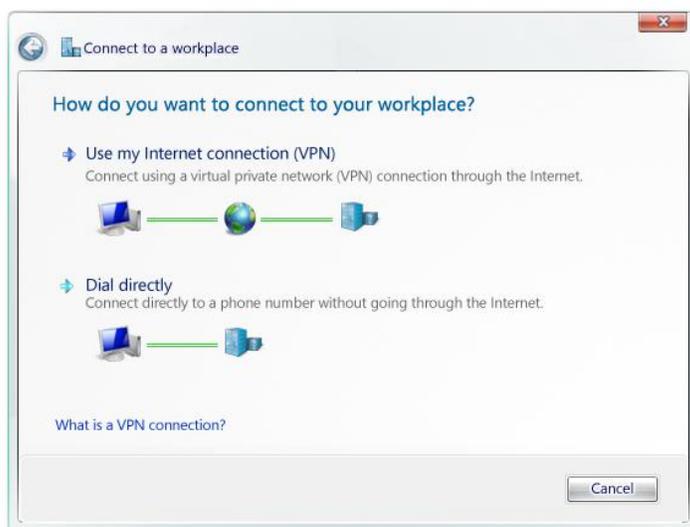
## Dialog boxes and wizards

Dialog boxes and wizards in Windows Vista have been redesigned to be clearer and more functional, with helpful explanations of options, bigger fonts, and redesigned graphics and color. They enable you to find relevant information more quickly and accurately. They are also more consistent in behavior with other interfaces, particularly in their use of Web-style navigation features such as forward and back buttons. For developers,

standard Windows Vista dialog box features are easier to integrate into applications and are more flexible than Windows XP dialog boxes. Developers can thus provide users with a more consistent and intuitive experience.



Wizards in Windows Vista are also more useful and, for developers, easier to create. All elements, including graphical links, are easily addressable so developers can create consistent, clean, efficient wizards that better assist users. For example, developers can customize buttons to better reflect the user workflow (for example, they are no longer limited just to Back, Next, Finish, and Cancel). Wizard windows can be resized to give users more prescriptive information based on different scenarios, and they can easily be



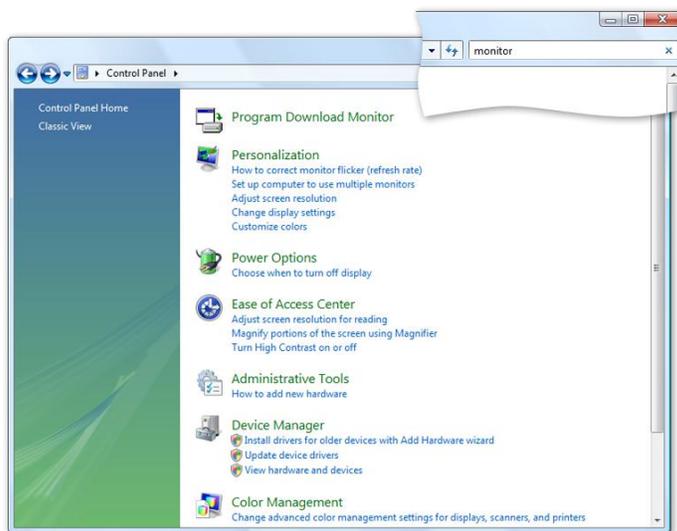
branded to maintain consistency with a third-party application's interface. Existing wizards will continue to work and will appear as they do in earlier versions of Windows, and migrating them to the new visual framework requires minimal developer effort.

## Programs Explorer and Control Panel

The Programs Explorer, which uses the typical Windows Explorer framework (Navigation Pane, Instant Search, and so on), provides you with a real-time account of installed applications on the desktop. This new Programs Explorer replaces the Add or Remove Programs control and presents installed application information in a clearer, easier-to-understand way.

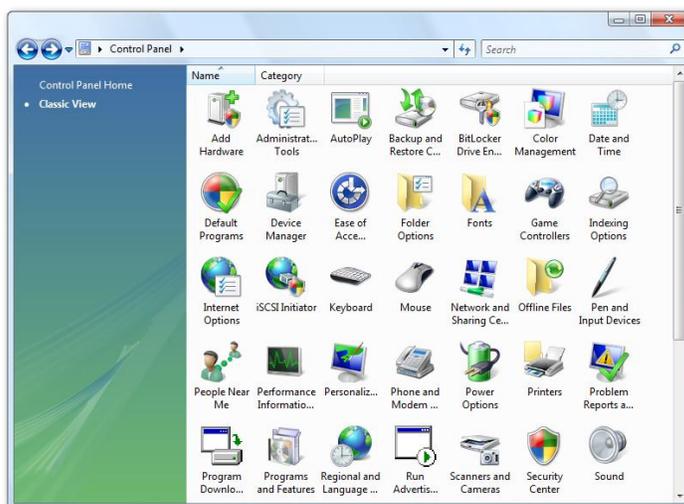
For organizations, the Programs Explorer also displays licensed applications that are available for installation by users. Because this information is presented in an Explorer, a user can use Instant Search to quickly find a specific application among a long list of applications that might be available in that organization.

The redesigned Control Panel also uses the Windows Explorer framework, and it features



two views to help users manage settings for their PC more quickly and easily. The first view is a more advanced version of the category-based view first introduced in Windows XP. In addition to categories, the new view lists specific tasks such as *Change screen resolution* to help the average user find the right control. Even better, Instant Search lets you type common word search terms, so, for example, typing *monitor* would show *Change screen resolution* as a matching task.

The second view is the classic, standard view. Instant Search works over this view as well.



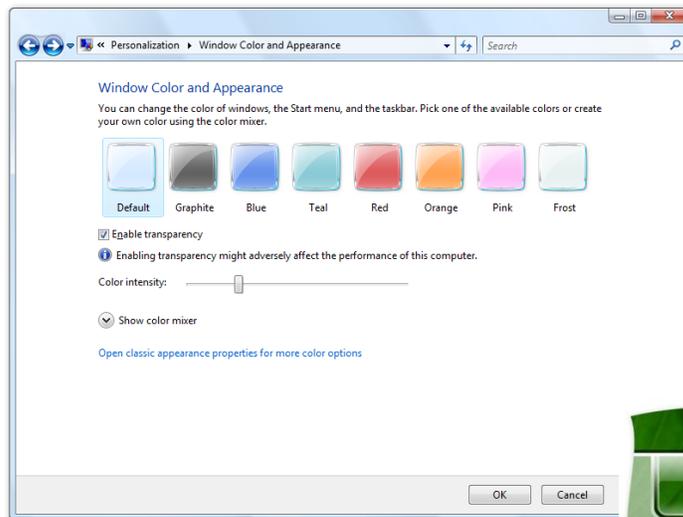
Finally, many of the accessories in the Windows Vista Control Panel have undergone extensive usability testing and have been redesigned and integrated into the Explorer framework, making them more consistent and approachable.

### Programs Explorer and Control Panel—Key Features

Feature	Brief Description
Control Panel category-based user interface (UI)	A user-friendly view of the Control Panel that displays Control Panel tasks.
Control Panel Instant Search	You can instantly search over tasks, categories, or Control Panel icons by using natural language.
Programs Explorer Add Programs view	You can see which applications on the network are available for installation.
Programs Explorer Installed Programs view	You can see which applications are installed on their system and can change or remove them.
Programs Explorer Installed Updates view	You can see which updates from Windows Update have been installed.
Programs Explorer Instant Search	Like the other search fields in the system, it enables instant metadata property searches and wider desktop and Internet searches. Unlike the other instances of Instant Search, this field also instantly searches the applications available for installation over the network.
Programs Explorer Windows Features View	You can add and remove Windows components.

## More about Windows Aero

As noted earlier, Windows Aero offers a premium user experience that makes it easier to visualize and work with your information and offers a smoother, more stable desktop experience. Key features in Windows Aero include the following.



**Glass.** Aero features windows that are truly translucent. This “glass” effect allows you to more easily focus on the content of a window, while providing better context for the surrounding elements on your desktop. For added personalization, you can change the color, the saturation, and even the level of transparency, to get exactly the look and feel you want.

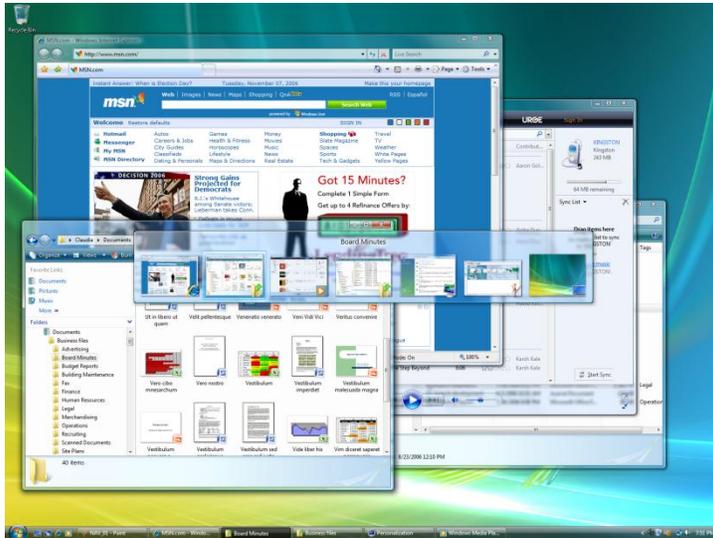


**Dynamic windows.** When minimized, a window will subtly animate to a specific location on the taskbar, making it easier to locate when you need it later.

**High dots per inch (DPI) support.** Previously, the Windows interface and many third party applications did not adequately support screens that were capable of outputting greater than 96 DPI. The experience was that these interface elements were too small to read and, as a result, people would end up returning these more capable screens. This was especially problematic for laptops with very small screens. Windows Vista can now comfortably scale up its interface as well as non-DPI aware applications to 144 DPI. The benefit is that users who need to use a high DPI screen for demanding applications no longer have to trade off usability.

**Live taskbar thumbnails.** With Windows Aero, live taskbar thumbnails show you the contents of any windows that are currently open on your desktop. When you pause your mouse pointer over a tile on the taskbar, you see the “live” contents of the corresponding window without having to bring that window to the foreground.





**Windows Flip (Alt+Tab).** Windows Flip is an update to the feature known as Alt+Tab in previous versions of Windows. Windows Flip shows you live thumbnails of your open windows instead of generic icons, making it easier to quickly identify the windows you're looking for. One of the displayed windows in the Flip experience will always be on your desktop, giving you a fast and simple way to instantly minimize all the open windows on your desktop.

**Windows Flip 3D.** Flip 3D gives you a new way to find the window you want. When you press the Start+Tab keys, Flip 3D dynamically displays all the open windows on your desktop in a three-dimensional (3D), stacked view. In this view, you can rotate through your open windows to find the right one. Flip 3D can even show live processes such as playing video. You can also use the arrow keys, or the scroll wheel on your mouse, to smoothly flip through the open windows and select the window you need.



**Smoother-performing desktop.** When you use Aero, open windows glide across your screen when you move or resize them. You'll see no redraw artifacts, latency, or "tearing" effects that sometimes appear on existing computers, particularly in windows that display dynamic content such as video. The Windows Aero experience also reduces graphics driver-related system crashes and blue screens.

The requirements for Windows Premium Ready machines and Windows Aero are aligned. A Windows Vista Premium Ready PC includes at least:

- 1 GHz 32-bit (x86) or 64-bit (x64) processor<sup>1</sup>
- 1 GB of system memory
- Support for DirectX 9 graphics with a WDDM driver, 128 MB of graphics memory (minimum)<sup>2</sup>, Pixel Shader 2.0, and 32 bits per pixel.
- 40 GB of hard drive capacity with 15 GB free space
- DVD-ROM drive<sup>3</sup>
- Audio output capability
- Internet access capability

Note: Windows Aero is available only to Genuine Advantage customers who are running the Home Premium, Business, Enterprise, or Ultimate edition of Windows Vista.

<sup>1</sup> Processor speed is specified as the nominal operational processor frequency for the device. Some processors have power management which allows the processor to run at lower rate to save power.

<sup>2</sup> If the graphics processing unit (GPU) uses shared memory, then no additional graphics memory is required beyond the 1 GB system memory requirement; if the GPU uses dedicated memory then 128 MB is required.

<sup>3</sup> A DVD-ROM may be external (that is, not integral or built into the system).

### User Interface—Key Features

Feature	Brief Description
Aero task bar	A new, sleek glass task bar that can show a thumbnail when you rest the mouse pointer over any of the window tiles.
Basic user experience	The basic desktop user experience that all Windows Vista users get, regardless of hardware capabilities and stock-keeping unit (SKU). Basic is a theme file that gives you an upgraded and streamlined experience over Windows XP. It features a redesigned Start Menu, more efficient Explorers, and rich data visualization tools such as Live Icons and the new Preview and Reading Panes.
Backgrounds and screensavers	New Windows backgrounds and screensavers that are visually compelling and look great in the home, the office, and retail stores.
Classic Mode	Enables information technology (IT) staff to turn off new Windows Vista user experience features on a feature-by-feature basis. This mode turns off only new functionality, reverting to Windows 2000 functionality while retaining the Windows Aero or Windows Vista Basic look and feel.
Classic Theme	Turns off Windows Aero and Windows Vista Basic and turns on a Windows 2000–like user interface (UI). This UI still features many of the new Windows Vista user experience features, such as Instant Search and column controls. It changes only the appearance.
Desktop Compositing Engine	A new display engine that gives you dramatically improved stability and performance with respect to window drawing. It eliminates screen tearing when you move windows around the screen. Requires WDDM drivers.
High DPI support	For higher dots-per-inch (DPI) screens, Windows Aero can scale up the desktop experience so that low DPI–aware controls and applications can still be used.
Standard user experience	A mid-tier user experience that adds the stability benefits of WDDM and smoother redrawing of windows to the visuals of the Basic user experience. It has the same hardware requirements as Windows Aero.
Windows Aero user experience	A professional, attractive, graphically-rich desktop experience that requires a premium SKU and takes advantage of contemporary hardware (WDDM drivers). The experience features great design and rock-solid performance. It also includes fluid animation and transparent glass on the Start Menu, window borders, visually stunning window-management tools, Windows Flip, and Flip 3D.
Window customization tools	Tools for changing the tint of the glass that appears on different components throughout the system.
Windows Flip	An updated look and feel for the traditional Alt+Tab experience, now featuring live thumbnails of the open windows. Available only with the Aero desktop experience.
Windows Flip 3D	A new window management tool that is both efficient and visually stunning. Flip 3D lets you see nearly full-size versions of any of your open windows so that you can easily find the right one. Available only with the Aero desktop experience.
Windows Vista sound design	A new startup theme and system sounds that are uniquely Windows Vista.
Windows Vista task dialog boxes	More common dialog boxes have been redesigned and rewritten to make them clearer and more understandable.
Windows Vista wizard framework	A visual and functional update to the wizard framework that Microsoft pioneered, making all wizards easier to use and more visually pleasing.

## 3.05 User Experience: Search and Organization



We live in an age where nearly everything is digital. Documents, music, video, photos, and even daily correspondence—including email, faxes, and voicemail—are increasingly created, stored, and accessed in electronic form on personal computers. Combined with a huge increase in the storage capacity of hard drives over the last 10 years, we're at a point where it's increasingly difficult to stay on top of the information stored on our PCs.

Some of us try to stay organized by meticulously creating structured folder hierarchies in which to store our files. This, of course, takes lots of time and effort and quickly reaches its limit of usefulness when thousands of files are involved. The rest of us live in a world where we store our most important files on the desktop, quickly filling it up, or in a few preferred folders, relying on the Windows search functionality to help us find a specific file—which in earlier versions can take up to 30 minutes.

Windows Vista introduces enhanced desktop search and organization that helps you locate files and emails on your PC. If you remember anything about a file—the type of file, when it was created, or even what it contains—Windows Vista can instantly find it for you. Windows Vista goes beyond desktop search—it can also help you “see” your files in multiple ways. Want to see all of your documents arranged by date? How about by author? No problem. The system can auto-organize your content using basic properties that are often automatically saved with your files. Even better, with supporting in-box experiences such as Windows Photo Gallery and Windows Media Player or with third-party applications, you can even “tag” your files with relevant properties, enabling the system to bring together your documents, photos, music, and videos in whatever way you think about them.

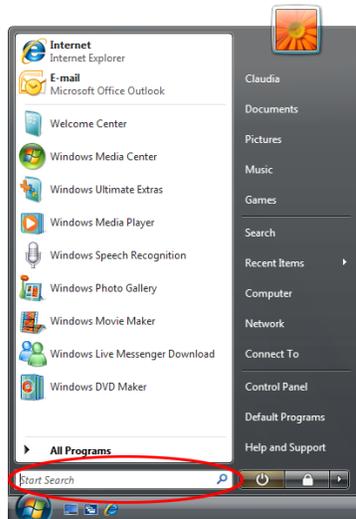
### Search features

#### Instant Search

With a new tool in Windows Vista called Instant Search, you are never more than a few keystrokes away from whatever you're looking for. This feature, which is available almost anywhere you are in Windows Vista, enables you to type a filename, a property, or even text contained within a file, and it returns pinpointed results. It's fast and easy. Instant Search is

also contextual, optimizing its results based on your current activity—whether it's searching Control Panel applets, looking for music files in Windows Media Player, or looking over all your files and applications on the Start Menu.



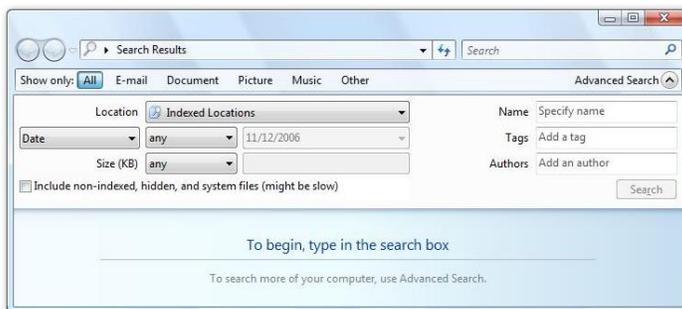


## From the Start Menu

From the more efficient and comprehensive Start Menu in Windows Vista, you can find virtually anything on your PC with fast-as-you-can-type performance. To find a specific file, application, or Internet Favorite, you simply open the Start Menu—or press the Windows key on the keyboard—and begin typing in the embedded Instant Search box. As you type, Windows Vista instantly searches file and application names, metadata, and the full text of all files, and it displays the search results organized by the type of asset—Programs; Favorites/Internet History; Files, including documents and media; and Communications, including email, events, tasks, and contacts.

## Search Explorer

In the Search Explorer, you can use the Search Pane and the Advanced Search options for more detailed searches and multiple search criteria. For example, you can search over a specific location or content type (such as documents, email, or media). You can also add



additional filters, such as specific keywords and date ranges. When you've designed a really useful search, you can save that search as a new Search Folder, enabling you to rerun that exact search anytime you click it.

## Small business and enterprise search

In an organizational environment, all the data important to users isn't necessarily stored on a single desktop. The next-generation search capabilities in Windows Vista are designed for use in distributed data environments in several important ways:

- **Redirected Folders.** Many enterprises concerned with the safety and security of end-user data redirect or "roam" user folders, such as their Documents folder, to a server. To preserve productivity, client-side caching is turned on in Windows Vista so the data is still available when an information worker is offline or not connected to the server. All redirected content is indexed by the Windows Vista-based PC, so all Windows Vista search and organization features work flawlessly over that content.
- **Offline Folders.** Information workers using server shares to store personal or project data frequently want that content to be available offline. In Windows Vista, taking folders or files offline has the effect of copying that content locally and creating a sync relationship between the local and server

copies. Doing this also ensures that the local content gets indexed, thus giving users an easy way to search over server-based content.

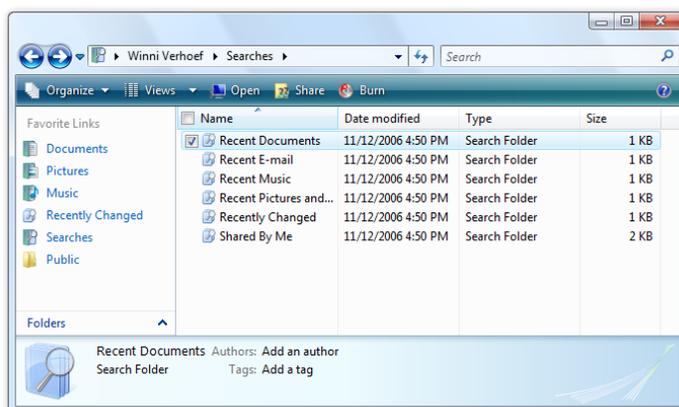
- **Windows Vista Computer to Computer Search.** By default, a search includes only the local computer. However, users can search other Windows Vista-based PCs connected to their network by using a distributed search. With a distributed search, the target computer instantly provides search results, but only if the user is authorized to access those files.
- **Office SharePoint offline documents.** With the 2007 Microsoft Office release, you can take Microsoft Office SharePoint libraries and documents offline via Microsoft Office Outlook, and Windows Vista lets you instantly search over that offline Office SharePoint content.
- **Third-party data source support.** Developers can use iFilters and protocol handlers to add their data to the Windows Vista system index so users can instantly search over that content.
- **Removable/connected hard drives.** Users frequently connect standalone hard drives to their PCs for additional storage, backup, or archival purposes. This content can be added to the Windows Vista system index so users can easily search that content.
- **Generic file shares and legacy computers.** Windows Vista provides search performance equal to Windows XP search over these devices. This is because fast search works only when the content is indexed by the local PC or when the remote location supports distributed searches.



## Folders and Search Folders

Traditional, location-based folders are still supported in Windows Vista because people are familiar with them and like using them. Folders are useful because they enable easy migration from computer to computer, and because legacy applications would break without them. In Windows Vista, you still save content in folders, but it's easier to use the folders because of tools such as Instant Search and the enhanced column header controls.

Windows Vista also introduces a new feature called Search Folders—when you click on a



Search Folder, it instantly runs a search. Windows Vista comes with many preconfigured Search Folders, such as Important E-mail, which instantly shows you all your flagged email, and All Attachments, which shows you all files that are attachments. You can also create and save your own Search Folders. For example, you can design a search for all documents authored by John that contain the word *project* somewhere within them. This search, titled *Author John/ Keyword Project*, is actually

saved as a Search Folder. Any time you click on this Search Folder, the search is run and the

view is populated with results in a split second. As more files authored by John and containing the word *project* are added to the hard disk, they automatically show up in your Search Folder, regardless of where on your PC you put them.

## Organization features

### Documents, Music, and Pictures Explorers

Although the new desktop search capabilities of Windows Vista fulfill many search needs, they are not designed to address every information management need. For instance, they do not readily help you find collections of similar files, such as files from the same project or author, and then share those files out, organize them, or move them around on your hard drive.

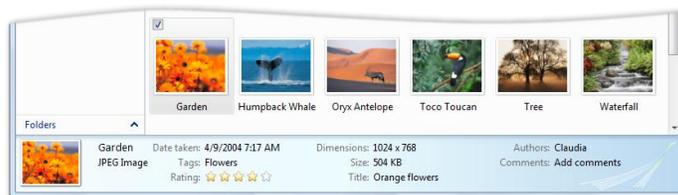
The powerful Explorers in Windows Vista extend the benefits of the system's new desktop search capabilities to the next level by combining Instant Search with the ability to auto-organize content throughout your PC based on file properties. Rather than having to remember specific locations or folder names to find your documents, music, photos, and email, you can rely on Windows Vista to search file properties known as "metadata." For example, if you want to see all of the documents you have recently changed, the Documents Explorer can find those items, no matter where they are on your PC, and you can easily arrange them in many different ways, such as by author. Or, if you prefer to see those files arranged by type—such as Microsoft Office Word documents or Microsoft Office Excel spreadsheets—the Documents Explorer can instantly sort and display files in this way as well.



The real power of the new Explorers is that files no longer have to be stored in a specific location to be found. For example, simply by “tagging” a photograph from your high school graduation with the keyword *graduation*, your name, and the names of family members in the photo, you can locate it using the Pictures Explorer or in the new Windows Photo Gallery in Windows Vista.

## Tagging your files

The powerful new search and organization features in Windows Vista make extensive use of file properties (metadata) to provide users with an even more dynamic way to interact with their information. Many of your files already contain metadata properties that are immediately usable on Windows Vista. The Microsoft Office system automatically saves



certain properties of created documents, such as author and date created. Music transferred to a PC often has properties such as song name, album, and artist. But Windows Vista also gives you ways to apply custom properties to your files.

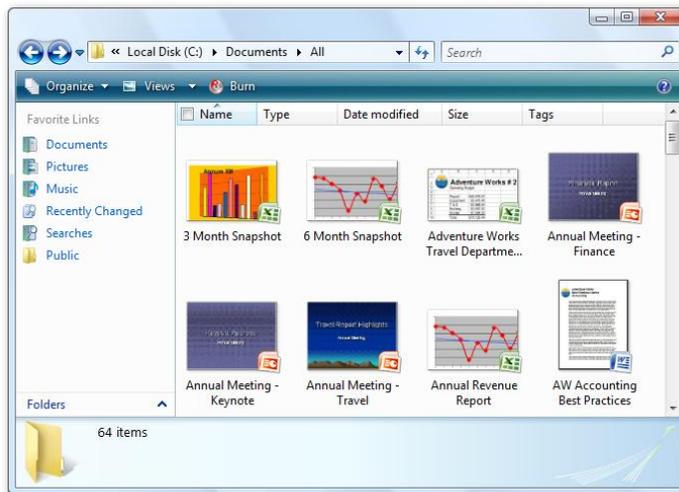
It's fast and easy to apply properties to any file or group of files:

- **Details Pane.** The easiest way to add a property to a file is to select the file and change it in the Details Pane at the bottom of the Explorer. Many of the entry fields support AutoComplete, making it even easier to add properties. And this method works for one file or across many files. Selecting multiple files and adding a property via the Details Pane adds that property to all of the selected files.
- **Properties window.** Of course, you can still go to the familiar Properties window by right clicking a file and selecting Properties. In the Details tab you have quick access to a file's metadata and there you can also select to remove all properties of a file with a single mouseclick, to prepare a file for sharing with others.
- **Saving a file.** Windows Vista features a new common File dialog box for opening and saving files. Applications that use this control enable you to use all of the innovative new searching and tagging features when you open and save files. To add properties when saving a file, you simply enter properties directly into the appropriate field in the common File dialog box.
- **Windows Photo Gallery.** Windows Photo Gallery is a new experience in Windows Vista that enables you to import, edit, and tag photos. Any tags applied to photos are reflected in the Pictures Explorer.
- **Windows Media Player 11.** Windows Media Player has always been the premier experience for ripping, organizing, listening to, and synching your music files. Any changes made to properties of your music files are reflected in the Music Explorer.

## Enhanced column header controls

Enhanced column header controls take advantage of the extensive use of file properties in Windows Vista to enable users to better manage large amounts of on-screen data.

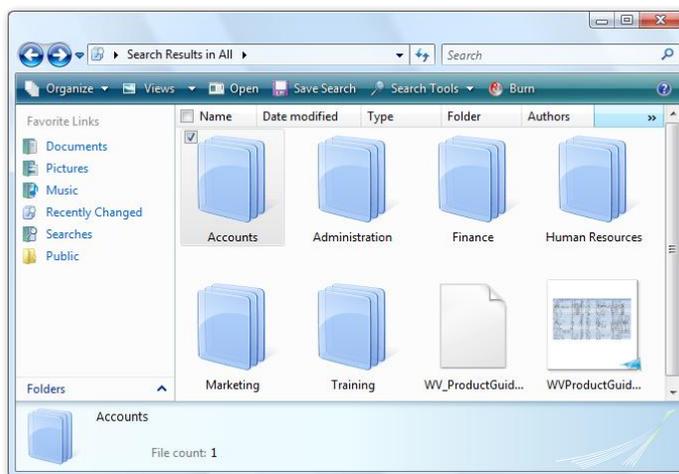
Imagine being able to view as many as 200 files in a single folder. Previous operating systems offer no easy way to manage so much data, especially when you're trying to sort through or organize the information. Instant Search offers one way to instantly find



a file or group of files based on a search term. But the new column header controls can do even more.

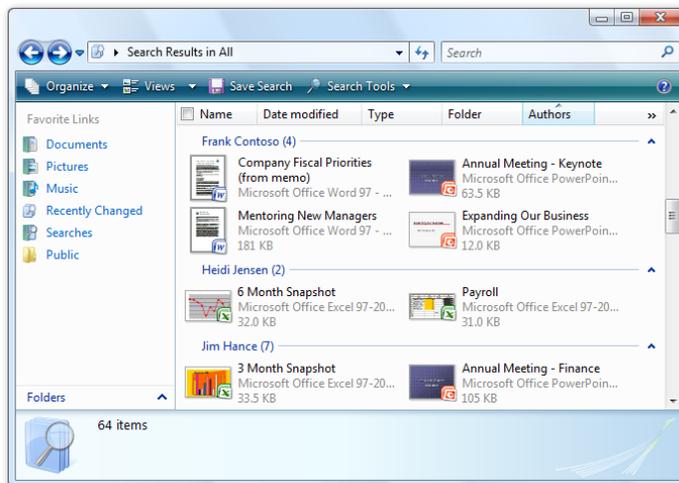
For all the files currently in view, the new column header controls feature innovative drop-down menus, which can display all the values across any of the columns. For example, choosing the Type column header control displays all of the different file types across the visible documents. Using simple check boxes, you can

pick and choose one or more types that you want to see. For example, selecting .PPT and .XLS filters out all other document types on screen, leaving only your Microsoft Office PowerPoint and Excel files.



**Stack View and Group By View:** In addition to the traditional "sort" view, the new column header controls feature two other ways to view your content. The new Stack View shows currently displayed data organized by stacks based on the values in a specific column. For instance, you can select the Author column header and choose to stack by author, and all the files currently in view, irrespective of where they are physically stored on your hard drive, are rearranged into stacks of documents organized by author. These stacks behave much

like folders in that you can click to open them and see the items inside, but unlike folders, stacks have no physical location on the hard disk. In a sense, they are virtual views of your content. More important, if a file has two authors—say, Tim and Paul—it is included in the stack for Tim and the stack for Paul, giving users the ultimate flexibility in how they find and organize their files.



The Group By View is similar to the Stack View. It simply takes the existing screen content and places it into groups according to the values in a particular column header. So, grouping by author gives you a more granular view of which documents belong to which author.

### Search and Organization—Key Features

Feature	Brief Description
<b>Instant Search</b>	
Index control	A control for configuring the system index locations and other settings.
Instant Search box	A search box that enables the instant filtering of search results currently in view.
Internet search	Passes search terms to the user's Internet search engine of choice.
Query Pane	A tool with drop-down menus for designing targeted searches that include multiple search criteria.
Save a Search	A new command to save complex queries for future use; searches are saved as Virtual Folders.
Scope Picker	A selection tool for picking which locations a search will include.
Search Explorer	An Explorer that enables broad Instant Searches or targeted searches over documents, media, email, and the Internet.
Third-party extensibility	Allows third-party content and file types to be included in the system index so they can also be searched.
<b>Small Business and Enterprise Search</b>	
Adjustable interface	Like the Internet search link, corporations can deploy an intranet search link.
iFilters and protocol handlers	Using one or both of these technologies, third parties can programmatically add their content to the local system index so users can instantly search over that content.
Fast search for offline folders	Searches content in offline folders.
Fast search for redirected user folders	Works over Group Policy-enabled redirected folders when client-side caching is turned on.

Feature	Brief Description
Fast search from Windows Vista computer-to-Windows Vista computer	Supports distributed searches across other Windows Vista-enabled PCs.
Offline Office SharePoint documents	The 2007 Office system enables corporate users to take files from Office SharePoint libraries offline via Office Outlook. Windows Vista can instantly search over that content.
Windows XP parity search	Provides crawling search over universal serial bus (USB) drives, generic file shares, and unknown PCs.
<b>Folders and Search Folders</b>	
Folders	Supports legacy storage units but is also coupled with new storage innovations such as the Instant Search box and column headers.
Search Folders	Saved queries that meet certain criteria (such as files created within a certain date range, with a specific keyword, or by a particular author) and can be run from anywhere on the desktop. Every time you open a Search Folder, it displays the most current results for the query.
<b>Tagging Your Files</b>	
AutoComplete	When you start to manually enter a property of a file, you see suggestions for completing the property.
Common File dialog box	A new dialog box for opening and saving files. It enables you to save files and apply metadata properties.
Details Pane	Enter/change a property directly in the Details Pane field.
Windows Media Player 11	An updated Windows Media Player experience that enables you to listen, sync, and organize your music. Properties edited in Windows Media Player are reflected in the Music Explorer.
Windows Photo Gallery	A new photo experience that allows you to view, edit, and tag your photos with keywords so you can view your files in multiple ways.
<b>Explorers Metadata Tagging</b>	
File properties	Metadata that can be added and changed on files and can be used to find and organize files on the computer regardless of physical location.
<b>Enhanced Column Headers</b>	
Column header Instant Search	Provides easy filtering when you have numerous values in a particular column.
Group By View	In this new custom view, the system groups any of the files in view by any property or category visible in the columns.
Sort View	In this standard view, the system sorts all files in view by any property.
Stack View	In this new custom view, the system stacks any of the files in view by any property or category visible in the columns.

## 3.06 Windows Sidebar and Gadgets



As you use your computer to access information, perform tasks, and interact with software applications, you may at times feel like you're facing information overload. You have to open a web browser just to check the weather, open an application to view your calendar, and open a calculator program just to add up a few numbers. Now, with Windows Sidebar and its associated mini-applications called *gadgets*, the specific information you need is at your fingertips.

### Windows Sidebar

Windows Sidebar is a pane on the side of the Windows Vista desktop where you can keep your gadgets organized and always available. Windows Sidebar makes great use of the



space on widescreen monitors and also works seamlessly on standard displays.

You can easily customize Windows Sidebar to suit your preferred location—always on top or resting below maximized windows. If you don't want to keep your gadgets docked on the Windows Sidebar, you can simply move them off, hiding the sidebar, and place them anywhere on your desktop.

### Gadgets

Gadgets are mini-applications with a variety of possible uses. They can connect to web services to deliver business data, weather information, news updates, traffic maps, Internet radio streams, and even slide shows of online photo albums. Gadgets can also integrate with your applications to provide streamlined interaction. For example, a gadget can give you an at-a-glance view of all your online instant messaging contacts, the day view from your calendar, or an easy way to control your media player. Gadgets can also have any number of dedicated purposes. They can be calculators, games, sticky notes, and more.

Windows Vista comes with an essential set of gadgets to get you started, and you can easily download more from an online gadget gallery. This gallery hosts gadgets from a wide variety of developers and publishers and offers an extensive selection to meet your specific needs.

## 3.07 Internet Explorer 7

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Microsoft Windows Internet Explorer 7, the new version of the popular web browser from Microsoft, represents a major step forward in making everyday web tasks easier, dynamic security protection, and improving the web platform and manageability. As you read through this section, you'll learn about all of the important capabilities in this exciting new version.

New features in Internet Explorer 7 focus on three areas:

- **Making everyday tasks easier.** Everyday tasks are easier with improved navigation through tabbed browsing and web search right from the toolbar. Improved printing and the ability to easily discover, read, and subscribe to Really Simple Syndication (RSS) feeds enable you to access only the information you want, when it's convenient.
- **Dynamic security protection.** Through a robust new architecture, Internet Explorer 7 offers security features that help defend against malicious software (also known as *malware*), as well as new ways to protect users from unintentionally providing personal data to fraudulent websites that use deceptive practices such as phishing.
- **Improved platform for web development and manageability.** Internet Explorer 7 offers improved support for cascading style sheets (CSS), a rich RSS feeds platform, and robust tools for deploying and managing Internet Explorer 7 in large enterprise environments.

### Making everyday tasks easier

To enable today's savvy Internet users to perform everyday tasks more productively and efficiently, Internet Explorer 7 has been redesigned with new and enhanced capabilities to help users easily search and consume multiple sources of information.

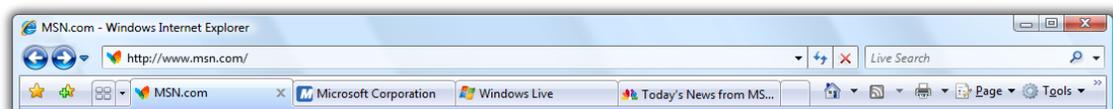
PC users can use tabbed browsing, inline toolbar searching, and shrink-to-fit webpage printing capabilities; discover, preview, and subscribe to web feeds; and employ Internet Explorer's cleaner, sleeker user interface to minimize the number of toolbars needed and maximize the amount of screen real estate devoted to the webpages they care about.

## Cleaner, sleeker user interface

*Frame* is a term that refers to the way the browser's user interface is laid out. In Internet Explorer 6, the default frame includes menus at the top and a row with buttons for Back, Forward, Stop, Home, Go, and so on; below that is the Address Bar.



Internet Explorer 6



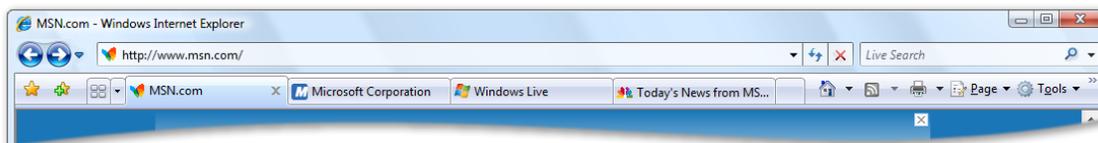
Internet Explorer 7

In Internet Explorer 7, the frame is noticeably simpler, more streamlined, and less cluttered. It maximizes the screen real estate devoted to the webpages that users want to view and reduces the toolbar "creep" that can sometimes take up as much as a third of the screen.

The Back and Forward buttons are smaller and have been moved next to the Address Bar. The Windows flag icon in the upper right corner of Internet Explorer 6 has been removed to make room for Instant Search. Microsoft has invested heavily in the user interface improvements in Internet Explorer 7; users experience the difference the moment they launch the new browser.

## Tabbed browsing

Tabbed browsing is the most-requested browser navigation feature among customers who want to manage multiple websites within one browsing window. To create or open tabs in Internet Explorer 7, you click on the empty tab on the Toolbar or right-click on any hyperlink in a webpage and choose New Tab. You can also right-click on a tab to refresh each page as an individual tab or refresh all of them as a group, as well as close individual tabs or the entire group, and reorder tabs on the tab bar by simply dragging and dropping.



## Quick Tabs

Internet Explorer 7 helps you manage multiple tabs with a feature called Quick Tabs. Quick Tabs enables you to view thumbnail images of all open tabs in one view. By simply clicking the Quick Tab icon just to the right of the Favorites icon, you can view all open



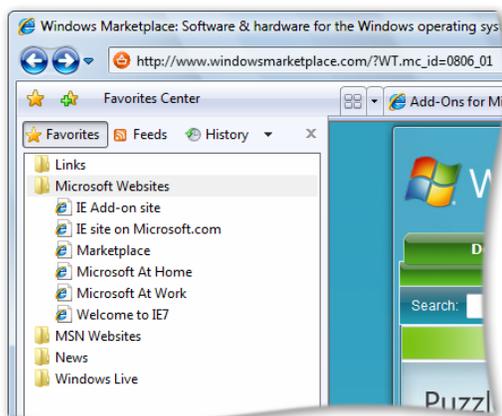
tabs. From the Quick Tabs View, you can open any tab by simply clicking anywhere on the tab image, and you can close any tab by clicking the X in the far right corner of the image. The Quick Tabs page scales to the number of tabs you have open. If you have nine tabs open, for example, Quick Tabs shows thumbnail images of all nine tabs; if you have more than 20 tabs open (not recommended), you see smaller thumbnail images of each tab, but you can still see all tabs in a single view.

## Tab Groups

Internet Explorer simplifies the organization of multiple tabs with Tab Groups. You can organize multiple tabs as a single Tab Group, which you can then save as a Favorite.

You can create Tab Groups for a variety of subjects or categories, such as shopping, finance, or news. For example, you can save travel sites such as Orbitz, Travelocity, and Expedia as a travel Tab Group in Favorites. The Tab Group appears as a folder on the

Favorites menu. You can click on the folder to expand the Tab Group to show the sites within the folder. You can open all the sites in a Tab Group with a single click on the arrow to the right of the folder. A Tab Group can contain an unlimited number of tabs or sites, and you can create an unlimited number of Tab Groups within Favorites.

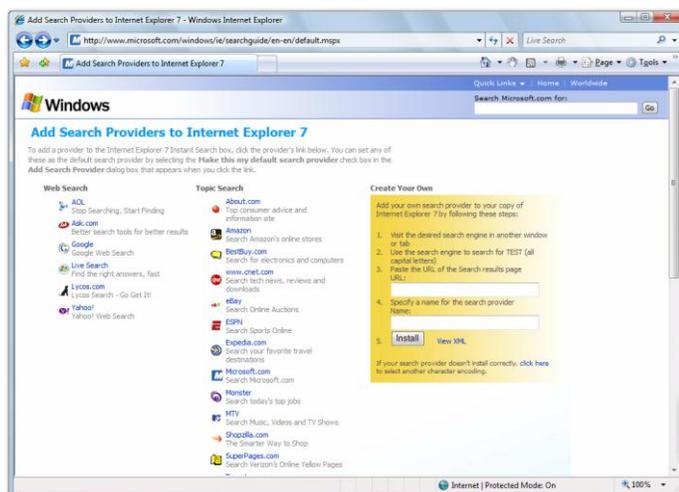


## Instant Search

Instant Search makes it quick and easy to search the Internet directly from the browser frame using your favorite search provider. You can choose a search provider from the drop-down list as well as easily add more providers to the list from the Windows Search Guide.

When you upgrade to Internet Explorer 7, Instant Search inherits the default setting you chose for AutoSearch in Internet Explorer 6. To offer you the greatest choice, Internet Explorer 7

expands the definition of “search provider” to include broad and vertical search providers in the Instant Search drop-down list. From the Instant Search drop-down menu, you can simply click Get Search Providers to be linked to the Windows Search Guide. This guide includes many broad and vertical search providers that you can add to Instant Search with a single click.



## Printing advances

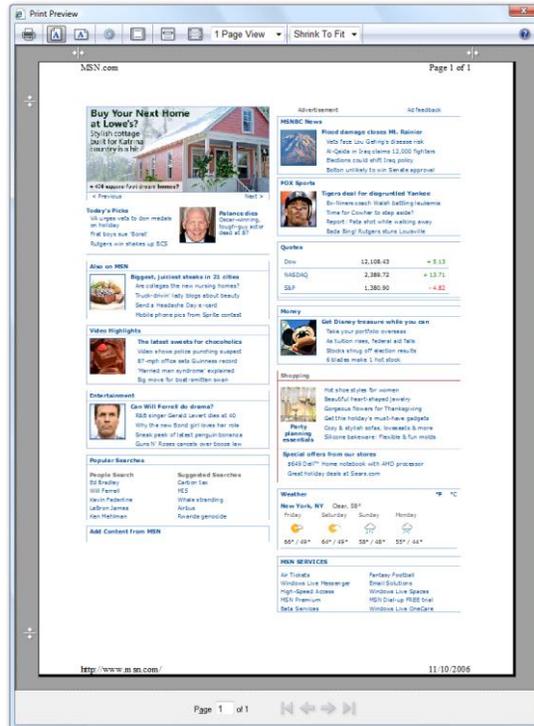
As part of Microsoft’s efforts to simplify the common tasks that users perform every day, Internet Explorer 7 includes enhanced functionality that makes it easier to print a webpage.

By default, Internet Explorer 7 shrinks a webpage’s text just enough to ensure that the entire page prints properly—you no longer need to cut and paste the page into a text-editing program. You can also adjust webpage margins, change the page layout, remove headers and footers, and increase or decrease the print space.

Print Preview also enables you to print the whole webpage or just part of a webpage. If you want to print the webpage without graphics or ads, you can do that. You simply select the text and/or graphics you want to print (using the mouse) and select Print Preview. Print Preview shows only the area you selected and prints it accordingly.



Internet Explorer 6  
(Normal printing)



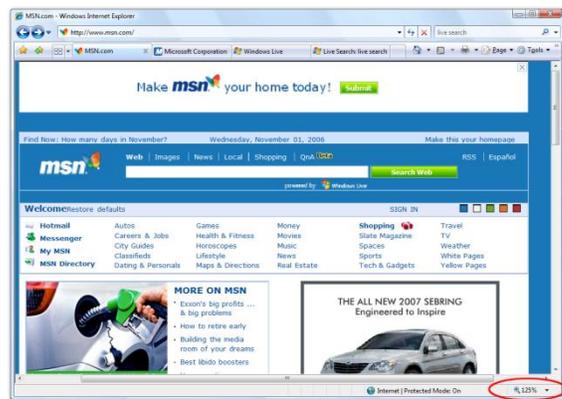
Internet Explorer 7  
(Shrink to Fit Printing)

### Page Zoom

To improve the user experience, Internet Explorer 7 introduces the Page Zoom feature, which enables you to increase or decrease the page size for easier viewing. Not only can you change the text size, but you can also modify any graphics or any text embedded in graphics. You can also enlarge hard-to-read text or small thumbnail images on websites.



Normal View

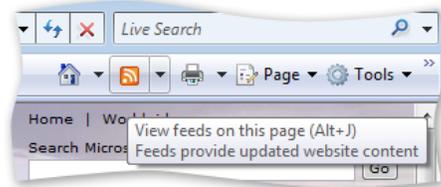


Zoomed View

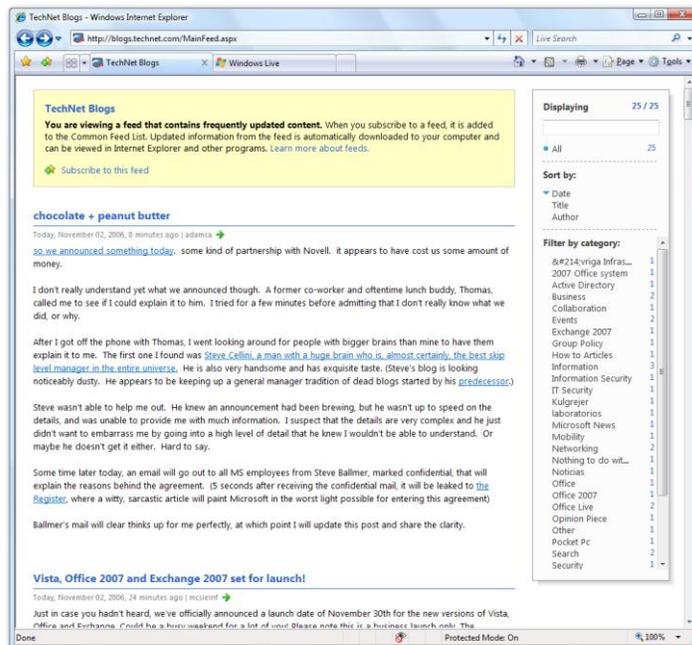
## RSS feed support

With new integrated support for RSS in Internet Explorer 7, users can easily discover, subscribe to, and read RSS feeds directly in the browser. You can have personalized sports, news, or shopping feeds delivered directly to you.

Web publishers use RSS to create and distribute feeds that include links, headlines, and summaries. With an RSS reader, you can subscribe to many feeds and read new entries all in one place, without visiting individual websites.



In earlier versions of Internet Explorer, RSS feeds are rendered in the browser in raw XML, which is unreadable by anyone but the most technical users. In Internet Explorer 7, users can read the feed directly in the browser, scan for important stories, and get a description of the content. You can also subscribe to a feed with a single click—a process that is very similar to adding a website Favorite.



Internet Explorer 7 also supports an RSS platform so all applications can share the same set of RSS subscriptions. This enables developers to focus on creating new end-user experiences rather than on the details of RSS functionality. More details on this functionality are provided in the upcoming “Improved Platform and Manageability” section.

## Making Everyday Tasks Easier—Key Features

Feature	Brief Description
Advanced printing	Automatically scales a printed webpage so it is not wider than the paper it's printed on. Internet Explorer 7 also includes a multi-page Print Preview with live margins, resizing of text to avoid document clipping, and an option to print only selected text.
Favorites Center	Offers easy and fast access to Favorites, Tab Groups, Browsing History, and RSS feed subscriptions. Expands out when needed and can be pinned in place for even easier access.
Instant Search	You can run a web search query using your favorite search provider by entering it in a search box on the Toolbar. This eliminates the clutter of having a separate toolbar. You can choose a provider from the drop-down list and easily add more providers.
Page Zoom	Enlarge or zoom in on individual webpages, including both text and graphics, to focus on specific content or make the content more accessible to those with vision limitations.
Quick Tabs	Provides easy tab selection and navigation by displaying thumbnails of all open tabs in a single window.
RSS feeds	Automatically detects RSS feeds on sites by illuminating an icon on the toolbar. With a single click on the icon, you can preview and optionally subscribe to the site's feed, and then be automatically notified as content is updated. Read RSS feeds directly in the browser, scan for important stories, and filter your view with search terms or site-specific categories.
Simplified user experience	The Internet Explorer 7 frame is noticeably simpler, more streamlined, and less cluttered with unnecessary items compared to earlier versions. This maximizes the screen real estate devoted to the webpages that users want to view and makes it easy to perform the most common browsing tasks.
Tabbed browsing	You can view multiple sites in a single browser window and easily switch from one site to another via tabs at the top of the browser frame.
Tab Groups	You can group and save tabs into logical categories, allowing you to open multiple tabs with a single click. You can easily set a Tab Group as the Home Page Group so the entire Tab Group opens every time Internet Explorer is launched from the Start Menu.

## Dynamic security protection



Web browsers perform a broad range of functions in the computing environment. They must be open and flexible enough to handle a wide variety of web site functionality and at the same time be secure enough to prevent unwanted data access or application behaviors. Managing this balance is a top priority for Microsoft.



Vulnerabilities exist in all sophisticated software code; the differences essentially come down to how difficult they are to exploit and what a hacker who exploits them can do. Some security vulnerabilities are not even technological in nature. For example, malicious individuals can exploit social behaviors and use misinformation techniques to trick users into turning over personally identifiable information through obscured websites, confusing dialog boxes, and unexpected add-on behavior. Web browsers represent an alluring target for hackers because in addition to the large installed user base, many users can be easily confused and have not applied all security updates in a timely manner.



Windows XP Service Pack (SP) 2 greatly improved security in the operating system, reducing vulnerabilities by more than 25 percent compared to the original release of Windows XP running Internet Explorer 6. Microsoft is extending these improvements with significant security investments in Internet Explorer 7 for Windows XP and Internet Explorer in Windows Vista. Combined with the Microsoft Windows Defender application (formerly known as Windows AntiSpyware), the security built into Internet Explorer 7 provides more levels of defense in depth and security protection than ever before.

Microsoft has two primary security objectives with Internet Explorer 7:

- **Protection against malware.** Microsoft is committed to building customer confidence in the security of their browsing activity and helping to prevent the installation of unintended or malicious software. Microsoft defines *malware* as all malicious code or unwanted software, including worms, viruses, adware, and spyware.
- **Personal data safeguards.** Internet Explorer 7 helps to protect users from phishing attacks by preventing fraudulent websites from stealing user data and enables users to more safely and securely engage in legitimate e-commerce without divulging their personal information unintentionally.

### Protection against malware

*Malware*, short for malicious software, refers to software applications designed to damage or disrupt a user's system. The proliferation of malware and its impact on security were some of the key driving forces behind the design features of Internet Explorer 7. The new version has been improved to reduce the potential for hackers to compromise a user's browser or system by limiting the amount of damage that can be done should malware find its way onto a user's system. In addition, Internet Explorer 7 includes several technical features designed to thwart hackers' efforts to lead users into giving away personal data when they should not. Core parts of the browser's architecture have also been fortified to better defend against exploitation and improve the way the browser handles data.

### Protected Mode

Available only to users running Internet Explorer 7 in Windows Vista, Protected Mode provides new levels of security and data protection for Windows users. Designed to defend against “elevation of privilege” attacks, Protected Mode provides the safety of a robust Internet browsing experience while helping prevent hackers from taking over the browser and executing code through the use of administrator rights.

In Protected Mode, Internet Explorer 7 in Windows Vista cannot modify user or system files and settings without user action. All communications occur via a broker process that manages the communication between the Internet Explorer browser and the operating system. The broker process cannot be scripted to act without user input, thereby reducing the likelihood of automated and/or unwanted software installation. Any scripted actions or automatic processes are prevented from downloading data or affecting the system.

Internet Explorer running in Protected Mode is restricted from writing to any local machine zone resources other than temporary Internet files, and attempts to write to those areas are harmlessly rerouted to a temporary storage area to provide compatibility with older applications. Protected Mode also supports tabbed browsing security protection by opening new windows—rather than new tabs—for content contained outside the current security zone.

### ActiveX Opt-In

Internet Explorer offers web developers the ActiveX platform as a mechanism to greatly extend browser capabilities and enhance online experiences. Some malicious developers have co-opted the platform to write harmful applications that steal information and damage user systems. Many of these attacks have been made against ActiveX controls that shipped with the Windows operating system, even though the controls were never intended to be used by Internet-facing applications.

Internet Explorer 7 offers a powerful new security mechanism for the ActiveX platform. ActiveX Opt-In automatically disables entire classes of controls—all controls that the developer has not explicitly identified for use on the Internet—which greatly reduces the attack surface and thereby mitigates the potential misuse of preinstalled controls. Now you’re prompted by the Information Bar before you can access a previously installed ActiveX control that has not yet been used on the Internet. This notification mechanism enables you to permit or deny access when viewing unfamiliar websites. For websites that attempt automated attacks, ActiveX Opt-In protects users by preventing unwanted access and giving the user total control. If you want to enable an ActiveX control for loading, you just click the Information Bar.

### Protection against cross-domain scripting attacks

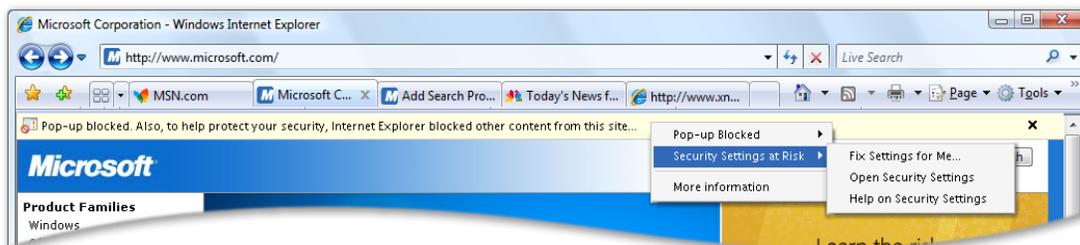
Cross-domain scripting attacks involve a script from one Internet domain manipulating content from another domain. For example, a user might visit a malicious page that opens a new window containing a legitimate page (such as from a banking website) and prompts the user to enter account information, which is then extracted by the hacker.

Internet Explorer 7 has been improved to help deter this malicious behavior by appending the domain name from which each script originates and allowing that script to interact only with windows and content from that same domain. These cross-domain script barriers help ensure that user information is seen only by those to whom the user has intentionally provided it. This new control further protects against malware by limiting the potential for a malicious website to manipulate flaws in other websites and initiate the download of some undesired content to a user’s PC.

## Fix My Settings

Most users install and operate applications using the default configuration, so Internet Explorer 7 ships with security settings that provide the maximum level of usability while maintaining controlled security. A custom application might legitimately require a user to lower security settings from the default, however. In such cases, it is critical that the user reverse those changes when the custom settings are no longer needed.

Internet Explorer 7 introduces the Fix My Settings feature to alert users that they are browsing with unsafe settings. This new feature warns you with an Information Bar when current security settings might put you at risk. When you make changes in the Security Settings window, you also see red highlighting if you try to modify certain critical items. In addition to getting dialog box alerts warning you about unsafe settings, you are reminded by the Information Bar as long as the settings remain unsafe. You can instantly reset the security settings to the Medium-High default level by clicking the Fix My Settings option in the Information Bar. If you close your browser and reopens it with unsafe settings, you will be navigated to a neutral page and further informed that you are browsing in an unsafe way.



## Advanced Protection against spyware with Windows Defender

Microsoft Windows Defender enhances security and privacy protections when used with Internet Explorer 7. By extending protections against malware at the browser level, Windows Defender helps prevent malware from entering the machine via piggyback download, a common mechanism by which spyware is distributed and installed silently along with other applications.

Although the improvements in Internet Explorer 7 cannot stop non-browser-based spyware from infecting the machine, using Internet Explorer 7 with Windows Defender provides a solid defense to protect users at several critical security decision points. Windows Defender is available for Windows XP SP2 as well as Windows Vista.

## URL-handling protections

Historically, attackers have taken advantage of internal code design issues within the web browser to attack a system. Hackers have relied on users clicking on an HTML link that references some type of malformed URL that contains odd or excessive characters. In the process of parsing the URL, the system's buffer overflows and executes code that the hacker wants to install. Given the size of web browser application code, the most efficient way to prevent these types of attacks has been to issue updates as each attack is discovered and the root cause identified. Yet even if only a handful of such updates were required, the more optimal solution would be to rewrite the baseline application code to minimize such malicious activity.



To learn more about Windows Defender, please turn to [3.09: Windows Defender](#) on page 82.

By rewriting certain sections of the code, Microsoft has drastically reduced the internal attack surface of Internet Explorer 7 by defining a single function to process URL data. This new data handler ensures greater reliability while providing more features and increased flexibility to address the changing nature of the Internet as well as the globalization of URLs, international character sets, and domain names.

## Personal data safeguards

Most users are unaware of how much personal, traceable data is transmitted with every click of the mouse while they browse the Web. The extent of this information continues to grow as browser developers and website operators develop their technologies to enable more powerful and convenient user features. With some basic website development tools, malicious website operators can build near replicas of well-known and trusted websites. Most online users are likely to have trouble discerning a valid website from a bogus copy.

**More consumers are buying online.** The extent to which convenience and discount pricing are available online gives users an attractive reason to click and buy. The Internet enables any large or small business to easily create an online storefront for selling goods and thereby reach a consumer audience well beyond traditional physical and geographic boundaries. Search engine marketing efforts allow these websites to establish instant consumer credibility and reach millions of users through some of the largest search engines and portal websites. These factors lead to situations in which consumers are dealing with distant businesses and have few concrete mechanisms to differentiate legitimate businesses from those seeking to collect their personal information for improper gain. Another challenge facing users is the ability of malicious website operators to attract unsuspecting consumers by mimicking the appearance and function of well-known and trusted businesses.

**Increase in phishing.** Malicious website operators also use a technique known as *phishing*, which is masquerading online as a legitimate person or business for the purpose of acquiring users' personal information. Over the past year, phishing attacks have been reported in record numbers, and identity theft is emerging as a major threat to personal financial security.

Unlike direct attacks where hackers break into a system to obtain account information, a phishing attack does not require technical sophistication but instead relies on users willingly divulging information such as financial account passwords or Social Security numbers. These socially engineered attacks are among the most difficult to defend against because preventing them requires user education and understanding rather than merely issuing an update for an application. Even experienced professionals can be fooled by the quality and details of some phishing websites as hackers become more experienced and learn to react more quickly to avoid detection.

Internet Explorer 7 offers a range of enhancements and solutions to better protect users from malicious websites and confusing URLs. The new Security Status Bar, located next to the Address Bar, helps users quickly differentiate authentic websites from suspicious or malicious ones. One way it does this is by enhancing user access to digital certificate information that helps validate the trustworthiness of e-commerce websites. Internet Explorer 7 also provides a simple file cleanup utility that deletes the browsing history for better protection of privacy and passwords.

## Security Status Bar

In recent years, encrypted communications and Secure Sockets Layer (SSL) technologies have been introduced to better protect users' information. Still, many Internet users remain overly trusting when websites ask for their confidential information. With the explosion of home-based and small business websites selling goods that span the pricing spectrum, users are even more likely to encounter unknown entities asking for their financial information. The combination of these factors creates a situation ripe for abuse. Internet Explorer 7 addresses this issue by providing users with clear, prominent, color-coded visual cues indicating the safety and trustworthiness of a website.

Earlier versions of Internet Explorer placed a gold padlock icon in the lower right corner of the browser window to designate the trust and security level of the connected website. Given the importance and inherent trust value associated with the gold padlock, the Security Status Bar in Internet Explorer 7 displays the padlock icon more prominently.

Users also can view a website's digital certificate information with a single click on the icon. Digital certificates, issued by recognized entities known as certificate authorities, serve two functions: 1) they provide third-party validation of the authenticity or trustworthiness of a business or website, and 2) they provide cryptographic encryption of data communications to keep information safe and secure as it is passed between the website and browser.

The Security Status Bar also supports information about High Assurance (HA) certificates for stronger identification of secure sites such as banking sites. These sites can be secured with High Assurance SSL certificates, also known as Enhanced Validation, which indicates that the site has gone through a thorough auditing process by the certificate authority. Internet Explorer 7 highlights these validated sites with a green-shaded address bar and prominently displays the associated business or entity name.

To provide users with another visual cue for recognizing questionable websites, the padlock icon appears on a red background if Internet Explorer 7 detects any irregularities in the site's certificate information. By contrast, for websites bearing certificates with proper credential data, the Address Bar clearly displays the name of the certificate owner and a gold background to indicate the higher level of safety and trustworthiness.

## Microsoft Phishing Filter

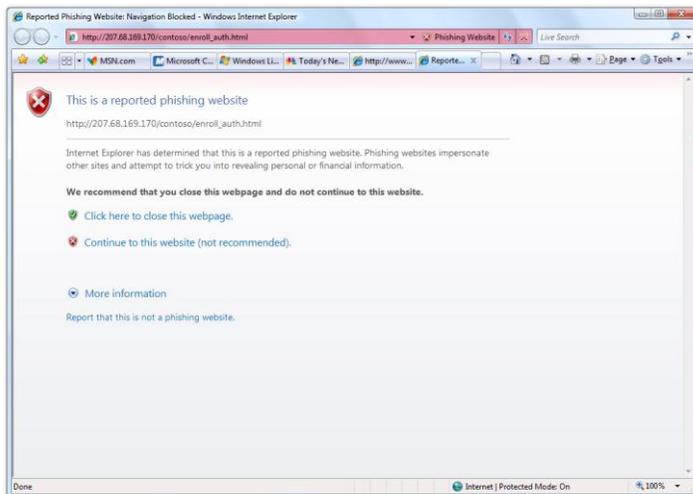
Individuals who engage in phishing and other malicious activities thrive on lack of communication and limited sharing of information. The new Microsoft Phishing Filter in Internet Explorer 7 uses an online service that is updated several times an hour with the latest industry information about fraudulent websites, and it warns Internet Explorer 7 users about suspicious sites. The filter is designed around the principle that early warning systems must derive information dynamically and update it frequently in order to be effective.

The Phishing Filter combines client-side scans for suspicious website characteristics with an opt-in online service. It helps protect users from phishing scams in three ways:

- It compares the addresses of websites a user attempts to visit with a list of reported legitimate sites that is stored on the user's computer.
- It analyzes sites that users want to visit by checking those sites for characteristics common to phishing sites.

- It sends the website address (only the address, with no personally identifiable information) that a user attempts to visit to an online service run by Microsoft to be checked immediately against a frequently updated list of reported phishing sites.

If the destination has been confirmed as a known phishing site, Internet Explorer 7 signifies the threat level (in red) and automatically navigates the user to a neutral page



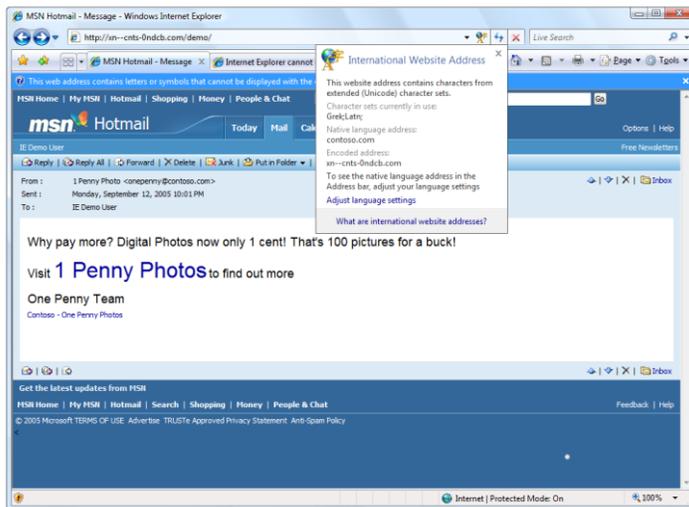
that contains a warning. If a site has not been confirmed as a phishing site but is behaving in a way similar to a phishing site, the Address Bar is flagged as yellow and warns the user of the suspicious behavior. The user can report any phishing sites or false positives to the Microsoft Phishing Filter directly from the browser. The browser is shipped with the Phishing Filter neither on nor off. The user must make a selection the first time the browser is run after installation. Both enabling or disabling the Phishing Filter requires only a single click in the browser.

## URL-display protections

Hackers commonly attempt to mislead users into thinking they are looking at information from a known and trusted source. A valuable hacking tool has been the ability to hide true URL information and domain names from users. Internet Explorer 7 contains two powerful visual tools to help prevent users from being duped: an Address Bar in every window and Internationalized Domain Name (IDN) support.

- **Address Bar in every window.** With Internet Explorer 7, all browser windows require an Address Bar. Because hackers often abuse valid pop-up window actions to display windows with misleading graphics and data to convince users to download or install malware, the requirement of a read-only Address Bar in each window helps ensure that users know more about the true source of the information they are seeing.
- **IDN display protections.** The Internet encompasses a global community, and browsers must be able to handle non-English characters and domain names. Operators of malicious websites have used international character display issues as a mechanism for phishing attacks against users and as a way to hide the true website domain name. The problem derives from international alphabets: many characters in certain languages (e.g., the letter *a* in English) can resemble entirely different characters in other languages (e.g., the letter *ä* in Cyrillic). As a result, an individual with malicious intent might register a domain name similar to a legitimate one to fool users into submitting their content to a false site. Previous versions of Internet Explorer did not have IDN support and thus were not vulnerable to this kind of attack.

Internet Explorer 7 natively delivers full IDN functionality and display protections and also provides extensive security mechanisms to protect users from attack. One of the core



security features of IDN support in Internet Explorer 7 is the multiple-language display in the Address Bar.

Internet Explorer 7 IDN rules force the display of the Punycode domain name format when multiple character sets are contained within a single domain name label. IDN support is aware of operating system language settings, and only enabled language character sets are displayed in their native language characters. Certain language combinations, such as Chinese and English, are always displayed in Punycode and are never valid in the same label because they

do not share a common character set. Other language combinations, such as French and English, might be displayed either in Punycode or natively in IDN, depending on which languages are enabled on the user's system. For example, if both French and English language support are enabled, the URL [www.microsoft.com](http://www.microsoft.com) is displayed properly in the Address Bar because the two languages share a common character set base. However, if support for both languages is not enabled, the address is displayed in Punycode because it mixes both the French and English character sets in the same label portion. The Address Bar displays *www.xn--microsoft-03a.com* instead, alerting the user to the suspicious URL.

## Delete Browsing History for better protection of privacy and passwords

Removing all personally identifiable and tracking information from the browser is crucial to maintaining online privacy, especially in shared computing environments. Earlier versions of Internet Explorer provide mechanisms for deleting history information, cleaning the cache, erasing automatically completed form history, and clearing the Start/Run history. But removing this data requires deleting each set individually, and not all of the necessary removal buttons are located on a single screen or within one area.

Internet Explorer 7 provides a Delete Browsing History option that provides users with one-click cleanup to easily and instantly erase personal data. Delete Browsing History is especially valuable in shared-resource environments. Accessing online resources using a friend's computer seems harmless enough, but you must rely on the security of your friend's system to protect your data. Likewise, in public environments such as libraries, schools, and conference centers, computers might be used by hundreds of people and potentially expose personal data and history information to every one of those users. Delete Browsing History provides a simple mechanism to instantly erase information and eliminate any concern about data privacy on other systems.



To learn more about Parental Controls, please turn to [4.02: Parental Controls Settings](#) on page 143.

## Parental Controls

Internet Explorer 7 in Windows Vista uses a network layer filter component—available to all Windows Vista applications—that allows parents to establish filter controls for a range of settings, including controls for objectionable content or for defining a specific set of allowable websites to browse.

Internet Explorer 7 in Windows Vista works directly with the Parental Controls service to provide easy access to logging information and a single interface for managing settings. The Parental Controls service can also be set to block file downloads, offering another way to prevent malware from getting on a system.

## Dynamic Security Protection—Key Features

Feature	Brief Description
ActiveX Opt-In	Disables nearly all preinstalled ActiveX controls to reduce the attack surface, and requires user consent before a previously unused control can be accessed. Users can easily enable or disable ActiveX controls as needed through the Information Bar and the Add-on Manager.
Add-ons Disabled Mode	To help troubleshoot difficulties with launching Internet Explorer or reaching specific websites, users can start in Add-ons Disabled Mode, where only critical system add-ons are enabled.
Address Bar protection	Every window, regardless of whether it is a pop-up or a standard window, presents a read-only Address Bar to the user, helping to block malicious sites from emulating trusted sites.
Cross-domain barriers	These prevent scripts on webpages from interacting with content from other domains or windows. This enhanced safeguard further protects against malware by limiting the potential for malicious websites to manipulate flaws in other websites or cause the user to download undesired content or software.
Delete Browsing History	Enables users to clean up cached pages, passwords, form data, cookies, and history, all from a single window.
Fix My Settings	Prevents users from browsing with unsafe settings by warning them with an Information Bar when current security settings might put them at risk. When you make changes in the Security Settings window, you also see red highlighting if you try to modify certain critical items. In addition to getting dialog box alerts warning about unsafe settings, you are reminded by the Information Bar as long as the settings remain unsafe. You can instantly reset Internet security settings to the Medium-High default level by clicking the Fix My Settings option in the Information Bar.
High Assurance SSL	Internet Explorer 7 provides support for the new High Assurance certificates, coloring the Address Bar green to indicate that the site has completed the additional validations and independent verification processes of certificate authorities. High Assurance certificates help increase user trust for online transactions and visually alert the user when they are present—all of which helps safeguard personal data.
Internationalized Domain Name Support	In addition to adding support for Internationalized Domain Names in URLs, Internet Explorer also notifies the user when visually similar characters in the URL are not expressed in supported language character sets or combinations, thus protecting the user against sites that could otherwise appear as a known, trustworthy site.

Feature	Brief Description
Parental Controls	To help keep kids safe online, parents can control browsing behavior through the parental control settings built into Windows Vista. The child's safety level can be monitored and safely changed remotely. The safety level carries over to many PC activities other than browsing the Internet, such as playing games or accessing the machine outside of certain approved usage times. Further, a parent can view a child's browsing session logs, and these logs cannot be removed without the parent's permission.
Phishing Filter	Proactively warns and helps protect users against potential or known fraudulent sites and blocks the site if appropriate. The opt-in filter is updated several times per hour using the latest security information from Microsoft and several partners to help identify fraudulent websites.
Protected Mode	Internet Explorer 7 in Windows Vista runs in isolation from other applications that run on the operating system. Exploits and malicious software are restricted from writing to any location beyond Temporary Internet Files without explicit user consent.
Security Status Bar	Enhances user awareness of website security and privacy settings by displaying color-coded notifications next to the Address Bar. Internet Explorer 7 changes the Address Bar to green for websites bearing new High Assurance certificates, indicating that the site owner has passed extensive identity verification checks. Phishing Filter notifications, certificate names, and the gold padlock icon also reside next to the Address Bar for better visibility. Certificate and privacy detail information can easily be displayed with a single mouse-click on the Security Status Bar.
URL Handling Security	Redesigned URL parsing ensures consistent processing and minimizes possible exploits. The new URL handler helps centralize critical data parsing and increases data consistency throughout the application.

## Improved platform and manageability

Web developers have expressed frustration with peculiarities in the behavior of Internet Explorer 6, especially in the areas of standards support. In addition, application developers who want to take advantage of new web capabilities have been required to develop everything from the ground up. Network administrators have been looking for better ways to manage large numbers of browser users.

With Internet Explorer 7, the browser architecture has been reengineered to address better standards compliance and to support a variety of rich end-user experiences. In beta 1, Microsoft improved support for Cascading Style Sheets (CSS) and better transparency support for the Portable Network Graphics (PNG) bitmap image file format. The final release goes even further—Internet Explorer 7 is even more standards-compliant and makes web and application development easier. Yet, even with this new functionality, Internet Explorer 7 can still be centrally managed via Group Policy. In addition, a new version of the Internet Explorer Administration Kit (IEAK) is available to provide more deployment options.

## Improved CSS support

Cascading Style Sheets (CSS) is a style sheet language used to describe the presentation of a document written in a markup language. Its most common application is to style web pages written in HTML and XHTML. The CSS specifications are maintained by the World Wide Web Consortium (W3C).

Internet Explorer 7 prioritizes compliance with CSS standards by implementing the features that developers consider most important. In the process, it has addressed some of the major inconsistencies that can cause web developers problems when creating rich, interactive webpages. This includes fixing some positioning and layout issues related to the way Internet Explorer 6 handles `<div>` tags. More information about these bugs can be found at [www.positioniseverything.net/explorer/peekaboo.html](http://www.positioniseverything.net/explorer/peekaboo.html) and [www.positioniseverything.net/explorer/guillotine.html](http://www.positioniseverything.net/explorer/guillotine.html).

Internet Explorer 7 ships with improved CSS 2.1 support. Specific issues addressed by Internet Explorer 7 include the following:

- Ability to hover on all elements
- Fixed positioning
- CSS 2 selectors
- HTML 4.01 improvements
- Windowless Select Element

## Transparent PNG support

Internet Explorer 7 also adds support for alpha-channel transparent PNGs. PNG is a bitmap image file format that can indicate the exact degree of transparency a picture should have through a measurement called the *alpha channel*. With an alpha channel, designers can use special effects that were not supported in earlier versions of Internet Explorer. For instance, they can create webpage images with shadows that do not fully obscure the background image behind them.

## RSS feed platform

The Windows RSS Platform is included as part of Internet Explorer 7 for Windows Vista and Windows XP. This platform provides rich functionality for downloading, storing, and accessing feeds across the entire operating system, and it enables more users than ever to embrace RSS. This means that once a feed is subscribed to in one application, that subscription and all associated content are available to all applications across the operating system. The days of having siloed RSS data in different applications are over.

The Windows RSS Platform provides this rich data layer through two primary components:

- **Common Feed List.** Accessible through either the Windows RSS Platform application programming interfaces (APIs) or the file system, the Common Feed List provides a common storage location for all subscription sites. Any application can add or delete sites and can share information about feeds, such as how subscriptions are organized in folders.
- **Common Data Store.** Accessible through either the Windows RSS Platform APIs or the file system, the Common Data Store handles downloading, storing, and managing the read and unread status of feed data.

Microsoft expects that the use of RSS enclosures will increase substantially in the near term. The Common Data Store is an ideal tool for ensuring that the most updated content—such as text, calendar entries, pictures, podcasts, and many other types of files—is delivered and accessible to anyone who subscribes to it. Further, because the platform does all of the hard work of synching, parsing, and storing RSS feeds, it is much easier for application developers to build applications that use RSS for their synching strategy. Microsoft believes that this platform technology will contribute to a major increase in the number of applications that use RSS.

The initial users of the Windows RSS Platform will be technical enthusiasts who already use and subscribe to RSS, as well as application developers who are looking for a new technology to help them share varied content among applications. As RSS adoption grows and Internet Explorer installations increase, Microsoft expects widespread adoption of RSS by general users, often without them even knowing that RSS is the underlying technology.

## OpenSearch

Internet Explorer 7 supports OpenSearch 1.1, the latest Creative Commons release of the standard from A9.com, Inc., a subsidiary of Amazon.com, Inc. OpenSearch enables syndication formats such as RSS and Atom to be used in search applications. Further, the Instant Search in Internet Explorer 7 adopts OpenSearch extensions, permitting search engines to plug in to Internet Explorer simply by supporting OpenSearch.

## Improved AJAX support

AJAX, shorthand for Asynchronous JavaScript and XML, is a web development technique for creating interactive web applications. Internet Explorer 7 improves the implementation of the XMLHttpRequest as a native JavaScript object for rich AJAX-style applications. While Internet Explorer 6 handles XMLHttpRequest requests with an ActiveX control, Internet Explorer 7 exposes XMLHttpRequest natively. This improves syntactical compatibility across different browsers and allows clients to configure and customize a security policy of their choice without compromising key AJAX scenarios.

## Administration improvements

With Internet Explorer 7, administrators have centralized control over settings via Microsoft Active Directory Group Policy, which makes the browser more manageable. All previous and new features are manageable via Group Policy, including the Phishing Filter and all browser add-ons, to help administrators ensure that browser users comply with company standards. Further, fully customized Internet Explorer deployments are possible with the enhanced Internet Explorer Administration Kit 7 (IEAK 7). In addition, customers can confirm compatibility of their key applications and websites with Internet Explorer 7 using the Application Compatibility Toolkit 5.0 beta, available via the Microsoft Connections websites.

Internet Explorer continues to be supported as part of the Windows platform, with continuous incident response support provided by the Microsoft Security Response Center. Further, there is no change to Windows support life-cycle timelines with this new release, so administrators can be assured that Microsoft is standing behind the new release.

### Improved Platform and Manageability—Key Features

Feature	Brief Description
Alpha channel in PNG	Supports transparency within the PNG image format, resulting in better-looking websites that are simpler to build.
Application Compatibility Toolkit	Allows information technology (IT) pros and developers to understand any incompatibilities with their existing websites, applications, and deployments.
CSS improvements	Addresses many of the major inconsistencies that can cause web developers problems when producing visually rich, interactive webpages. Improved support for CSS 2.1, including selectors and fixed positioning, allows web developers to create more powerful effects without the use of script.
Group Policy improvements	Support for all aspects of Internet Explorer settings through Group Policy, greatly easing management across an enterprise.
Improved AJAX support	Improves the implementation of the XMLHttpRequest as a native JavaScript object for rich AJAX-style applications. While Internet Explorer 6 handles XMLHttpRequest requests with an ActiveX control, Internet Explorer 7 exposes XMLHttpRequest natively. This improves syntactical compatibility across different browsers and allows for clients to configure and customize a security policy of their choice without compromising key AJAX scenarios.
Internet Explorer Administration Kit	OEMs and deployment specialists can prepackage Internet Explorer with customized settings or additional programs for their users.
Open Search Extensions	In conjunction with Amazon.com, Microsoft submitted a set of RSS Simple List Extensions to the RSS community and released them under the Creative Commons license. Among other features, these extensions greatly simplify development of applications that interact with Open Search-compatible search engines.
RSS Platform	Provides rich functionality for downloading, storing, and accessing RSS feeds across the entire operating system and enables more users to embrace RSS. Once a feed is subscribed to in one application, that subscription, and all the associated content, is available across the operating system to any application that wants to consume it.

## 3.08 Security

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Although the IT industry has become much more effective in limiting the effect of malicious worms and viruses, threats continue to evolve as hackers become more sophisticated and as users become more connected to each other and to the Web via broadband Internet access.

To address the evolving nature of malicious threats, Microsoft's security efforts are built around complementary technologies that together provide you with layered, in-depth protection.

Building on the security advances in Windows XP Service Pack 2 (SP2), Windows Vista has been engineered to be the most secure version of Windows ever developed by Microsoft. It includes a number of new security features that, in combination, help you accomplish three important goals:

- Enjoy a PC free from malware, including viruses, worms, spyware, and other potentially unwanted software
- Have a safer online experience
- Understand when a PC is vulnerable and how to make it more secure

### Enjoying a PC free of malicious software

The effects of malicious software (also known as *malware*) can range from mere annoyances (such as the display of unwanted advertising when you view websites), to significant problems that can result in decreased PC performance, to identity theft involving your personal information.

In keeping with Microsoft's layered approach to security protection, Windows Vista includes new features that help prevent malware from being installed on your machine, help mitigate damage that malware can cause if it does infect your PC, and remove malware that has already been installed.

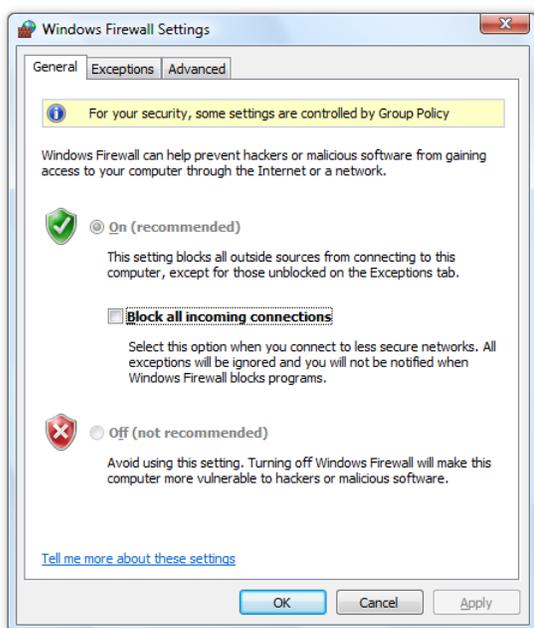
The anti-malware features discussed in this section include:

- Windows Firewall
- Windows Update
- User Account Control
- Internet Explorer 7 Protected Mode
- Windows Defender (for protection from spyware and potentially unwanted software)

When used in combination with other Microsoft software and services such as the Windows Malicious Software Removal Tool, Windows Live Safety Center, and Windows Live OneCare, or with antivirus applications available from third party security companies, Windows Vista can give you significant protection from malicious software.

## Windows Firewall

A firewall is a critical first line of defense against many types of malware. Properly configured, it can stop many kinds of malware before they can infect your computer or other computers on your network. Windows Firewall, which comes with Windows Vista, is turned on by default and begins protecting your computer as soon as Windows starts. The Windows Firewall Control Panel is designed to be easy to use, with several configuration options and a simple interface.



More advanced than the Windows Firewall in previous versions of Windows, the firewall in Windows Vista helps protect you by restricting other operating system resources if they behave in unexpected ways—a common indicator of the presence of malware. For example, if a component of Windows that is designed to send network messages over a given port on your PC tries to send messages via a different port due to an attack, Windows Firewall can prevent that message from leaving your computer, thereby preventing the malware from spreading to other users.



To learn more about Windows Update, please turn to [3.22: Windows Update](#) on page 133.

## Windows Update

Another important feature of Windows Vista is Windows Update, which helps keep your computer up-to-date by offering the option of automatically downloading and installing the latest security and functionality updates. This update process is designed to be simple and seamless—updating occurs in the background, and required restarts can be completed at a more convenient time.



To learn more about User Account Control, please turn to [6.05: Advanced Security](#) on page 246.

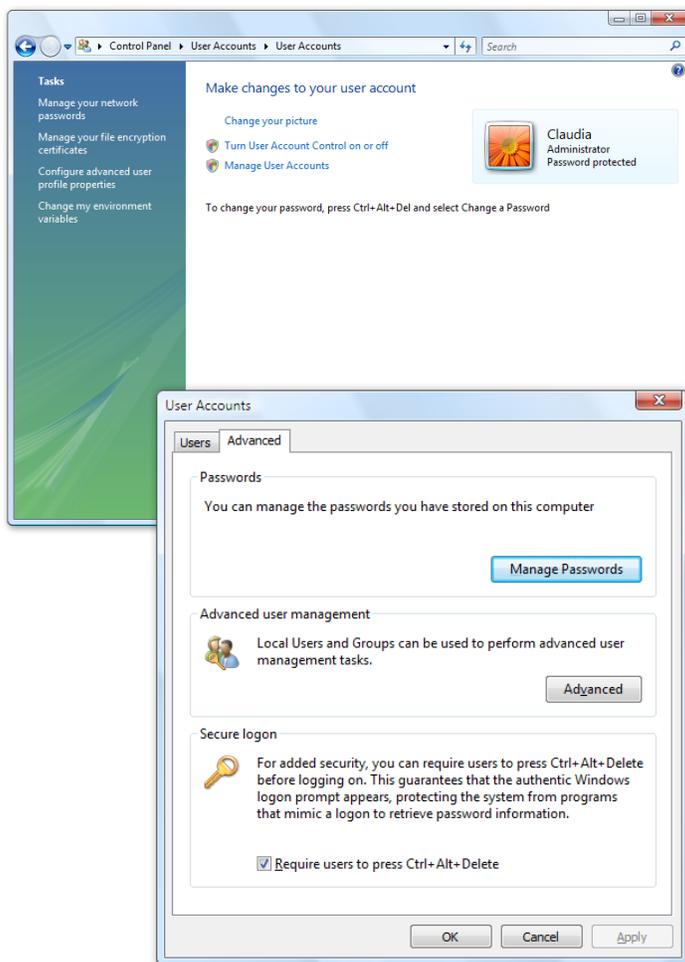
## User Account Control

Most user activities, such as surfing the Web, sending email, and using productivity applications, do not require administrative privileges. Yet most people log on to their home PC with an account that has full administrator privileges. This puts the PC at greater risk from viruses, spyware, and other threats.

User Account Control (UAC) in Windows Vista makes it easier to use your PC with standard user privileges. You can create a separate user account for each member of the family and control which websites, programs, and games each person can use and install.

UAC also helps families with children protect their PCs from malware such as viruses, worms, and spyware that might be hidden in programs that appeal to children. UAC makes it practical to give children their own standard user account, so that if a child tries to install a new piece of software, the system will prompt for an administrator account password to approve the action.

Even when you use an administrator account, UAC provides additional protection. By default, most programs run with the permissions of a standard user, which limits the potential damage they can do. If you need to start a program that requires administrator privileges, the system will prompt you for an administrator password.





To learn more about Protected Mode, please turn to [3.07: Internet Explorer](#) on page 53.

### Internet Explorer 7 Protected Mode

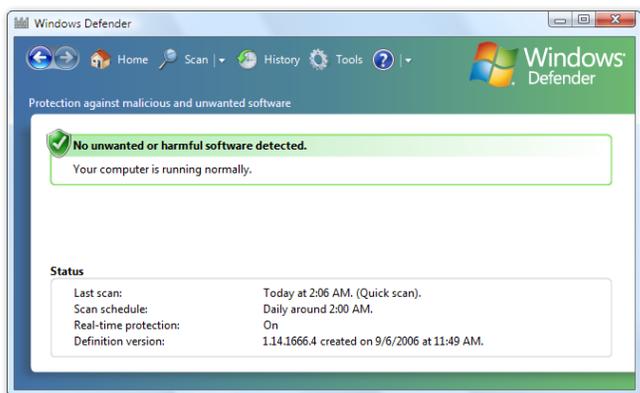
Internet browsers have become a common avenue for hackers to deliver malware or to try to cause damage to a user’s computer. Internet Explorer 7 in Windows Vista includes many security improvements to help protect against these attacks. For example, Internet Explorer Protected Mode provides a robust Internet browsing experience while helping to prevent hackers from taking over your browser and executing code without your intervention.



To learn more about Windows Defender, please turn to [3.09: Windows Defender](#) on page 82.

### Windows Defender

Windows Defender (previously known as Windows AntiSpyware) is a feature of Windows Vista that helps protect your PC by regularly scanning your computer’s hard drive and offering to remove any spyware or other potentially unwanted software that it finds. It also provides always-on protection that monitors key system locations, watching for changes that signal the presence of spyware and checking any files accessed against a constantly updated database of known spyware.



Note: Windows Vista does not include real-time (also known as “on-access”) virus protection. The features discussed above complement antivirus software but are not a substitute for third-party antivirus software such as Windows Live OneCare or the applications offered by third party security companies.

### Enjoying a PC Free of Malicious Software—Key Features

Feature	Brief Description
Internet Explorer 7 Protected Mode	In Protected Mode, Internet Explorer 7 cannot launch new applications or modify user or system files and settings without user consent.
User Account Control	A set of features that help minimize use of administrator privileges, reducing the impact of malware (such as viruses, worms, spyware, and other potentially unwanted software) on your PC.
Windows Defender	Helps protect your PC by regularly scanning your computer’s hard drive and offering to remove any spyware or other potentially unwanted software that it finds. It also provides always-on protection that monitors key system locations, watching for changes that signal the presence of spyware and checking any files opened against a constantly updated database of known spyware.
Windows Firewall	First line of defense against malware. Turned on by default, it begins protecting your computer as soon as Windows starts. It is easy to use, with few configuration options and a simple interface.
Windows Update	Helps keeps your computer up-to-date by offering the option of automatically downloading and installing the latest security and functionality updates.

## A safer online experience

The Internet is a vast resource for exploring, communicating, shopping, and learning. But as it has grown in scope and popularity, it has become an avenue for identity thieves trying to trick consumers into revealing valuable personal information, predators stalking instant messaging conversations, and malevolent hackers attempting to infect unprotected PCs with viruses.

Windows Vista includes new features designed to help protect users and provide families with a safer experiences online. These features include:

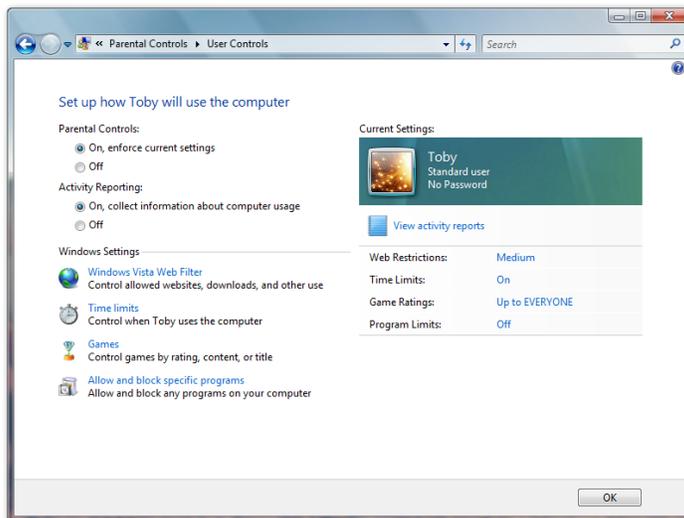
- Parental Controls
- Phishing Filter
- Internet Explorer 7 Security Status Bar
- Windows CardSpace



To learn more about Parental Controls, please turn to [4.02: Parental Controls Settings](#) on page 143.

### Parental Controls

Windows Vista introduces a comprehensive set of parental control features that offer parents greater peace of mind and an increased level of confidence in their ability to control what content their children can view when they use a computer.



The Parental Controls panel helps parents to:

- Limit when and for how long their children can use the computer
- Control which websites their children can visit and which software applications their children can use
- Restrict access to software games based on title, content, or ratings
- Read detailed reports about their children's computer usage



To learn more about Phishing Filters, please turn to [3.07: Internet Explorer](#) on page 53.

## Phishing Filter

Windows Vista includes advances that help protect users against *phishing*, a technique used by online scam artists to illegally obtain a user's valuable personal information, such as credit card numbers, passwords, and other account data.

Phishing Filter, a feature in Internet Explorer 7, uses a series of "checks" to help protect users from phishing scams. With the Phishing Filter, Internet Explorer 7 warns users about suspected phishing sites or redirects users to a warning page in the case of a known phishing site.



To learn more about the Security Status Bar, please turn to [3.07: Internet Explorer](#) on

## Internet Explorer 7 Security Status Bar

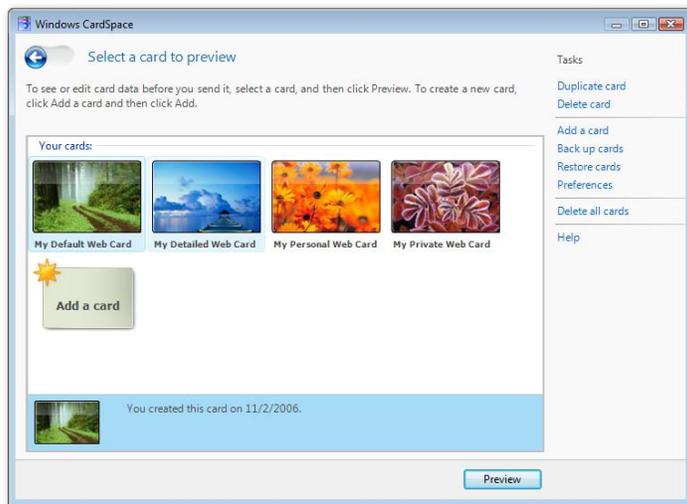
The new Internet Explorer 7 Security Status Bar, located next to the Address Bar, helps you quickly differentiate authentic websites from suspicious or malicious ones. It provides clear and prominent visual cues about the safety and trustworthiness of a website as well as one-click access to certificates that authenticate the legitimacy of valid websites. The new Security Status Bar prominently features a gold padlock icon to designate the trust and security level of a website. The Security Status Bar also displays special color coding to give users a more visual way to determine whether a site is legitimate.

## Windows CardSpace

Windows CardSpace is a new technology that offers users a way to organize and manage their digital identities, maintain fewer passwords, and better control what personal information they share over the Internet. When you visit a website that supports Windows

CardSpace, you'll have the option to submit an information card in lieu of a username and password to log in. Information cards are easy to submit via the new interface built into Windows Vista.

Windows CardSpace is more secure than a username/password approach because the personal information in the information card is encrypted and stored safely on your PC or with a trusted identity provider such as a bank, Internet service provider (ISP), or government agency.



To learn more about Windows CardSpace, please turn to [6.09: .NET Framework 3.0](#) on page 277.

### A Safer Online Experience—Key Features

Feature	Brief Description
Internet Explorer 7 Security Status Bar	Helps you quickly differentiate authentic websites from suspicious or malicious ones. It provides clear and prominent visual cues about the safety and trustworthiness of a website, and it offers one-click access to certificates that authenticate the legitimacy of valid websites.
Parental Controls	<p>Helps parents keep their children safe by:</p> <ul style="list-style-type: none"> <li>▪ Limiting when and for how long their children can use the computer</li> <li>▪ Controlling which websites their children can visit, which software applications their children can use, and who they can chat with when logged on to the Internet</li> <li>▪ Restricting access to software games based on title, content, or software rating</li> <li>▪ Viewing detailed reports about their children's computer usage</li> </ul>
Phishing Filter	Helps protect against phishing scams by analyzing sites you attempt to visit for characteristics common to phishing sites and checking website addresses against a frequently updated list of reported phishing sites maintained by Microsoft. You're warned when you attempt to visit a suspicious site and are advised not to proceed to a known phishing site.
Windows CardSpace	Helps users organize and manage their digital identities so they can maintain fewer passwords and better control what personal information they share over the Internet.

## Know if you're protected

With the evolving nature of threats on the Internet, it can be difficult to know if you're taking the appropriate steps to make your computer more secure. Independent surveys have shown that many users believe they have up-to-date virus protection when, in fact, they do not. New security features in Windows Vista help you know if you're protected and if you're not, and they provide the guidance and control you need to make your computer more secure.

## Windows Security Center

Windows Security Center (WSC) helps make your PC more secure by alerting you when your security software is not up-to-date or when your security settings have potential



weaknesses that should be corrected. For example, WSC shows you the status of your firewall settings and tells you whether your PC is set up to receive automatic software updates from Microsoft.

WSC originally debuted in Windows XP SP2. In response to feedback from customers and third-party security companies, Microsoft has made improvements to WSC in Windows Vista, including showing the status of antispyware software, Internet Explorer security settings, and User

Account Control. In addition, WSC can monitor multiple vendors' security solutions running on a computer and indicate which are enabled and up-to-date—a feature that other security center solutions do not have or do not do as well as WSC. Windows Security Center monitors the following security components for Windows Vista.

**Firewall:** Windows Security Center monitors the installation of a firewall solution, including the Microsoft Windows Firewall and third-party solutions. WSC monitors the presence of a firewall solution as well as the security state of the firewall. If any issue is detected with the firewall state, the user is alerted and provided with an appropriate guided experience to correct the problem from within Security Center.

**Automatic Updates:** Windows Security Center verifies that Automatic Updates is enabled and using Microsoft's recommended settings. If the Windows Automatic Updates service is not running or if settings differ from the recommended settings, the user receives an alert notification and will be provided with a way to enable Automatic Updates in WSC.

**Antivirus:** Windows Security Center verifies the installation of antivirus solutions. When present, WSC reports whether real-time scanning is enabled and if the virus signature files are up-to-date. If any of these conditions are not met, the user receives an alert notification and is prompted with a way to resolve the problem.

**Antispyware and other malware protection:** Windows Security Center verifies the installation of third party antispyware solutions as well as Windows Defender. When a third party antispyware solution is present, or Windows Defender is on, WSC reports on whether scanning is enabled and if the spyware definition files are up-to-date. If any of these conditions are not met, then the user receives an alert notification and is prompted with a way to resolve the problem.

**Internet security settings:** Windows Security Center monitors the security settings that are associated with Internet Explorer and alerts the user whenever those security settings are lower than the recommended levels, which might put the user at risk. WSC provides a button to restore settings which the user can use to have WSC fix the settings or take the user to the control panel where the user can fix the settings manually.

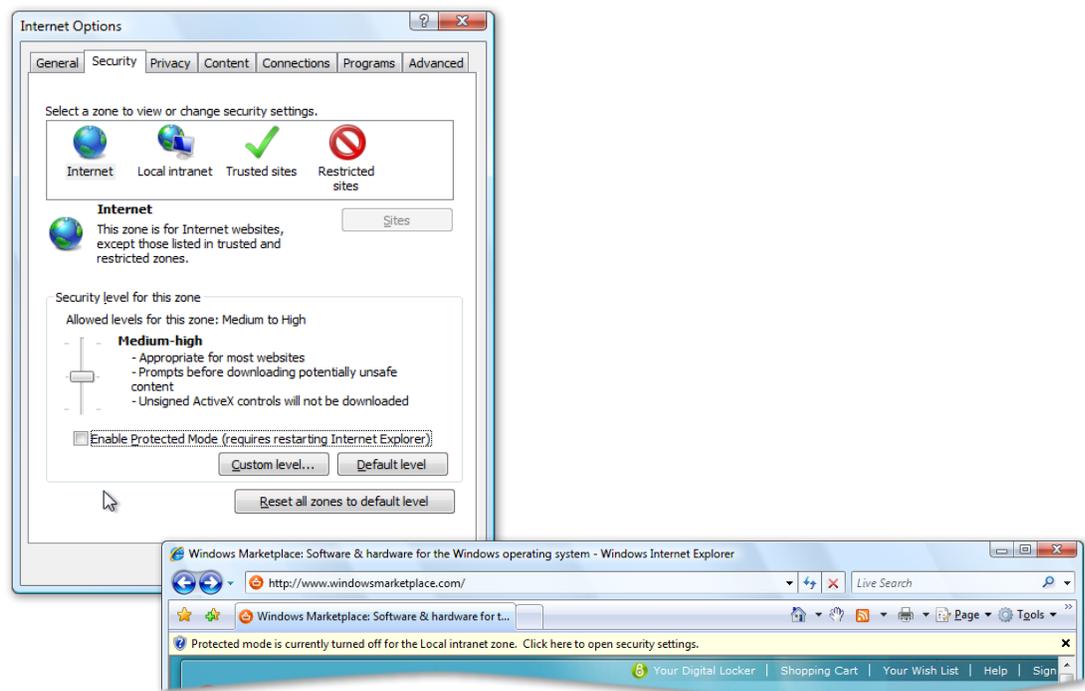
**User Account Control:** To help ensure a safer computing experience, the User Account Control (UAC) service and policy must not be disabled or degraded. Window Security Center monitors the status of UAC and notifies the user if UAC has been changed to a setting different from what Microsoft recommends. WSC provides a button to restore UAC to the recommended settings in this case.



To learn more about Fix My Settings, please turn to [3.07: Internet Explorer](#) on page 53.

## Fix My Settings

Internet Explorer 7 ships with security settings that provide the maximum level of usability while maintaining controlled security. Sometimes a user might need to lower security settings from the default, but it is critical that such changes are reset to the default when they are no longer needed. The new Fix My Settings feature helps keep you protected by warning you when your current security settings might put you at risk and by giving you an easy way to get safe again. It notifies the user within the browser itself and within Windows Security Center if the settings are in an insecure state.





To learn more about Remote Assistance, please turn to [3.22: Windows Update](#) on page 133.

### Remote Assistance

Another feature to help you get and stay secure is Remote Assistance, a collaborative Help tool that lets someone you trust remotely view and share control of your computer to assist in diagnosing and resolving computer troubles.

### Know if you're protected—Key Features

Feature	Brief Description
Fix My Settings	Alerts you with multiple cues when security settings are unsafe and provides options to correct them.
Remote Assistance	A collaborative help tool that lets another person remotely view and share control of your computer to assist in diagnosing and resolving computer troubles.
Windows Security Center	Alerts you when your security software is out-of-date or security settings have potential weaknesses that should be corrected.

## 3.09 Windows Defender

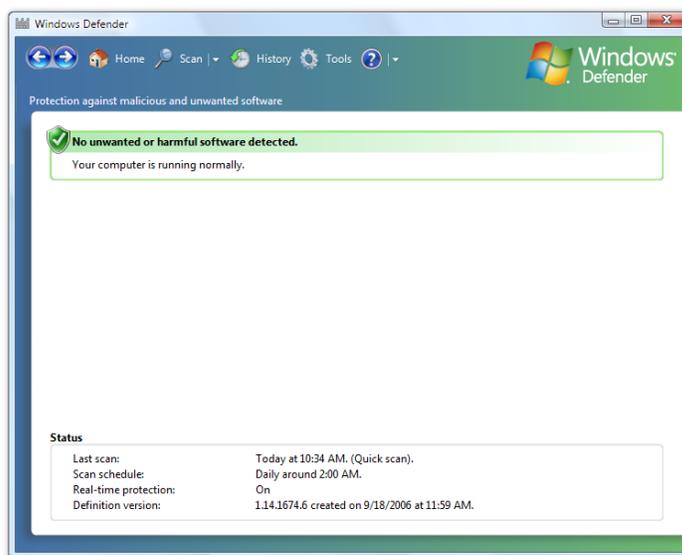


Windows Defender (formerly known as Microsoft AntiSpyware) is a feature of Windows Vista that helps customers protect their computer against pop-ups, slow performance, and security threats caused by spyware.

In this section, we use the term *spyware* colloquially to refer to an array of software programs that can be installed on a PC inadvertently or without consent of the user.

Windows Defender lets you make conscious choices about software installed on your PC by providing always-on protection that monitors key system locations, watching for changes that signal the presence of spyware. Superior scanning and removal technologies use up-to-date spyware definitions created by Microsoft, with help from Windows Defender users who submit reports of potential new spyware.

From installation to maintenance and updates, Windows Defender is simple to use and comes with preconfigured settings and guidance to help you become more secure. An improved user interface gives you more control over your software. Common tasks such as scanning, blocking, and removing unwanted software are easier than ever, and a



Software Explorer helps you understand which software and services are running on your computer and stops or disables “rogue” software. Windows Defender automatically handles many common tasks and interrupts or alerts you only in the case of issues that require immediate action.

Windows Defender takes advantage of many of the platform enhancements in Windows Vista, including improved caching technology that allows scans to run faster and User Account Control, which enables the software to run without requiring the user to elevate privileges to scan or remove spyware

from the system.

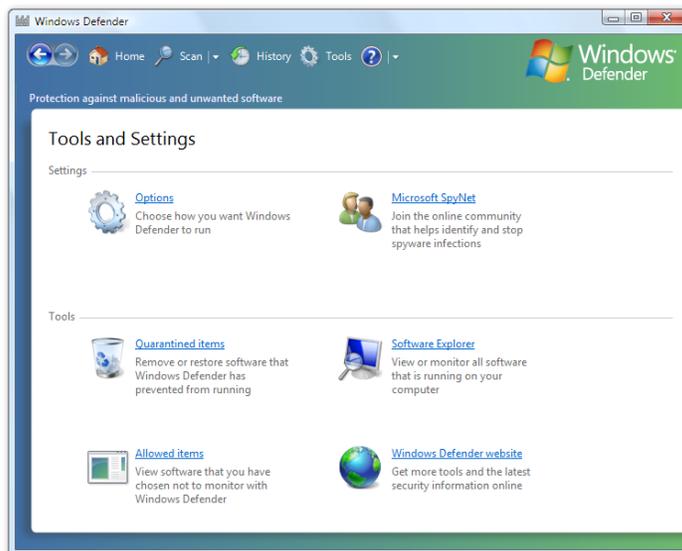
Integration with Microsoft Internet Explorer allows downloaded files to be scanned before they are saved or executed, reducing the chance that spyware might be installed by accident. “Scan on execute” functionality provides an added layer of protection, and integration with Windows Security Center helps you keep track of spyware protection alongside other security and safety features.

Windows Defender is available for Windows XP Service Pack (SP) 2, Windows Server 2003 SP1, and Windows Vista.

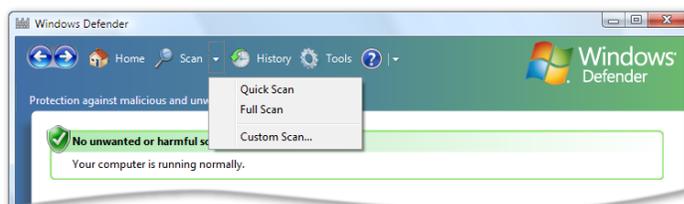
Only genuine Windows customers can receive product downloads, Windows updates, and special offers. Windows Defender will validate that your copy of Windows is genuine before installation on Windows XP SP2 and Windows Server 2003 SP1. Furthermore, Windows Defender will only remove severe threats for machines that are not genuine. Low, medium, and high threats will be detected, but not removed unless your copy of Windows is genuine.

## Spyware protection

To help protect your data and your computer, Windows Defender depends on three key technologies: scanning and removal of spyware, real-time protection, and ongoing updates.



Generally, a quick scan can detect the most common spyware on your computer. You can also elect to perform a full system scan, which takes longer but examines your entire computer for signs of spyware using a more comprehensive definition set. You can also specify a custom scan using the drop-down menu to scan specific areas of your computer, such as removable storage.



## Scanning for and removing spyware

By default, Windows Defender scans your computer for spyware every day at 2 a.m. unless you specify a different schedule. During the scan, Windows Defender automatically takes action on high, medium, and low alert items, depending on your preferences.

You can also quickly scan the most common locations, such as program files and Internet Explorer browser Help objects on your computer at any time by clicking the Scan button.

Once a scan is complete, Windows Defender notifies you of any spyware it discovers on your computer. It then prompts you with options for dealing with each threat and recommends appropriate action in most cases.

Generally, there are four actions you can take if a threat is detected:

- **Ignore:** No action is taken, but the potential threat will continue to be detected in future scans.
- **Quarantine:** Backs up the software in a safe location and then removes it. This prevents the software from running, but it can be restored if needed.
- **Remove:** Deletes the software from the computer entirely.

- **Always Allow:** Adds the software to the “allowed items” list. It will not be detected in future scans.

Windows Defender can scan and remove software even if the user running it is not an administrator—by default, non-administrators can take action on detected items. They can choose to remove, quarantine, or ignore items.

## Real-time protection

Scanning can remove existing spyware, but to help protect against new or unknown threats, Windows Defender includes monitoring agents for real-time protection. Several security agents monitor critical areas of the computer that spyware might attempt to modify: autostart, system configuration, Internet Explorer add-ons, Internet Explorer configuration, Internet Explorer downloads, services and drivers, application execution, application registration, and Windows add-ons. These critical areas of the computer represent the common entry points for spyware.

Typically, spyware must modify one of these areas to run automatically or spy on what you're doing without your consent. If any changes occur to these areas, Windows Defender notifies you and lets you allow or block this activity. Some legitimate software might behave in suspicious-looking ways, so Windows Defender helps you make decisions about whether to allow it on your system by showing you the percentage of other Windows Defender users who have allowed it. Typically, legitimate software will have a very high “allow” rate.

## Updated definitions

Since spyware is a constantly evolving threat, Windows Defender automatically makes sure it has the latest definitions before a scheduled scan, so you are better protected from new threats. Definition updates are created by Microsoft analysts with help from an active, worldwide community of Windows Defender users who submit spyware reports. These reports help keep Microsoft—and you—ahead of new and emerging threats posed by spyware.

Customers can opt in to this community (currently called Microsoft SpyNet) at two different levels. If you choose the recommended settings during Windows Vista setup, you automatically join with a basic membership. Basic member reports contain certain standard computer information, which may include information about the files or programs in question, such as filenames, cryptographic hash, vendor, size, and date stamps. In addition, full URLs can be collected to indicate the origin of the file, and might occasionally contain personal information such as search terms or data entered in forms.

Advanced member reports are more comprehensive and may occasionally contain personal information from, for example, file paths and partial memory dumps. Advanced members are also alerted about unknown software that exhibits behaviors similar to spyware. To the extent that any personal information is included in any SpyNet report, Microsoft does not use the information to identify you or contact you. These reports, along with reports from other Windows Defender users who are participating in Microsoft SpyNet, enable Microsoft researchers to discover new threats more rapidly. Spyware definitions are then created for programs that meet the analysis criteria, and the updated definitions are made available to all users through Windows Update.

To learn more about Windows Defender's privacy policy, and about the information collected by SpyNet reports, go to

<http://www.microsoft.com/athome/security/spyware/software/privacypolicy.mspx>.

## Control over software on your computer

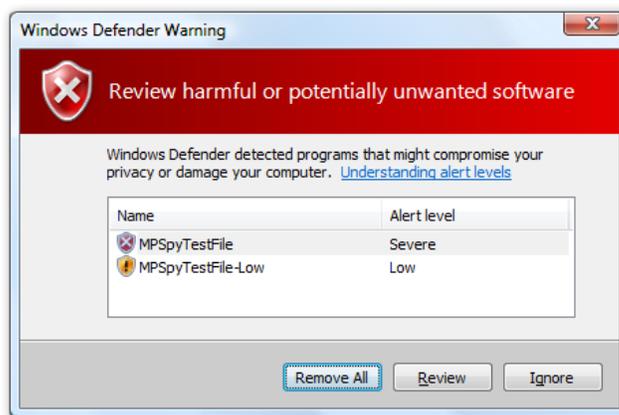
Windows Defender gives you a clearer view of and more control over the software on your computer. When it detects suspicious actions by unknown software, it alerts you to the potential threat. It also includes a number of tools and features that help you keep track of what software you have, understand threats and alerts, and keep track of scanning and protection activity.

### Understanding alerts

Windows Defender alerts you when it detects suspicious behavior on your computer or discovers known spyware during a regularly scheduled scan. It adjusts these alerts based on the alert level of the potential threat.

When changes occur from software that has not yet been classified, a small notification appears in the system tray. For potentially unwanted or malicious software, a yellow or red

alert warning dialog is displayed (that is, yellow for the former, red for the latter, and red if both potentially unwanted and malicious software is detected) because these items generally require immediate action. You can either take immediate action or click Review to get more information about the software. When multiple items are discovered, only one alert is shown to minimize interruptions and allow you to take action quickly and get back to using your computer.



### Software Explorer

To help you understand which software and services are running on your computer, automatically running on startup, or communicating over the Internet, Windows Defender includes a Software Explorer that lists these processes and helps you stop or disable "rogue" software.

### Windows event log

You can also keep track of Windows Defender's activity—including alerts, detection, and removal, and installation of new definitions—using the Windows event log. You can review or audit previous actions you have taken by searching in Event Viewer for events created by Windows Defender.



To learn more about the Windows event log, please turn to [6.04: Management](#) on page 241.

### Windows Defender—Key Features

Feature	Brief Description
<b>Thorough Spyware Removal</b>	
Advanced spyware detection	For quickly and easily finding known spyware programs.
Scan scheduler and automatic, configurable cleaning	Maintains your computer with regularly-scheduled spyware scans and automatic cleaning.
Software Explorer	For quick discovery and removal of unwanted programs that might have been installed without your consent.
Spyware quarantine and removal, spyware threat details	Straightforward and thorough spyware removal returns your computer to normal.
<b>Continuous Spyware Protection</b>	
Browser hijack detection	Easily blocks Internet settings changes attempted by spyware.
Intelligent user alert	Protection that does not distract you from using your computer.
Real-time protection	Continuously guards against common ways that spyware gets on your computer.
<b>Up-to-date Defenses</b>	
Automatic Definition Updates	Automatically helps protect you from the latest threats.
SpyNet voting network	Helps stop new spyware threats faster.

## 3.10 Windows Backup and Restore

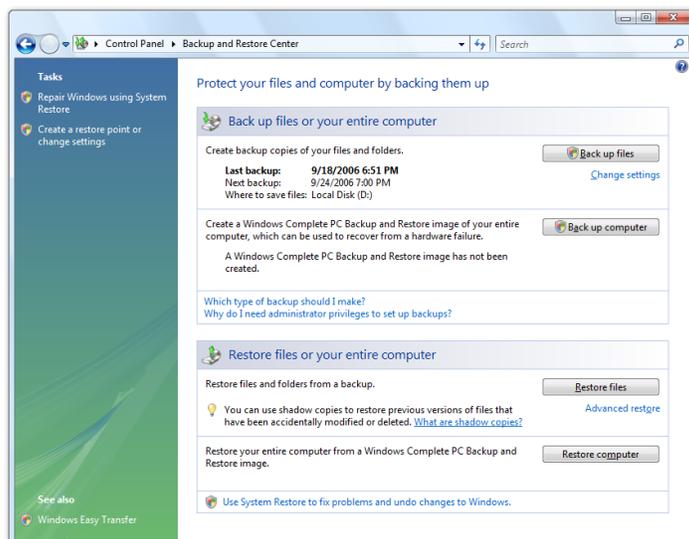


Although backing up key files and system information is important, not everyone takes the time to do so. Research has shown that customers want easier ways to pick the right files and folders to back up, as well as built-in support for common backup media such as CDs and DVDs.

The Backup and Restore features in Windows Vista address these needs by enabling customers to pick the type of files they wish to back up. And with built-in support for CD and DVDs, Windows Vista Backup and Restore makes backing up and restoring important files easy. Customers can restore files from single CDs/DVDs or from multi-disc sets even if the entire backup disc set is not available. Customers can also create partial backups.

### Backup and Restore Center

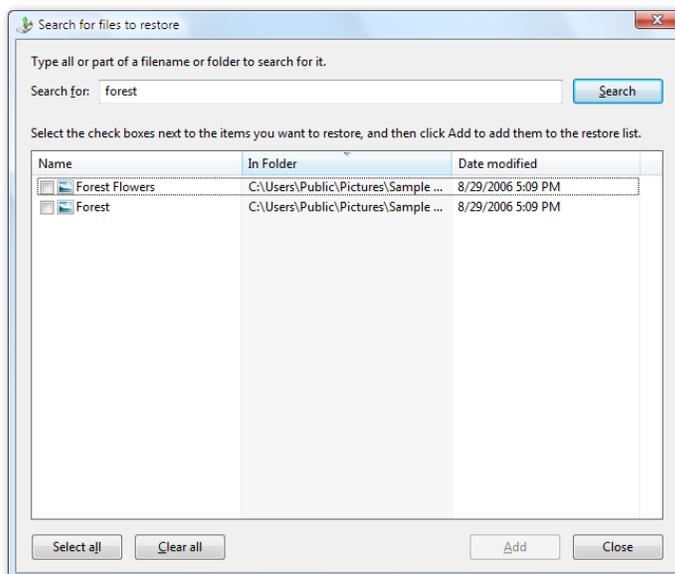
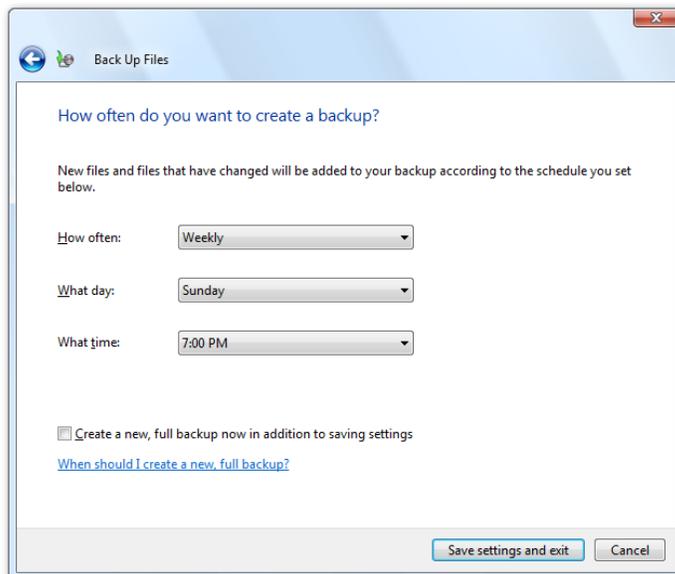
All of the Backup and Restore features are presented in a single, unified control panel, called the Backup and Restore Center. It provides a single location from which you can access and manage your backup and restore activities.



### File backup and restore

Windows Vista helps you easily back up the files on your PC when and where you choose to back them up, with the convenience of automated scheduling. Copies of all selected data file types on your PC, from all locations on your disk, are created in storage so you can easily access them when the need arises. For ease of use and to prevent confusion, programs and system files are not included in the file backup. They can be separately restored by reinstallation or by using full system backup/restore as well as system restore points.

Windows Vista provides a comprehensive backup experience, much easier to use than the basic backup utility included in Windows XP. The new File Backup feature gives you many choices for storing your backed-up information. You can choose to back up to CD-ROM, DVD-ROM, an external hard disk connected to your PC by universal serial bus (USB) or IEEE 1394, another hard disk on your PC, or to another PC or server connected to your network.



You no longer have to regularly remember to back up your data. You can use a simple wizard to schedule when and where you want your data to be backed up, and Windows Vista will take care of it on its own.

Windows Vista conserves backup storage space by incrementally backing up only the changes made since the last backup. When multiple CDs or DVD disks are used, each backup disk is self contained, so that you can restore files even if not all of the disks are available.

Of course, backup is only as useful as the recovery experience, which has been expanded in scope in Windows Vista. A wizard helps you select the files or folders to restore and prompts you for the restore media. It then restores the files you select to their original location or to a location of your choosing. If you are not sure what files to restore, you can use the Search feature to search within your backup store for the files you need.

You can also restore files to another PC, in which case the Restore feature can create your user account on the new PC if it is not available there.

## Windows Complete PC Backup and Restore

While file restore is useful in cases of file loss and data corruption, Windows Complete PC Backup and Restore is most useful for disaster recovery when your PC malfunctions.

Available only to Business, Enterprise, and Ultimate Edition users, Complete PC Backup and Restore is capable of restoring your whole PC environment, including the operating

system, installed programs, and user settings, as well as data files. You can restore your PC content back to its original PC if its hardware problems were fixed, or to a replacement PC if not. Complete PC Backup and Restore can be initiated from within Windows Vista as well as from the Windows Vista installation CD in the event the PC is so corrupt it cannot startup normally from the hard disk.

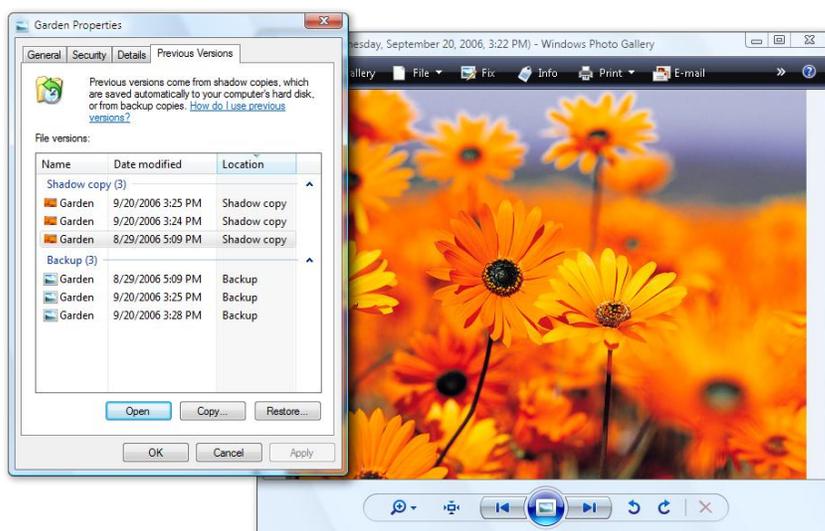


## Shadow Copy

Have you ever accidentally saved over a file you were working on? Accidental file deletion or modification is a common cause of data loss. Windows Vista includes a useful innovation to help you protect your data: Shadow Copy. This feature, available in the Business, Enterprise, and Ultimate Editions, automatically creates point-in-time copies of files as you work, so you can quickly and easily retrieve versions of a document you may have accidentally deleted. Shadow Copy is automatically turned on in Windows Vista and creates copies on a scheduled basis of files that have changed. Since only incremental changes are saved, minimal disk space is used for shadow copies.

This feature is easily accessed by right clicking a file or folder and selecting Restore previous versions. It allows you to go back in time and access your files and folders as they were on previous dates. You can preview each file in a read-only version to determine which file to restore. Then, to fully restore it, you can just drag the file to a folder, or select it and click

Restore to restore it to its original location.



It works on single files as well as whole folders. When restoring a file, all previous versions that are different than the live copy on the disk are shown. When accessing a previous version of a folder, users can browse the folder hierarchy as it was in a previous point in time.

## System Restore

While file backup can recover your data files, System Restore can recover your system files, executable program files, and registry entries—everything your operating system needs to be able to run. When going back to a restore point, your PC is returned to its state at that particular time. This is very useful when your PC malfunctions and needs to be returned to a previously “known to be good” working state.

System Restore was introduced in Windows ME to allow people to restore a computer that was not working well to a previous state, without affecting personal data files (for example, Microsoft Office Word documents, graphics files, and email messages). System Restore uses “restore points” to give you a convenient way to roll back your computer. You don't have to worry about creating these restore points with System Restore—they are created automatically at the time of significant system events (such as when you install a software application or driver), as well as once a day otherwise. System Restore automatically creates easily identifiable restore points, which you can use to revert your system to the way it was at a previous time.

System Restore in previous versions of Windows was based on a file system filter that monitored changes to system files, and then made a full copy of the file each time it was changed. If you encountered a problem, you could roll back the system files and the Windows registry to their previous state at a date when the PC was known to have worked properly.

System Restore has been improved in Windows Vista. It now uses shadow copies to store incremental copies of system files that have changed. This allows for a more reliable restore process as well as faster restores. If your PC is in critical condition and you cannot run System Restore from it, you can now use the Windows Recovery Environment by running it from the Windows installation CD. System Restore now also includes an “undo” option, by providing an automatically created restore point before attempting changes to the system, for cases when you restore and then decide to back out of it.

These innovations in Windows Vista help ensure you don't lose important information, as well as keep your PC in good health. Overall, Windows Vista offers multiple layers of backup and restore protection from hardware failure and usage errors.

### Windows Backup and Restore—Key Features

Feature	Brief Description
Automatic Backup Scheduling	Backup your files automatically at scheduled intervals.
Backup and Restore Center	Find all of the Backup and Restore Features in a single, unified control panel.
Complete PC Backup and Restore	Backup or restore your complete PC, including the operating system, installed programs, user settings as well as data files.
Incremental Backup	Windows Vista conserves backup storage space by incrementally backing up only the changes made since the last backup.
Shadow Copy	Quickly and easily retrieve versions of a document you may have accidentally deleted.
System Restore	Recovers your system files, executable program files, and registry entries.

## 3.11 Performance



New technology in Windows Vista makes your PC significantly more responsive in performing everyday tasks. Improved startup and sleep performance helps both desktop and mobile PCs get up and running more quickly. And Windows Vista manages both memory and input/output (I/O) devices more efficiently, making the computer more consistent and more responsive to user applications. And as the computer ages, a number of features work together to help keep the PC running as quickly as when it first arrived.

Windows Vista also incorporates a new approach to addressing performance issues and offers a Performance Information and Tools Control Panel that helps users easily understand their PC's performance characteristics and manage and troubleshoot performance issues. Because some Windows Vista features and third-party applications will work only if your machine meets certain hardware requirements, a new Windows Experience Index scale helps you understand how your PC measures up and whether those features and applications will work on your machine.

In addition to in-the-box improvements, Windows Vista is designed to take advantage of the latest hardware to improve system performance. Windows ReadyBoost (formerly code named "EMD") uses flash memory to boost performance without the need for you to add RAM. Windows ReadyDrive (formerly code named "Hybrid Hard Drive") takes advantage of new hybrid hard disk technology to improve reliability, battery life, and performance. Finally, state-of-the-art self-tuning and diagnostics make it much easier for users and information technology (IT) administrators to manage performance effectively.

### Startup, sleep, and shutdown performance

Windows Vista users will experience improved performance in all "on" and "off" transitions. With Windows Vista, users are able to quickly place the computer in sleep mode using the power button in the Windows Start Menu or, if configured, the PC's hardware power button. (Sleep is a new power state that combines the quick resume benefits of standby, with the data protection benefits of hibernate.)



To learn more about the Sleep power state, please turn to [3.13 Mobile PC](#) on page 102.



When entering Sleep, Windows Vista automatically manages memory using Windows SuperFetch, the new memory manager in Windows Vista that is discussed later in this chapter. SuperFetch helps ensure that when the user resumes the computer from Sleep, the Windows Desktop and open Programs are responsive and consistently available within just a couple of seconds.

Although infrequent, when the user does need to restart their computer from the fully-off state, Windows Vista performs many initialization tasks in the background (such as loading items in the Startup folder) to help users access their desktop and programs quickly.

## Improved responsiveness

Inconsistency in PC performance is one of the top issues for computer users. Consider this common problem: One morning, applications launch quickly and everything seems to be working well. Then you go out for lunch, and the computer slows down. Another day, applications seem to take longer to launch in the morning.

Users want to be able to count on consistent responsiveness from their machines. Windows Vista includes a number of innovative technologies that help ensure that you can launch applications quickly when you start your machine, and that these applications will continue to be responsive throughout the day.

Windows Vista uses memory more efficiently, improving performance by providing new scheduling mechanisms for time-critical work. These improvements provide a more consistent and responsive user experience, with fewer blocking disk I/Os and less performance degradation from background system activities.

### Windows SuperFetch

A new memory management technology in Windows Vista, Windows SuperFetch helps make the computer consistently responsive to user applications by making better use of the computer's RAM. Most existing memory management schemes employ a most-recently-used memory management algorithm, in which the content last accessed remains in RAM until it is replaced by something else. When users leave their machines to attend a meeting or go to lunch, background applications often would take this opportunity to execute actions such as indexing, virus scans, or system management functions. When the user returned to use an open application, they would often find it sluggish because the content related to that application was no longer "warmed up" in memory—it had been forced out by the indexer or virus scanner. Users frequently found that applications that ran quickly *before* they left their desk were much less responsive when they returned because of imperfect memory management.

Windows SuperFetch improves system responsiveness by managing memory using a new algorithm that prioritizes user applications over background tasks and adapts to how each user works. With SuperFetch, background tasks still run when the machine is idle. However, when the background task completes, SuperFetch repopulates memory with the data the user was accessing before the background task ran, so when users return to their desks, their applications continue to run as quickly as before.

SuperFetch also helps improve PC responsiveness by tracking which applications are used most often on a given machine and preloading these applications into memory. This makes the system more responsive at startup or when a switch is made to a different user profile. SuperFetch uses an intelligent prioritization scheme that can even differentiate which applications you're more likely to use on the weekend than during the week, so the computer is ready with the applications that are most likely to be needed at any given time.

## Low-priority I/O

While SuperFetch allows Windows Vista to manage memory much more effectively, memory is not the only resource needed to ensure responsiveness. Applications also compete for access to input/output (I/O) devices, such as the system's hard drive. One of the benefits of Windows is that multiple programs can run simultaneously. However, if multiple applications are trying to access the same system resource—such as the hard drive—at the same time, performance can suffer. Prior to Windows Vista, all applications had equal priority when it came to I/O access. If a background process such as a virus scan was running at the same time that you were trying to access a file on the hard drive, the two applications would compete for access to the hard drive, significantly slowing the responsiveness of the PC for the task you were trying to perform.

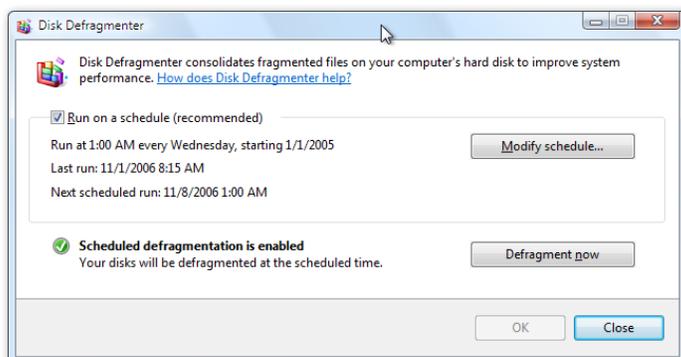
Windows Vista introduces the concept of low-priority I/O, which allows background processes to run with lower-priority access to the hard drive than user applications. If an application is written to use low-priority I/O, it can run at the same time as a user application without slowing the user application. In Windows Vista, a number of services are written to use low-priority I/O, including search indexing, automatic disk defragmentation, and Windows Defender's daily system scan.

## Automatic disk defragmentation

Infrequent disk defragmentation leads to an inefficient layout of files on the hard disk, which can slow PC performance. Windows Vista includes a new disk defragmenter that runs in the background and automatically defragments the hard disk as the need arises.

The new disk defragmenter no longer needs to complete in a single session—it can

defragment incrementally, whenever the computer is idle.



Disk defragmentation is one of the processes that takes advantage of low-priority I/O out-of-the-box. A hard disk can thus be defragmented in the background without hurting the responsiveness of your applications.

## Faster access to DVDs and music

Windows Vista includes a new feature called Windows HotStart, which helps people who use their mobile PCs for media and entertainment. Mobile PCs can include a separate button for media playback that starts up right into Windows Media Player or the Media Center user interface. So when you use a mobile PC on a long flight, HotStart lets you quickly get to DVDs or music, saving both time and battery life.



To learn more about the Windows Experience Index, please turn to [3.03 Windows Experience Index](#) on page 26.

## Rating PC Performance

Windows Vista introduces the Windows Experience Index (WEI) to help you understand your PC's performance capabilities, and to ease the task of buying new PCs, hardware and software. The Windows Experience Index is a simple numeric system that rates how well your PC can run the performance-oriented features in Windows Vista, such as the new Aero user interface, multiple monitors, high definition TV, and personal video recording. The numerical rating can also help you match the right software to run on your PC.

## Diagnosing performance issues

The built-in performance diagnostics in Windows Vista can detect and self-correct many performance issues. Performance diagnostics provide instrumentation and services for both user-driven and tool-driven diagnoses of common problems, including glitchy media playback, slow application startup, slow startup of the operating system, and network-related delays. Built-in performance diagnostic tools track how long it takes to execute common activities, analyze performance declines, and display results in the Performance Center, where users can then take action to remedy the problem. Performance issues are also written to the system event log, where they can be monitored by users or by support professionals.

Windows Vista also includes new tools and instrumentation that make it easier for IT administrators to manage system performance. For example, performance counters are more widely implemented, reliable, and secure. For IT professionals, a new performance monitor snap-in to the Microsoft Management Console provides a better user experience and allows easier monitoring and diagnoses of performance-related issues.

## Performance gains from Windows Vista and new hardware

Today's PC marketplace has an extraordinarily wide range of PC hardware. To take advantage of the varied landscape, Windows Vista scales its features so that it best uses the hardware available. For example, if a WDDM (Windows Driver Display Model) graphics card is present, Windows Vista shows the Windows Aero interface<sup>1</sup>. If a compliant graphics card is not present, Windows Vista will run, but will not show the Aero user interface.

The same is true of the performance features in Windows Vista. When the right hardware is present, it unlocks some of the most innovative performance features in Windows Vista: Windows ReadyBoost and Windows ReadyDrive.

<sup>1</sup> If other requirements to run Windows Aero are also met, including a version of Windows Vista that supports Windows Aero, such as Windows Vista Home Premium. [Windows Vista Product Guide](#)

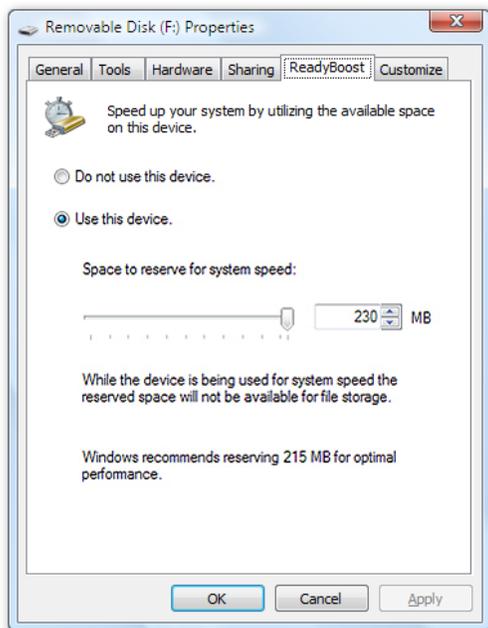
## Windows ReadyBoost

Adding system memory (typically referred to as RAM) is often the best way to improve a PC's performance, since more memory means more applications are ready to run without

accessing the hard drive. However, upgrading memory can be difficult and costly, and some machines have limited memory expansion capabilities, making it impossible to add RAM.

Windows Vista introduces Windows ReadyBoost, a new concept in adding memory to a system. You can use non-volatile flash memory, such as that on a universal serial bus (USB) flash drive, to improve performance without having to add additional memory "under the hood." The flash memory device serves as an additional memory cache—that is, memory that the computer can access much more quickly than it can access data on the hard drive. Windows ReadyBoost relies on the intelligent memory management of Windows SuperFetch and can significantly improve system responsiveness.

It's easy to use Windows ReadyBoost. When a removable memory device such as a USB flash drive or a secure digital (SD) memory card is first inserted into



a port, Windows Vista checks to see if its performance is fast enough to work with Windows ReadyBoost. If so, you are asked if you want to use this device to speed up system performance. You can choose to allocate part of a USB drive's memory to speed up performance and use the remainder to store files.

Windows ReadyBoost technology is both reliable and secure. You can remove the memory device at any time while using Windows ReadyBoost without any loss of data or negative impact to the system; however, when the storage device is removed, performance returns to the level experienced without the device. Wear on a USB drive is not an issue when you use it to enhance performance—a unique algorithm optimizes wear patterns so the USB device can run in this capacity for many years, even when heavily used. Finally, data on the storage device is encrypted to prevent inappropriate access.

The storage device must meet certain performance requirements to work with Windows ReadyBoost<sup>2</sup>. Please look for the phrase "Enhanced for Windows ReadyBoost" when buying your next removable storage device.

## Windows ReadyDrive

Windows ReadyDrive is a new feature in Windows Vista that enables PCs equipped with a hybrid hard disk—a new kind of hard disk that adds flash memory to a standard mobile PC hard drive—to see better performance, more reliability, and improved battery life.

By using the flash buffer on the hybrid hard disk to cache disk reads and writes, a PC equipped with a hybrid hard disk can actually read and write from the hard disk without needing to spin the disk. This means that Windows ReadyDrive can spin down the physical

<sup>2</sup> To use Windows ReadyBoost, the removable flash device must have at least 256 MB free and have fast enough read/write performance. It also must provide at least 1.75 MB/sec for *random* 4 KB reads and 1.75 MB/sec for *random* 512 KB writes.

disk and save battery power on the machine. In addition to saving power, this increases the ruggedness, because the next time you run from meeting to meeting with your laptop open, Windows ReadyDrive makes it less likely the disk will be spinning and susceptible to damage.

Like Windows ReadyBoost, the flash memory on the hybrid hard disk is used by Windows ReadyDrive to increase application performance. However, Windows ReadyDrive can also improve startup and hibernate resume time as well because key information—the information that will be needed early in the startup and resume process—is written to the flash, and can be accessed quickly.

### Performance—Key Features

Feature	Brief Description
Fast shutdown	Provides quick response to the user's request to sleep, shutdown, or restart, eliminating the confusion caused by delays or a lack of responsiveness and providing a consistent and reliable "off" experience.
Low-priority I/O	Windows Vista differentiates between high-priority, low-priority, and critical I/O, as well as deadlines for I/O requests. Allows background processes to run with lower I/O priority than user processes, for greater responsiveness.
Performance self-tuning and diagnostics	Detects and self-corrects problematic performance. Provides instrumentation and services that support user-driven and tool-driven diagnoses of performance problems, such as media glitching, slow application startup, slow system startup, and network-related delays.
Reliable power-state transitions	User-initiated transitions to sleep or shutdown (through a laptop lid closure or the new and simplified shutdown interface) occur with significantly increased reliability. This eliminates the "burning briefcase" issue, in which a laptop wakes to suspend the user state to the hard disk but fails to complete the transition, thereby overheating in a briefcase.
Sleep, fast startup	Sleep is the default "off" setting in Windows Vista. It delivers consistent and reliable power transitions, a simple usage model, two-to-three-second resume times, and nonvolatile protection of end-user data.
Windows Experience Index	A numeric rating system designed to help users understand the performance capabilities of their Windows Vista-based PC and the software they want to run on their machine.
Windows ReadyBoost	Windows Vista can use available memory on a memory device, such as a USB flash drive, as extra memory cache to provide more consistent and responsive performance.
Windows ReadyDrive	Windows Vista takes advantage of the additional capabilities of hybrid hard disk drives by proactively managing the nonvolatile cache that is integral to these hybrid devices. Windows ReadyDrive helps provide performance, battery life, and reliability advantages over standard drives.
Windows SuperFetch	Intelligent memory management lets users access their data more quickly. Optimizes based on usage patterns over time.
Windows System Assessment Tools (WinSAT)	A new set of tools in Windows Vista that run tests on the processor, memory, hard disk, general graphics, and gaming graphics and convert results into the Windows Experience Index ratings.



## 3.12 Networking

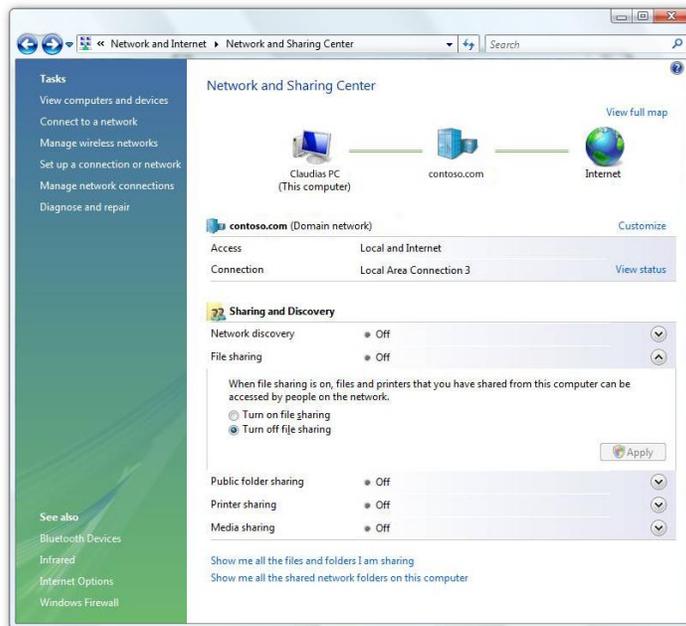


Windows Vista includes new features that make networking easier to set up, easier to use, and more secure and reliable. Whether at home or in a small business or large enterprise, Windows Vista makes connectivity easier so you can focus on what's most important. Connect wirelessly to your company's network, share a high-speed Internet connection and printers, copy files between computers, or enjoy your favorite online entertainment at home.

### Network and Sharing Center

Windows Vista puts you in control of your network experience with the Network and Sharing Center, where you can check your connection status, see your network visually, or troubleshoot a connection problem. The Network and Sharing Center informs you about the network your computer is connected to and verifies whether it can successfully reach

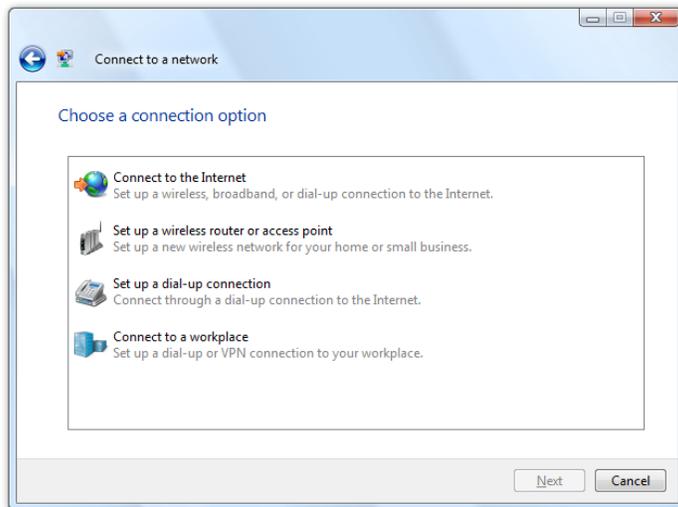
the Internet. It even presents this information in a summary form called the Network Map so you can immediately see your connectivity to the network and to the Internet. If a computer on the network loses Internet connectivity, you can graphically see which connection is down and then use Network Diagnostics to help determine the cause of the problem and find possible solutions.



## Connecting

Windows Vista streamlines the process of connecting to networks and enables you to connect to any type of network—local wireless networks, corporate networks through a virtual private network (VPN) or a remote access service (RAS), or dial-up—all in one easy-to-find place. This view of connectivity options is just one click away from the Start Menu.

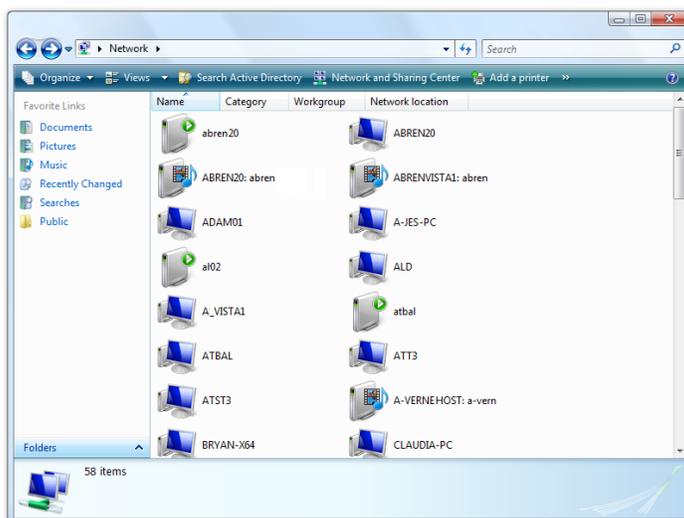
Wireless networking is also more secure, with enhanced support for the latest wireless security protocols, including Wi-Fi Protected Access 2, or WPA2. To improve the overall user



experience, rather than showing multiple pop-up notifications, Windows Vista shows a system tray icon on the lower right side of the screen with a single icon that indicates when wireless networks are available. Windows Vista also provides an easy way to create direct computer-to-computer (ad hoc) wireless connections to enable sharing and peer-to-peer applications, even when you're not connected to the Internet.

## Network Explorer

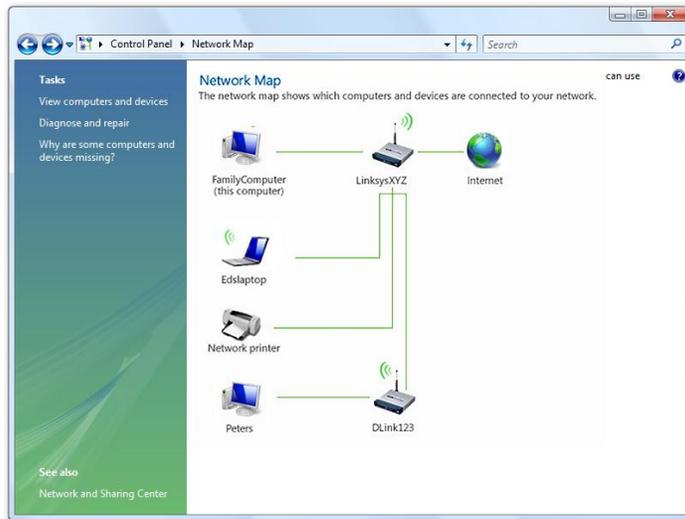
Once a network is set up, you can browse content on networked computers, devices, and printers, just like you browse the folders stored on your PC. The new Network Explorer in Windows Vista makes it easy to do this. It presents a view of all computers, devices, and



printers on the network, and it is significantly faster and more reliable than My Network Places in Windows XP. The Network Explorer displays computers and devices, even when they are not yet fully configured for the network. The Network Explorer can even use custom, representative icons for different devices (when enabled by manufacturers). You can also directly interact with selected devices—to adjust settings or control music playback, for example.

## Network Map

When you have multiple wired and wireless computers and devices connected to a network, it can be difficult to understand how everything is connected. Windows Vista provides a new feature called the Network Map, which shows an easy-to-understand



graphical view of everything on the network and how it is all connected. This helps you optimize your network for the best performance and easily locate any problems.

## Network Setup

With Windows Vista, setting up a network among multiple PCs and devices such as printers, music players, and game systems is simpler and more intuitive. The Network Setup Wizard easily and automatically identifies supported network devices, and it creates more secure connections to the network that help keep your network protected against intruders.

With Windows Connect Now, you can save network settings to a portable universal serial bus (USB) flash drive to make adding more supported PCs and devices to the network a quicker and easier process. Simply insert a USB flash drive into a PC or device, and it automatically reads the data and readies itself to join the network.

File and printer sharing is also easily enabled on each PC on the network from the Network Setup Wizard, so you can share documents, photos, music, and other files across your network.



## Network Awareness

Network Awareness is a platform in Windows Vista that reports changes in network connectivity to supported applications. This provides a more seamless and contextually relevant networked experience. As you connect to different networks, applications that support Network Awareness can modify settings and the user experience based on that network. For example, when you switch from your home network to a wireless network at your neighborhood coffee shop, your firewall settings can change so other users cannot see your computer and your shared files.

### Networking—Key Features

Feature	Brief Description
Connecting interface	A single, easy interface for viewing and connecting to all available wireless networks, corporate (VPN and RAS) connections, and dial-up connections. Helpful wizards are also available to help you set up these connections for the first time.
Network Awareness	A platform that reports changes in network connectivity to supported applications, enabling a customized user experience for each network.
Network and Sharing Center	A central, easy-to-use place for quickly viewing network status and important network settings.
Network Diagnostics	Windows can diagnose network problems when they occur and suggest solutions.
Network Explorer	In one place, you can browse all computers and devices on the network. The speed and reliability of discovering networked computers, servers, and devices is significantly improved compared to Windows XP.
Network Map	A visual map of the network that displays computers and devices as well as the ways in which they are connected. Broken connections are clearly displayed on the map, and you can use Network Diagnostics to help diagnose the problem and find possible solutions.
Network Setup Wizard	Easy, self-guided wizard that recognizes when supported networking hardware is connected and helps you create a network. It then guides you in using the Windows Connect Now technology to create a secure wireless network and easily connect devices and computers to it. Rather than writing these settings down, you can transfer them with a USB flash drive or an Ethernet cable.

## 3.13 Mobile PC



Mobile PC users face challenges every day that desktop computer users do not usually confront. Desktop computer users typically have a reliable source of power and are connected to a single network. In contrast, mobile PC users frequently must manage transitions as they move from place to place. Sometimes you're plugged in and sometimes you're using battery power. You might be connected to a corporate network in the morning, a wireless network in a client's conference room in the afternoon, and your home network in the evening.

Windows Vista addresses the unique needs of mobile PC users by providing several new and enhanced features. This section describes some of these key features and enhancements.

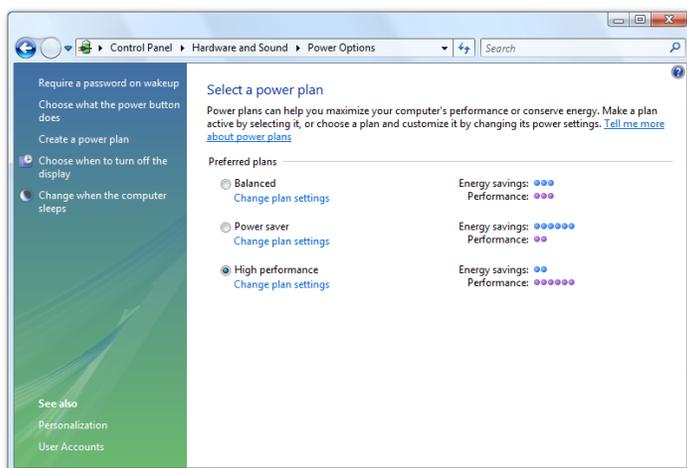
### Power management experience

You now have more control than ever over how your mobile PC uses and manages power. Windows Vista offers a simplified and more reliable power management experience compared to earlier versions of Windows.

### Power plans

Power settings in Windows Vista are based on power plans. A power plan is a collection of hardware and system settings that manages how your computer uses power. Power plans help you easily balance the tradeoff between power conservation and system performance. Windows Vista includes three Windows default power plans:

**Balanced.** This plan balances energy consumption and system performance by adapting your mobile PC's processor speed to your activity. For example, the processor speeds up when you play a multimedia game and slows down when you read a document.



**Power saver.** This plan saves power on your mobile PC by reducing system performance. You use it primarily when you want to maximize battery life.

**High performance.** This plan maximizes system performance on your mobile PC. You sacrifice some battery life to improve overall performance.

The Balanced plan meets most people's needs. You can easily change one or more settings in a Windows default power plan, such as

the amount of time that elapses before your mobile PC goes to sleep or goes into hibernation. And, new in Windows Vista, if you don't like the changes that you made to a plan, you can restore the plan's default settings.

You can also easily switch between power plans by using the improved battery meter on the task bar or on the battery tile in Windows Mobility Center. You can see all of the power plans on your mobile PC in the Control Panel and change settings there as well. The plan settings adjust when you are running on battery power, so you don't need to switch plans just because you pulled the plug.

## The sleep power state

In earlier versions of Windows, resuming from standby or hibernate is not always consistently fast or reliable. Windows Vista promotes the use of sleep so you can use your computer whenever you want, without having to wait for the computer to start. To put your mobile PC to sleep, simply click the Power button on the Start Menu. To wake your mobile PC, press the hardware power button.

Using sleep offers the following advantages:

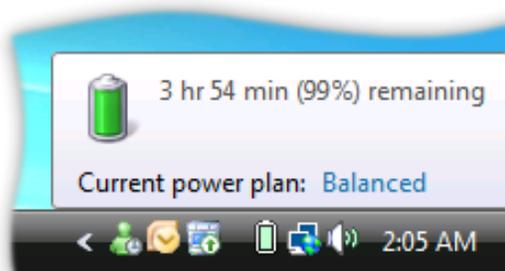
- Windows Vista saves your work and the state of your programs to memory and then puts the computer to sleep. If your battery is running low, Windows Vista saves your work to your hard disk and then turns off your mobile PC.
- You don't have to wait for your mobile PC to shut down. It goes to sleep in only a few seconds.
- When your mobile PC wakes, Windows Vista restores your previous work session within seconds. You don't need to restart your mobile PC, log on, and then open the files that you were working on.

Sleep is typically the best power-saving state for your mobile PC when you're not using it. You should shut down your mobile PC or put it into hibernation only when necessary—for example, when you don't plan to use it for several days.

## Improved battery meter

Windows Vista makes it easy to determine how much battery life you have left and to manage the power consumption of your mobile PC. The battery icon in the notification area on the task bar provides information at a glance. It indicates when your battery is low, critical, or missing from your battery bay. If you are hovering over the battery meter,

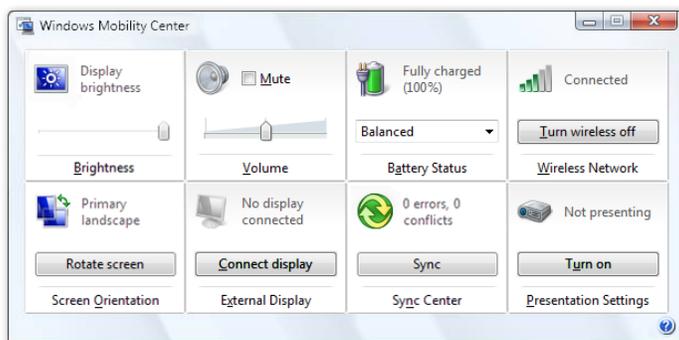
you can see the amount of time and percentage of battery power remaining, and also which power plan is active. If you click the battery meter, you see an expanded view, and you can immediately change the power plan. If you have more than one battery on your mobile PC, the expanded view provides details about each battery. Timely notifications tell you when your battery life reaches low and critical levels.



## Windows Mobility Center

You use your mobile PC in more places and in more ways than you use a desktop computer, and you spend more time adjusting it for the environment that you're in. In earlier versions of Windows, to change your screen brightness, adjust the volume, or turn off your wireless connection to save battery power, you must search for the settings in separate places in the Control Panel or on the task bar.

Windows Mobility Center puts the most frequently used mobile PC settings in a single location. Now you can change your display brightness, volume, power plan, wireless network, external display (such as a network projector or additional monitor), and

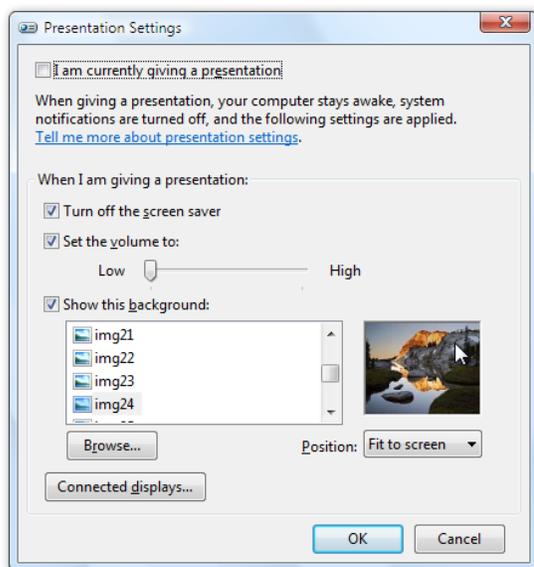


synchronization all from one place.

If you use a Tablet PC, you can also rotate your display. No more hunting through the Control Panel or icons in the notification area to find what you need. All of the important mobile settings are right there in Windows Mobility Center. Windows Mobility Center is available only on mobile PCs.

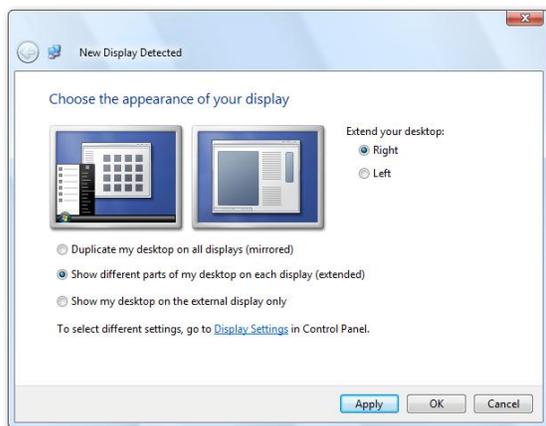
## Presentation settings

Presentation settings are options on your mobile PC that you can apply when you're giving a presentation. If you've ever had your display turn black during a presentation, you will appreciate that your screen saver can automatically turn off every time you give a presentation.



When presentation settings are turned on, your mobile PC stays awake and system notifications are turned off so they don't interrupt your presentation. You can also choose to turn off the screen saver, adjust the speaker volume, and change your desktop background image to another image or, in the case of Windows Meeting Space presentations or presentations given over a network, to a solid color to improve performance. Your settings are automatically saved and applied every time you give a presentation, unless you manually turn them off.

Presentation settings automatically turn off when you disconnect your mobile PC from a network projector or additional monitor, and also when you shut down or log off from your mobile PC.



## Multiple monitors

Anyone who has tried to connect a mobile PC to an external display knows how challenging it can be. Windows Vista simplifies the process by automatically detecting the external display and showing your mobile PC's desktop. You can then choose how you want your desktop to appear and customize the display settings, such as resolution and color depth. You can also specify that a particular display is used for a presentation, which turns on the correct presentation settings automatically.

When you connect your mobile PC to an external display, Windows Vista opens the New Display Detected dialog box, where you can select one of the following display options:

- **Mirrored.** Duplicates, or “mirrors,” your desktop on each display. Mirrored is the default display option. It’s useful when you plan to use your mobile PC to give a presentation on a projector or a fixed display in a conference room, such as a wall-mounted plasma display or a TV-type monitor.
- **Extended.** Extends your desktop across all of the displays that you connect to, so that you can move program windows back and forth between the displays. This option is useful if you want to increase your work space.
- **External display only.** Shows your desktop on all monitors that you connect to, but not on your mobile PC display. This display option is useful if you want to conserve battery power. You can also use this option when you play a DVD on a mobile PC that supports full-screen video playback on only one display.

## Network projection

Windows Vista makes it easy to give a presentation from a mobile PC. By using the Connect to a Network Projector Wizard, you can connect to any Windows-compatible network projector over a wireless or wired network. A network projector is a shared resource that you can access from your mobile PC—much like a printer on a network.

The Connect to a Network Projector Wizard offers two ways to connect to a projector:

- **Choose a projector.** When you search for a projector, a list of available projectors appears on your local network.
- **Enter the network address of a specific projector.** If you can’t find the projector on your network or if you want to project to a remote projector, you can connect manually. Examples of a manual connection network address are `http://server/projectors/projector_1` or `\\server\projectors\projector_1`.

When the wizard displays the available projectors, an icon appears next to each projector to indicate whether the projector is secured or unsecured. Whether you choose a projector by selecting it from the list of available projectors or by entering its address, you must enter a password if the projector is secured.

When you use the wizard, your desktop will be mirrored; that is, the same image appears on your mobile PC display and on the projector. Presentation settings are automatically optimized for network performance.



You can also use this feature in Windows Meeting Space, which enables you to stream content to a projector and to a Windows Meeting Space session simultaneously. You can also filter what is presented to a specific program.

## Windows HotStart

Windows HotStart is a new feature in Windows Vista that enables you to click a button and immediately start a program regardless of whether your mobile PC is on, sleeping, in hibernation, or off. Within a few seconds of clicking a HotStart button, you can start a media program, such as Windows Media Player, to play a CD or watch a DVD that you've recorded, or browse and play audio and video files from your hard disk. At any point, you can exit or pause the media program to return to your desktop without having to restart your mobile PC.

Although HotStart is ideal for playing media that you've recorded or stored on your hard disk, you can also configure the button to start other programs, such as an email program or web browser. HotStart also works on desktop computers.

## Mobile PC—Key Features

Feature	Brief Description
Battery meter	Shows the percentage of remaining battery charge, the battery time remaining, and the power plan in use when you hover over the battery icon.
Multiple monitors	Automatically detects an external display when you connect to one, and then opens the New Display Detected dialog box, where you can select a display option: Mirrored, Extended, or External display only.
Network projection	Makes it easy for you to connect to a network projector. This feature detects available projectors on a local network so you can choose one, connect, and begin using the projector.
Power plans	Helps you manage power consumption. Windows Vista includes three power plans—Balanced, Power saver, and High performance. By using power plans, you can balance the tradeoff between power conservation and system performance.
Presentation settings	Simplifies how you manage settings for presentations. When presentation settings are turned on, your mobile PC stays awake and system notifications are turned off so they don't interrupt your presentation.
Sleep	Combines standby and hibernate into a single power-saving state.
Windows HotStart	Starts any program with the press of a button, regardless of whether your mobile PC is on, asleep, in hibernation, or off.
Windows Mobility Center	Places the most frequently used mobile PC settings on the taskbar for convenient access.

## 3.14 Tablet PC



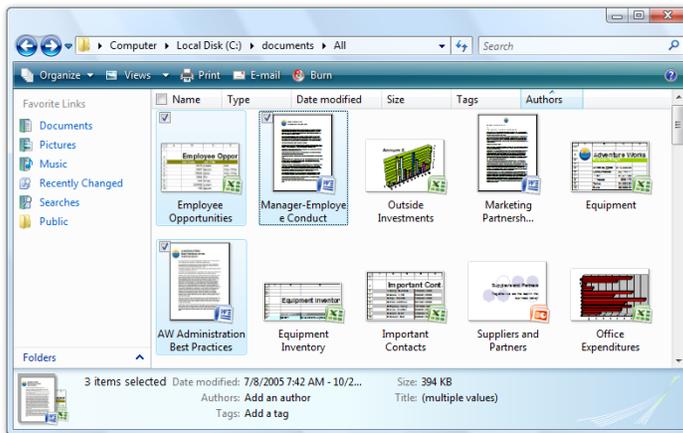
The Tablet PC ushered in a new era of mobile computing: a single, fully functioning computer that is practical and comfortable while you're on the go and also works well when you're at your desk. With integrated pen support, touch screen support, digital ink input, handwriting recognition technologies, and innovative hardware, Tablet PCs are comfortable and productive in any place and at any time.

### Pen improvements

Windows Vista includes significant pen improvements that make a tablet pen easier to use and that further enhance Tablet PC functionality beyond that of laptop computers.

### Visual feedback

Windows Vista provides visual pen feedback for single-tap, double-tap, and right-clicking. This subtle feedback gives you more confidence about the operation that you've completed. You can turn visual feedback on or off in Pen and Input Devices in the Control Panel.

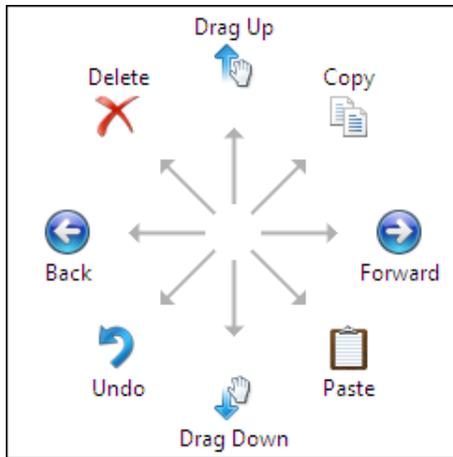


### Explorer check boxes

In earlier versions of Windows, it was difficult to select multiple files when using a slate Tablet PC or a convertible Tablet PC in slate mode. A feature called Explorer check boxes now makes it easier to select multiple files. When you hover over any set of files with a tablet pen, a small check box appears. You can select one or more files and then move, copy, or delete them as a group.

## Pen flicks

Windows Vista enhances pen functionality by adding pen flicks. These are gestures that you can make with a tablet pen to quickly navigate and perform shortcuts. Navigational pen flicks include drag up, drag down, move back, and move forward. For example, instead of dragging the scroll bar down to read a webpage on your Tablet PC, you can simply flick the pen and the window will scroll down. Editing pen flicks include copy, paste, delete, and undo. For example, you can paste an item into a document or delete text with just a flick of your pen. You can customize pen flicks to perform other functions, which increases your efficiency while making pen use feel more natural. To make pen training easier, Windows Vista includes a tutorial that presents the essentials of using a tablet pen to perform these shortcuts.



## Panning hand in Internet Explorer

Windows Vista improves document navigation in Internet Explorer with a new feature called the Panning hand. Instead of using the scroll bar to page through a document, you can simply grab the page with the pen and move it directly. By using a button with



a hand icon on the Internet Explorer toolbar, you can toggle between panning and text selection modes.

## New touch screen support

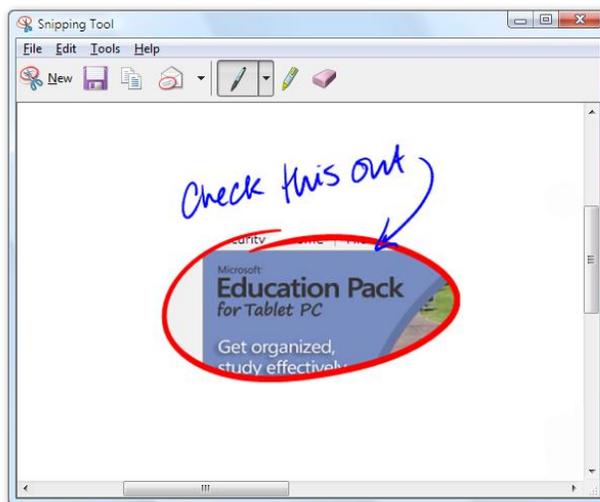
If touch input is available on your Tablet PC, you can use your finger to do many of the things that you do with a mouse or a tablet pen. For example, you can use your finger to browse the Web, control objects on the screen, and even write. You can also use touch flicks—gestures that you can make with a flick of your finger to quickly navigate and perform shortcuts.



To overcome the challenge of targeting small items or resizing windows with your finger, Windows Vista includes the touch pointer. This new feature consists of a left mouse button, a right mouse button, a drag area, and a pointer. While you're using touch, this mouse-like assistant floats on the screen just below your finger.

## Snipping Tool

You can capture a snip (or screenshot) of any object on your screen—whether it's part of a website, document, or program. Using your pen, you simply draw a circle, a rectangle, or a free-form shape around the object. You can then add handwritten comments to the snip and save it or send it in an email message. If the image you captured is from a webpage, Snipping Tool attaches the URL automatically. Snipping Tool in Windows Vista prevents the capture of content that has been protected by digital rights management.



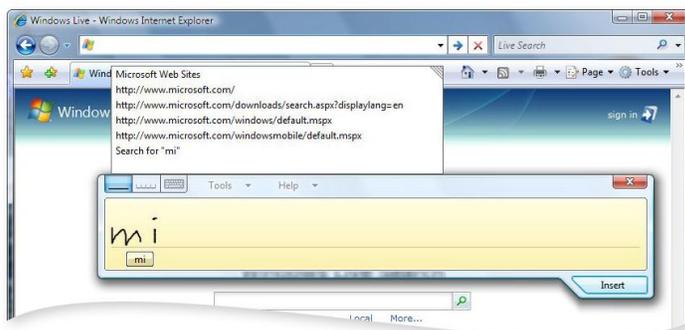
Snipping Tool in the Experience Pack for Tablet PC is one of the most popular programs among Tablet PC users. Because Snipping Tool is an accessory in Windows Vista, desktop computer and non-Tablet PC users can also take advantage of this feature. Simply drag your mouse to select a rectangular area for capture.

## Improvements to Tablet PC Input Panel

Windows Vista improves Tablet PC Input Panel, an accessory on Tablet PCs that enables you to use handwriting or an on-screen keyboard to enter text. You can use the writing pad or the character pad to convert your handwriting to text, or use the on-screen keyboard in the same way that you use a standard keyboard. By using Input Panel, you can enter text on your Tablet PC when typing on a standard keyboard would not be appropriate, such as a meeting, class lecture, or interview.

### AutoComplete

Entering URLs, email addresses, and filenames is faster and easier with AutoComplete, a new addition to Tablet PC Input Panel that works just like AutoComplete in programs

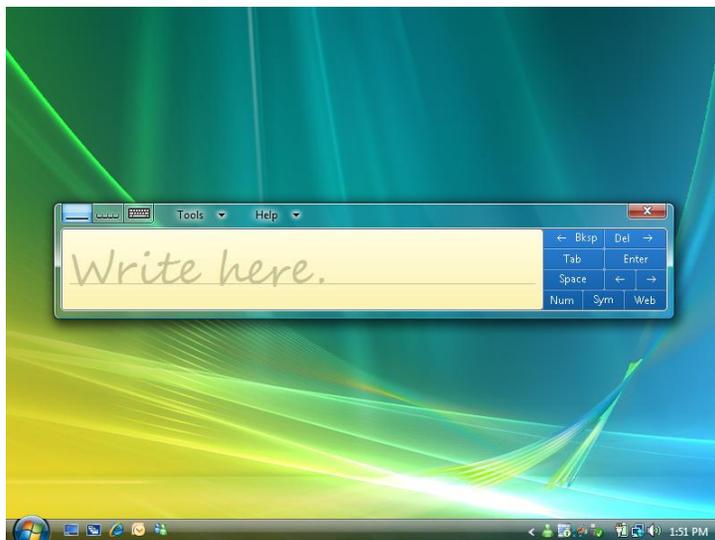


such as Microsoft Internet Explorer and Microsoft Office Outlook. As you write a letter or series of letters, AutoComplete lists possible matches in Input Panel based on text that you've entered before.

### Enhanced ink erasing

Everyone needs to make corrections to what they write. In Windows Vista, it's easier to edit or replace ink in Input Panel. For example, in Windows XP Tablet PC Edition 2005, you must use the Z-shaped scratch-out gesture to erase words or characters. Windows Vista enables several new, more tolerant scratch-out gestures, including strikethrough, vertical scratch-out in the pattern of an M or W, circular scratch-out, and angled scratch-out. If your tablet pen has an eraser, you can also use the back-of-pen eraser to delete writing.

### The Tablet PC Input Panel tab



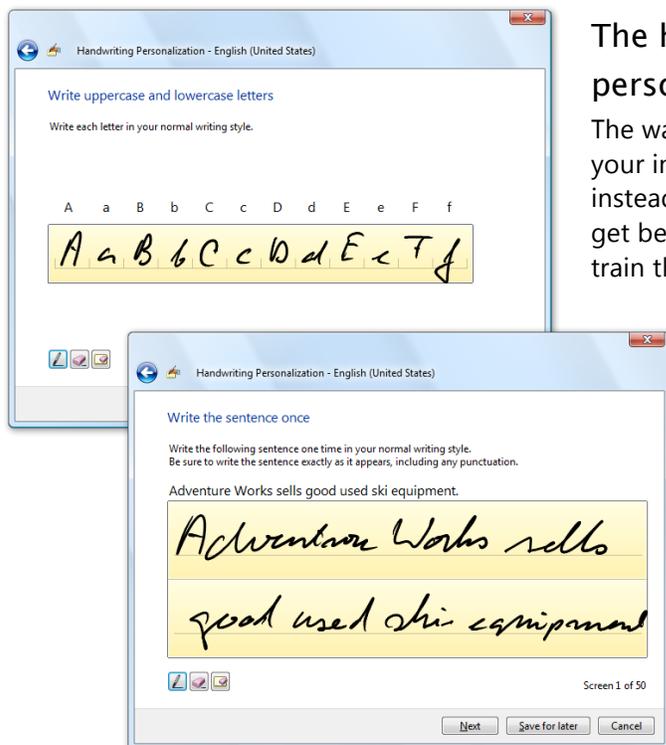
The Tablet PC Input Panel tab provides a new way to open and position Input Panel on the screen. When Input Panel is closed, the tab appears on the left edge of your screen by default. To open Input Panel, simply tap the Input Panel tab, and it slides out from the edge of your screen. When you close Input Panel, the tab slides back to the edge of the screen.

You can move the Input Panel tab by dragging it up or down along the edge of the screen. Then, when you tap it, Input Panel opens at the same

horizontal location on the screen that the tab appears.

## Handwriting recognition improvements

Noticeable improvements have been made to the handwriting recognition experience right out of the box. In addition, because personal writing styles vary considerably, and the vocabulary that individuals and organizations use constantly evolves, Windows Vista includes two new features that you can use to teach the handwriting recognizer about your writing style and vocabulary. These features can further improve handwriting recognition accuracy.



### The handwriting recognition personalization tool

The way you form characters and words is part of your individual writing style. In Windows Vista, instead of having to change your handwriting to get better handwriting recognition results, you can train the handwriting recognizer about how you write characters and words.

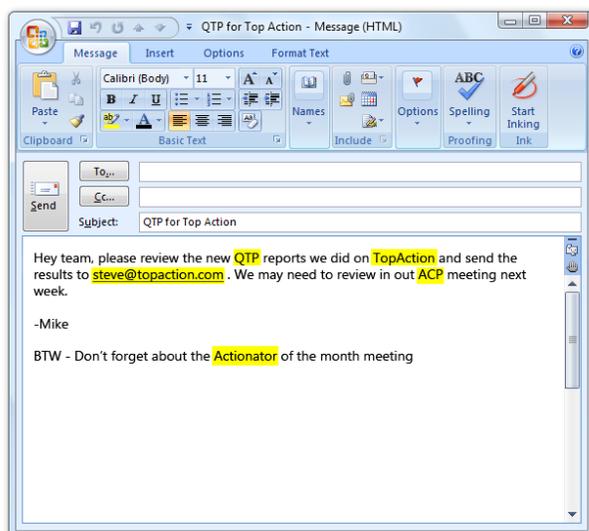
You can provide handwriting samples to teach the handwriting recognizer about your writing style and specific recognition errors to target. Using the handwriting recognition personalization tool increases the likelihood that your handwriting will be recognized correctly by Input Panel and by programs for the Tablet PC that use handwriting recognition.

### Automatic learning

If you turn on automatic learning in Windows Vista, it enables the handwriting recognizer to learn your handwriting style or vocabulary by collecting data about the words you use

and how you write them. The personalization occurs behind the scenes, without user interaction. Automatic learning works with many email programs, including Microsoft Office Outlook 2003 and Microsoft Office Outlook 2007.

For English, automatic learning creates a unique dictionary from a user's sent email messages. It adds new words and terms, such as acronyms, industry jargon, and email addresses, to the dictionary. The recognizer prioritizes the words by their frequency to further improve handwriting recognition results.



For East Asian languages, Windows Vista offers special recognition help for converting handwriting in Chinese (Traditional), Chinese (Simplified), Japanese, and Korean into text by remembering the corrections that you make to characters. As you make corrections, Windows Vista learns to distinguish more precisely between different characters, so that you see better results the more you use your Tablet PC.

## Handwriting recognition error reporting

Windows Vista provides a way for you to send information to Microsoft about corrections that you've made in Input Panel. By reporting errors, you can help Microsoft identify common handwriting recognition problems and improve the accuracy of handwriting recognition in future versions of Windows.

### Tablet PC—Key Features

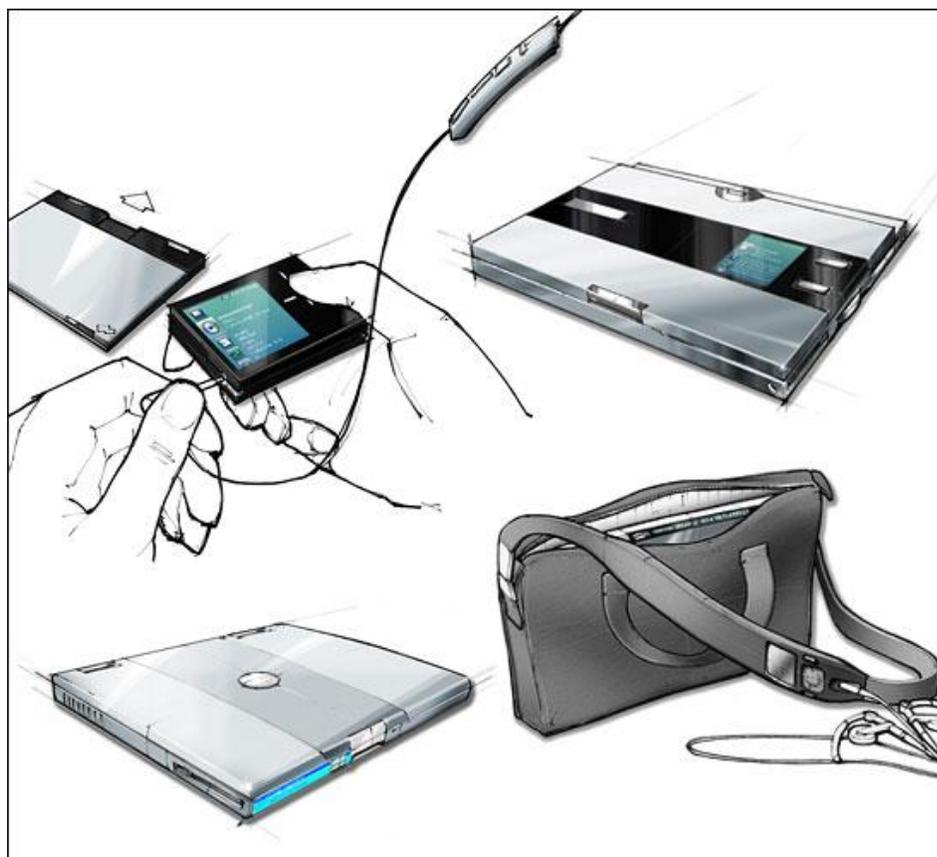
Feature	Brief Description
AutoComplete	Displays a list of possible matches (such as email addresses, URLs, and filenames) near the writing area when Input Panel recognizes your handwriting.
Automatic learning	Enables the handwriting recognizer to learn your handwriting style or vocabulary by collecting data about the words you use and how you write them.
Enhanced ink erasing	Makes it easier to correct handwriting mistakes, with improved eraser and scratch-out capabilities.
Explorer check boxes	Simplifies multiple file selection by displaying check boxes when you hover over any set of files with your tablet pen.
Handwriting recognition error reporting	Enables you to send information to Microsoft about corrections you've made in Input Panel, so that Microsoft can identify common handwriting recognition problems and improve the accuracy of handwriting recognition in future versions of Windows.
Handwriting recognition personalization tool	Enables you to customize handwriting recognition on your Tablet PC by training the handwriting recognizer to recognize how you form characters and words.
Panning hand in Internet Explorer	Improves document navigation by providing an easy way for you to grab and move a page in Internet Explorer in any direction to view different parts of the page.
Pen flicks	Enhances pen functionality by enabling you to quickly navigate and perform shortcuts with a tablet pen. Navigational pen flicks include drag up, drag down, move back, and move forward. Editing pen flicks include copy, paste, delete, and undo. You can customize pen flicks to perform other functions.
New touch screen support	If touch input is available on your Tablet PC, allows you to use your finger to do many of the things that you do with a mouse or a tablet pen.
Snipping Tool	Captures a snip, or screenshot, of any object on your screen so you can save, annotate, or share the image.
Tablet PC Input Panel tab	Provides a new way to open and position Input Panel on the screen. Simply tap the Input Panel tab, and Input Panel slides out from the edge of your screen.
Visual feedback	Consists of distinct icons for single-tap, double-tap, and right-clicking so you know which operation you've completed.

## 3.15 Windows SideShow



Wouldn't it be great if you could read an email message, confirm a meeting location, or check an airline flight reservation without turning on your computer? What if you could check the program guide on your Microsoft Windows Media Center PC by using a display that's built into your remote control? Windows SideShow puts this information literally at your fingertips, on a wide variety of devices that can get information from your mobile PC or your desktop computer.

Windows SideShow is an exciting new technology that dramatically expands the usefulness of your mobile PC or desktop computer. By closely integrating a variety of devices with your computer running Windows Vista, you can access information in many new scenarios. The following illustrations show different ways SideShow-compatible devices can be integrated into mobile PCs.



Windows SideShow uses *gadgets*, or add-in programs, to extend information from your computer onto devices. Developed by Microsoft and by other software vendors, gadgets run on a Windows SideShow-compatible device and update the device with information from your computer, such as email messages and media files. Using a gadget, you can view information from your computer regardless of whether your mobile PC is on, off, or sleeping—which can save you both time and battery life. You can also use some gadgets to control certain computer programs remotely, such as Windows Media Player or Microsoft Office PowerPoint.

## Gadgets offer broad functionality

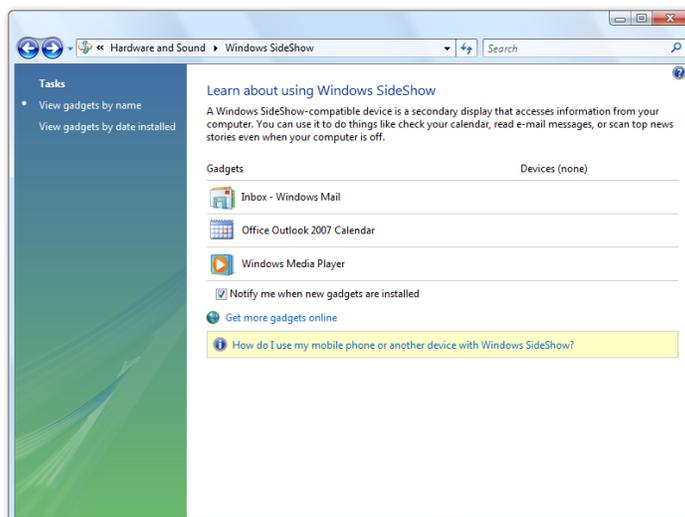
You can use gadgets to view your email messages, check your appointments for the day, or play music that's stored on your computer. Gadgets can also provide real-time information, such as a notification when you receive an instant message from a friend. The following illustration shows how you can view your email messages on a Windows SideShow-compatible device.



To get you started, Windows Vista comes with two gadgets—one for Windows Mail and another for Windows Media Player 11. Computer and device manufacturers may also preinstall other gadgets. Microsoft is developing additional gadgets, including ones that display Really Simple Syndication (RSS) feeds and calendar information from Microsoft Office Outlook 2007, and one that serves as a remote control for Microsoft Office PowerPoint presentations. Other software vendors can build gadgets for a variety of information, such as travel itineraries, stock quotes, customer data, line-of-business data, or any other useful information.

## Choose gadgets and customize settings in the Control Panel

Because you can view personal information on Windows SideShow-compatible devices, Windows Vista contains a central location in the Control Panel called Windows SideShow,



where you can turn gadgets on or off for each of your devices. Gadgets are turned off by default when they're first installed, but you can turn them on at any time. This screen shot shows Windows SideShow in the Control Panel.

From the Control Panel, you can also set your computer to wake periodically (such as every hour) so that all gadgets that are turned on can update your devices with the latest information.

## Choose devices for Windows SideShow

Windows SideShow-compatible devices can take many forms. Hardware manufacturers are already including secondary displays in their designs for mobile PCs and for devices, such as keyboards, mobile phones, and remote controls. The following are a few examples.

### Integrated devices on computers

If your mobile PC has an integrated Windows SideShow-compatible device, you can view your Windows Mail inbox without opening the lid or turning on the computer. You can quickly access your recent email messages whenever and wherever you want. In addition, some devices detach from your mobile PC and support MP3 or Windows Media Audio (WMA) playback. With these devices, you can play music that you've downloaded to your device without turning on your mobile PC.

### Mobile phones

Your mobile phone can do more than make and receive calls. With Windows SideShow, your mobile phone can also show important information that you choose, such as your contacts and calendar, the latest updates from websites you read, and your favorite pictures.

### Media remote control

While you watch TV with your family on your Windows Media Center PC, you can find out what programs are showing next or schedule a recording for the next day. You can also browse through your Windows Media Center music collection from the display on the remote control without turning on the TV. In addition, the device supports other gadgets for Windows SideShow, so you can look at tomorrow's calendar, check sports scores, monitor incoming email messages, and even receive instant messages.

### Digital picture frames

You can use wireless picture frames to display a rotating series of your digital pictures throughout your house by using Windows Media Connect. With Windows SideShow, your digital picture frame can also display useful information, such as the time, weather forecasts, instant messages, appointment reminders, news headlines, and stock quotes, in an attractive overlay on top of your pictures.

### Presentation remote control

Imagine being able to control your next Microsoft Office PowerPoint presentation while walking freely around the room or on a stage without being tethered to your mobile PC. Imagine being able to glance down at your mobile phone or personal digital assistant (PDA) for your slide notes instead of having to refer to a printed copy, or being able to switch to an earlier slide in your presentation without flipping through multiple slides. You can do all these things by using a Microsoft Office PowerPoint gadget and a Windows SideShow-compatible device, such as a PDA or mobile phone.

### Keyboards and tabletop devices

With a Windows SideShow-compatible keyboard, you can see the location of your next meeting when your computer is locked and monitor things such as incoming email

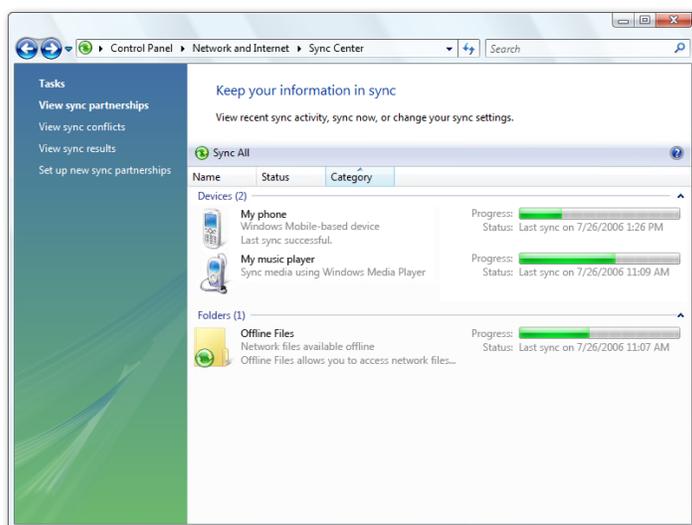
messages, news headlines, and stock quotes without leaving the program you're working in.

## 3.16 Sync Center



Windows Vista gives users one place—new Sync Center—to manage data synchronization between PCs, between PCs and servers, and between PCs and devices. This capability has become increasingly important as the range of computers, devices, locations, and data sources that customers want to synchronize has exploded. Home users want to connect to digital media devices, smart phones, and connected hard drives. Corporate customers are connecting their PCs to personal digital assistants (PDAs) and mobile phones and are using Folder Redirection and Offline Folders more often.

Until now, there has been no easy way to manage all of these individual sync relationships, so users have had to deal with many different sync experiences, depending on their devices or data sources.



New Sync Center enables users to initiate a manual sync, stop an in-progress sync, view the status of all current sync activities, and receive notifications to resolve conflicts. While offering you a unifying synchronization experience, Sync Center does not replace third-party sync tools or functionality. For example, a Windows Mobile device will still use its own infrastructure—Windows Mobile Device Center—to physically synchronize the data between it and a Windows Vista computer. Windows Mobile Device Center is the replacement for ActiveSync and provides a seamless

integration experience, allowing the user to easily synchronize Microsoft Office Exchange mail, Microsoft Office Outlook and Office system documents, and media files. If you want to change the granular sync settings for any relationship, Sync Center simply directs you to the Windows Mobile Device Center or, in the case of a partner device, to that third party's data-management settings infrastructure.

### Sync Center—Key Features

Feature	Brief Description
Delayed conflict resolution	When a conflict arises during synchronization, you can delay resolution.
Device sync connectivity	The user can check device connectivity status.
Global sync	One button initiates synchronization across all devices and data sources.
Individual sync	Synchronizes with only one data source or device.
Sync settings	For management of sync settings, Sync Center passes the user back to the partner device or data source setting's user interface (UI).
Sync status	A real-time display of sync progress and sync history.

## 3.17 Printing

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In recent years, the capabilities of printers for the personal computer have dramatically increased while costs have dropped significantly. As a result, demand among consumers and businesses for printers that can do even more is on the rise. Consider these trends:

- Older dot matrix technology has been replaced by sophisticated inkjet and laser printers that offer full-color output in a matter of seconds.
- A color laser printer that once cost thousands of dollars now costs only a few hundred dollars, and performance has dramatically increased. As a result, many businesses are using color output in day-to-day printing.
- Customers are using increasingly sophisticated graphics, such as transparencies and gradients, to bring their documents to life.
- Information workers and consumers are demanding greater color fidelity and more vibrant and lifelike images, whether in materials for a sales presentation or in prints of photos from a family vacation.
- Digital printing offers an affordable complement to traditional printing options, enabling economical short-run and on-demand printing. Print shops can now offer short-run printing at affordable prices due to lower job setup fees and less waste. And enterprises can produce professional-looking, cost-effective printing in-house and improve the response rates of personalized direct mail marketing communications.

### The new XML Paper Specification Document format

The capabilities of the underlying print subsystem in Windows Vista match the level of innovation we've seen in the last few years on the hardware side. The new XML Paper Specification (XPS) Document format, paired with XPS-capable printers, provides users with a truly next-generation publishing experience that addresses issues such as print fidelity, the size of files that use rich color effects, and the speed with which such files can be printed.

With Windows Vista, an XPS Document is automatically generated anytime you print from an application. The resulting "spool file" used by the print subsystem is identical to the fixed-format XPS Document that you can use to share content with other users electronically. So when content is sent to an XPS-capable printer, no conversion between the PC and the printer is needed. This makes possible a WYSIWYG (what-you-see-is-what-you-get) experience and greatly improves print fidelity and performance.



To learn more about XPS Documents, please turn to [5.02: XPS Documents](#) on page 203.



With XPS Support

Without XPS Support

## Improved Windows printing experience

Windows Vista Printing brings the next generation of document services to the Windows platform, providing customers with the following benefits.

### Improved color printing

The Windows Color System and the Windows print subsystem work together to provide a richer color printing experience. The operating system can communicate a broader range of color information from applications to inkjet printers that use more than four ink colors (known as wide-gamut printers). This makes Windows Vista a great platform for printing photos with more lifelike output.

### High-fidelity print output

By using the same format for printing as for application output, Windows Vista Printing enables high-fidelity output by reducing or eliminating image data conversions and color space conversions that typically occur during printing. New applications built on .NET Framework 3.0, the next-generation application programming interfaces (APIs) provided by Microsoft, benefit significantly because the smooth shadings, fades, and glow effects used in a document print just as intended, without loss of image fidelity or color fidelity due to conversions to intermediary file formats.

### Improved end-user experience

Communications technology built into the Windows Vista print subsystem enables applications to be more aware of how you've set up your print job and to more effectively transmit printer settings to the printer, leading to an improved user experience and less waste from misprints due to application and printer driver miscommunication. For example, the authoring application can more seamlessly communicate to the device how many pages to print for each sheet of paper, and end users can select print finishing options, such as stapling, directly from the authoring application rather than through the printer driver.

## Improved print performance

Windows Vista printing improvements include better color fidelity and better performance. For example, Windows Vista implements Client Side Rendering, which is especially helpful to enterprise customers because it reduces server processing time and network bandwidth demands. Customers can see as much as a 90 percent reduction in printing time compared to current processing, depending on the richness of the content and the capabilities of the target printer. Users also benefit because jobs can be queued for printing when either the printer or the computer is offline and then be sent to the printer automatically upon reconnection.

Windows Vista can significantly reduce the size of print jobs because of the way information is stored in an XPS Document. When printing to an XPS-capable printer, XPS Documents implement a capability known as *resource reuse*. This means the printing subsystem renders an image—such as a corporate logo or a graphically rich background for a Microsoft Office PowerPoint presentation—only once, even if it is used on multiple pages. This significantly reduces the print processing time and the amount of data sent over networks in enterprise environments when compared to previous versions of Windows.

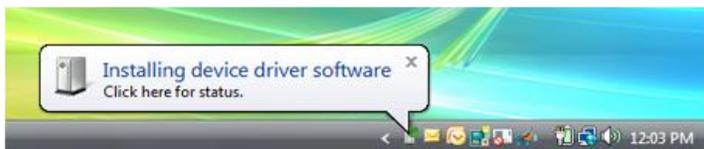
## XPS printing and backward compatibility

While XPS printing anticipates the future needs of customers, Windows Vista maintains maximum compatibility with current printers. The legacy Graphics Device Interface (GDI) print path in Windows XP, which uses GDI-based print drivers, is still available in Windows Vista.

## 3.18 Device Experience



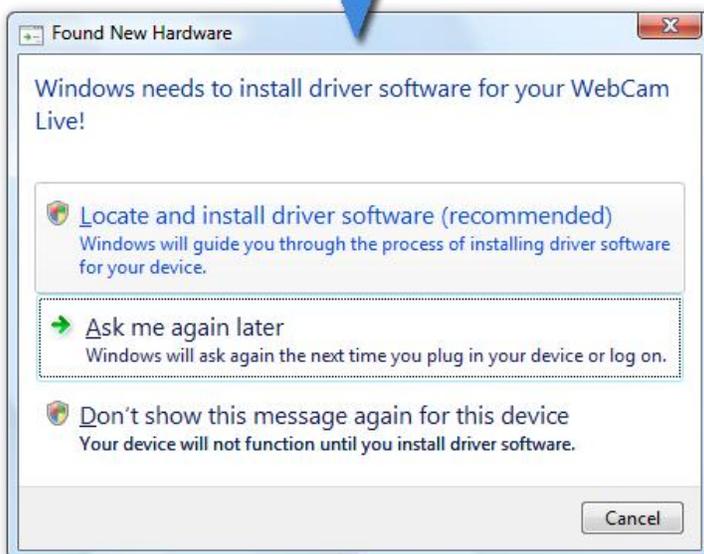
Windows Vista has an all new device infrastructure that seamlessly guides users through the device installation process. No matter what type of connection a device has, just plug it in—Windows Vista automatically searches for the best driver software to make your device work instantly. Millions of backward compatible hardware components and devices are supported right out of the box with thousands of new devices supported through automatic downloads from Windows Update.



### Seamless, automated install experience

Windows Vista takes the confusion out of installing new and existing devices. Simply plug devices in and the automated install process begins. The Driver Store in Windows Vista supports millions of devices right out of the box and with one click, Windows Vista will automatically check Windows Update for the newest device drivers provided by manufacturers. Manufacturers are continually adding drivers to Windows Update and can include special device software for a completely seamless installation process.

If needed, Windows Vista guides users through the process for installing software that came with the device.



### Driver Store

The new device infrastructure, called the Driver Store, is a cache of device driver software on Windows Vista ready for installation when needed. The Driver Store comes pre-

populated with device driver software allowing millions of devices like mice and keyboards, cameras, and printers to install automatically when attached.

## Windows Update

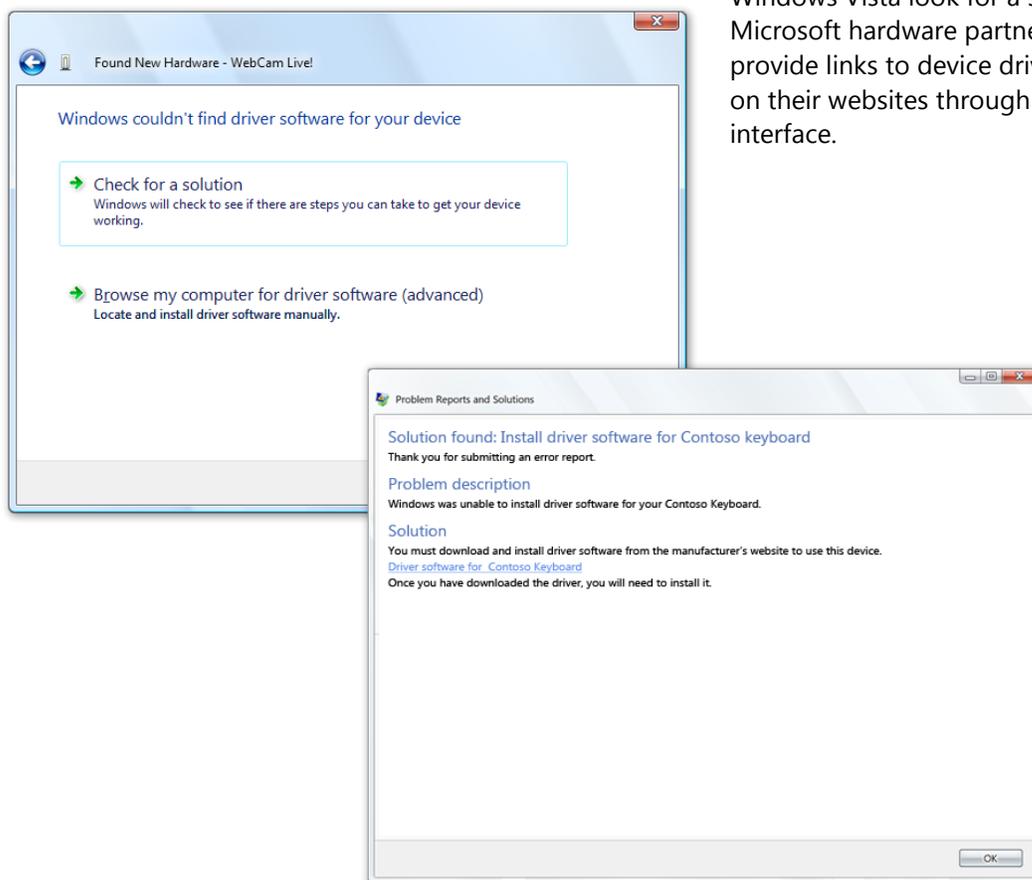
If a device requires software for special functionality, like a multifunction printer, hardware partners can choose to have their device software hosted on Windows Update. Windows Vista can automatically search for and install these drivers for a seamless installation experience.

## Enhanced diagnosis and error reporting

If device driver software cannot be found in the Driver Store or on Windows Update, or if the software that accompanied the device is not available, built-in diagnostics in

Windows Vista look for a solution.

Microsoft hardware partners can provide links to device driver software on their websites through this interface.



## Failure reporting

If failures occur at any time during the installation process—such as inability to locate a driver, install the driver, or execute the driver—Windows Vista can report the error so Microsoft analysts can work with hardware partners to improve driver quality and reliability over time. Users can submit feedback and rate the response through the built-in diagnostics framework.

## Automatic driver updates

Microsoft and its hardware partners are continually working to monitor and improve the health of device driver software. When updates are made to device driver software,

Windows Update can automatically download and install critical driver improvements while you can choose to install optional driver updates.

### Device Experience—Key Features

Feature	Brief Description
Automatic driver updates	Hardware partners can take action to correct problems with drivers and make them available for automatic or optional downloads from Windows Update.
Driver Store	A pre-populated cache of device driver software on each Windows Vista system allowing device software to install as needed.
Failure reporting	The built-in diagnostics framework in Windows Vista gives users actionable feedback if failures occur during the device installation process.
Seamless, automated device installation	Windows Vista supports hardware-first installation. When users attach devices, Windows Vista automatically searches the local Driver Store, Windows Update, or software accompanying the device to find and install the best device driver software.
Windows Update	Hardware partners can host new and updated device driver software that Windows Vista will automatically discover and install.

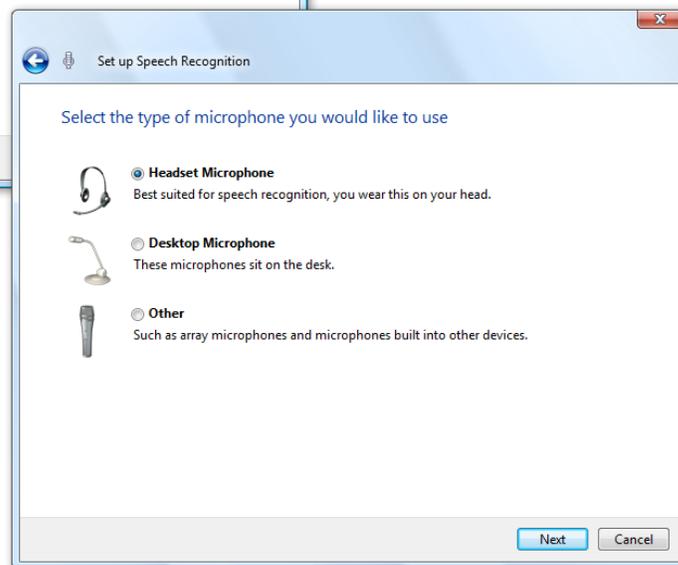
## 3.19 Windows Speech Recognition

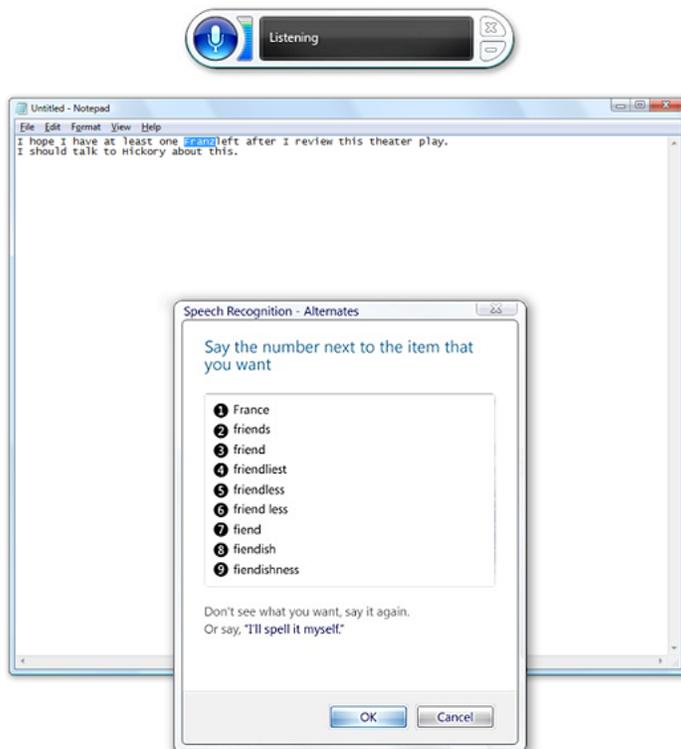


Windows Speech Recognition in Windows Vista empowers users to interact with their computer by voice. It was designed for people who want to significantly limit their use of the mouse and keyboard while maintaining or increasing their overall productivity. You can dictate documents and emails in mainstream applications, use voice commands to start and switch between applications, control the operating system, and even fill out forms on the Web.

Windows Speech Recognition is a new feature in Windows Vista, built using the latest Microsoft speech technologies. Windows Vista Speech Recognition provides excellent recognition accuracy that improves with each use as it adapts to your speaking style and vocabulary. Speech Recognition is available in English (U.S.), English (U.K.), German

(Germany), French (France), Spanish (Spain), Japanese, Chinese (Traditional), and Chinese (Simplified).





With Windows Speech Recognition, you are empowered right from the start; a guided setup and an interactive training experience familiarize you with key concepts and commands. Windows Speech Recognition also features an innovative, natural user interface that efficiently assists you in controlling your computer by voice. Whether you are starting an application, selecting a word, or correcting a sentence, you are always in control and Windows Speech Recognition smoothly guides you to completing the task at hand.

### Windows Speech Recognition—Key Features

Feature	Brief Description
Commanding	“Say what you see” commands allow you to naturally control applications and complete tasks, such as formatting and saving documents; opening and switching between applications; and opening, copying, and deleting files. You can even browse the Internet by saying the names of links.
Correction	Efficiently fix incorrectly recognized words by selecting from alternatives for the dictated phrase or word or by spelling the word.
Dictation	Dictate emails and documents and make corrections and save your work by voice.
Disambiguation	Easily resolve ambiguous situations with a user interface for clarification. When you say a command that can be interpreted in multiple ways, the system clarifies what you intended.
“How do I” help (U.S. English only)	You can say “How do I” followed by a task you want to perform with your computer. For example, “How do I change my desktop background?”
Innovative user interface	The new user interface provides a simple and efficient experience for dictating and editing text, correcting mistakes, and controlling your computer by voice.
Interactive tutorial	The interactive speech recognition tutorial teaches you how to use Windows Vista Speech Recognition and teaches the recognition system what your voice sounds like.
Personalization (adaptation)	Ongoing adaptation to both your speaking style and accent continually improves speech recognition accuracy.
Support for multiple languages	Windows Vista Speech Recognition is available in eight languages/dialects.

## 3.20 Help and Support

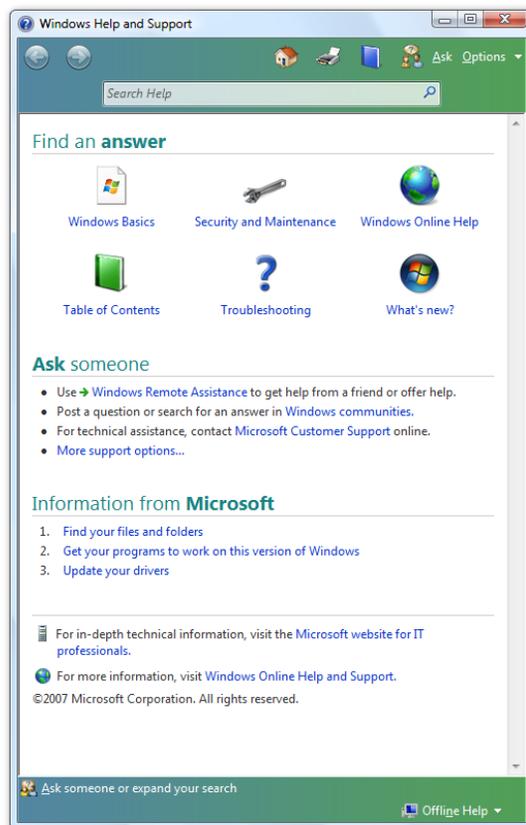


Anyone who has set up a new computer knows how time consuming, complicated, and confusing it can be. Throughout the installation process you see various screens and instructions, often with little explanation. And trying to find help can be a challenge.

When you set up Windows Vista on your computer, you'll notice a big difference. Whether you are a first-time user or an expert, you will feel confident about setting up and configuring your computer. With fewer installation steps, getting up and running is faster than ever before. And if you do have a problem, help is easier to find.

### A better out-of-the-box experience

When setting up Windows Vista, all of the main settings for your computer—such as the correct language and time zone to use—are presented to you in a single screen so you can feel confident that you are setting up your computer correctly and not missing any steps. And once Windows Vista is installed, the new Welcome Center provides additional information; links to common tasks, such as connecting to the Internet; and a list of offers from your computer's manufacturer.



### A new approach to helping customers

Traditionally, Help and Support in Windows has described how features work. With Windows Vista, Help and Support focuses on the tasks that you want to accomplish. Windows Vista Help is also updated regularly, so you always get the latest, most current information available.

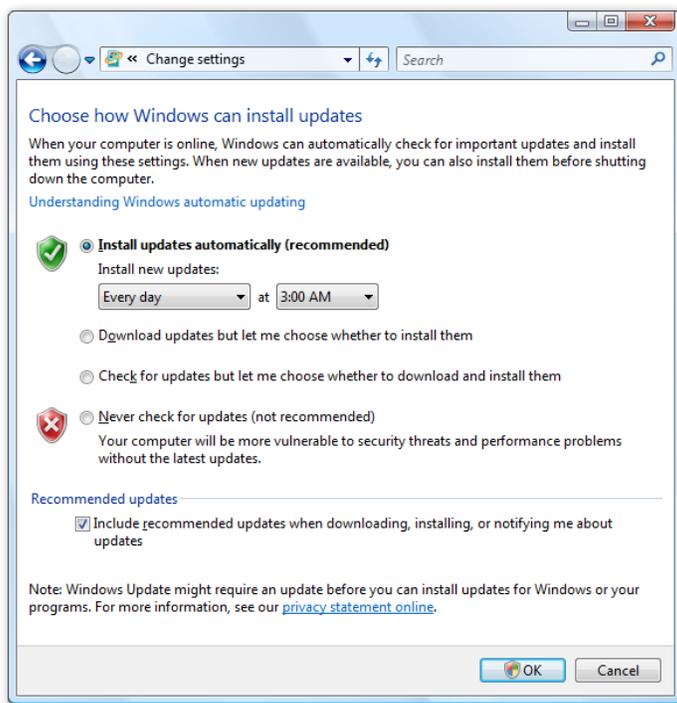


## Guided Help

Guided Help is an interactive tool that helps you accomplish a task. You can either have Windows show you where to click so that you can follow along and perform each step yourself, or you can choose to have Windows complete the task for you automatically.

## Problem reports and solutions

You can choose to have Windows Vista automatically report any system or program problems that you encounter. Then, if a solution is available, you can choose to receive the update or have it installed for you. Windows Vista also makes problem-solving easier with a new diagnostic framework that detects common problems and allows you to easily fix them.



## Windows Update

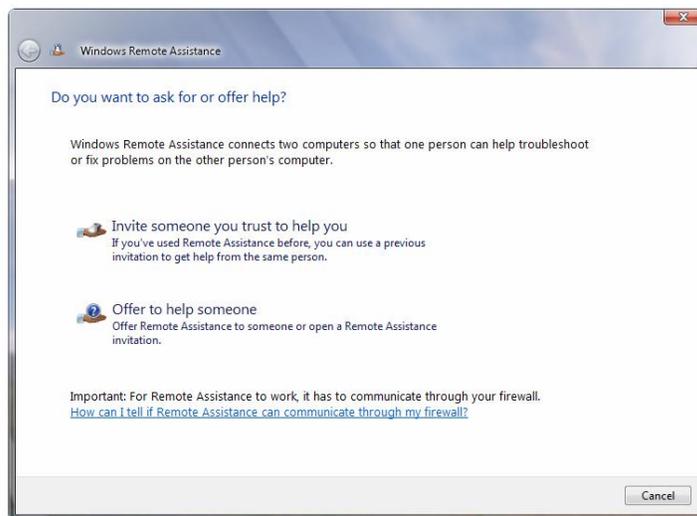
You want to know that your operating system is as secure, up to date, and reliable as possible. Windows Vista enables that by providing automatic updates that require little or no action on your part. You can set Windows to download and install updates automatically, on a schedule that you decide.

## Self-healing system

Windows Vista helps you keep your computer running reliably by automatically detecting and resolving many known problems, requiring little or no effort on your part. If Windows Vista cannot solve the problem by itself, you are given a set of steps to follow to fix the problem on your own. If there is no solution available, you can report the problem online and receive a solution as soon as one is available.

## Remote Assistance

Remote Assistance, first introduced in Windows XP, allows you to share your desktop with another user over a network or the Internet. You can also share control of your computer to get help fixing a computer problem. Remote Assistance in Windows XP is a useful feature, but it is somewhat complicated to set up and works well only over a broadband connection, making it less useful for many home users.



In Windows Vista, Remote Assistance is much easier to use, with fewer clicks, easier connectivity, and faster performance. If you need help with a computer problem, you can use email or an instant messaging program to ask for Remote Assistance from a support professional, a knowledgeable friend, or someone else you trust.

## Help and Support—Key Features

Feature	Brief Description
Remote Assistance	Allows users or experts to initiate the sharing of a computer to diagnose and repair problems.
Welcome Center	Provides primary setup assistance and special offers in one simple location.
Windows Feedback Services	Windows Vista-enabled personal or mobile computers can automatically report problems, and receive and install available solutions.
Windows Update	Near seamless user experience to automatically keep Windows and Microsoft applications (including the Microsoft Office system, Microsoft SQL Server, Microsoft Exchange Server, and Microsoft Visual Studio) up-to-date.

## 3.21 Accessibility



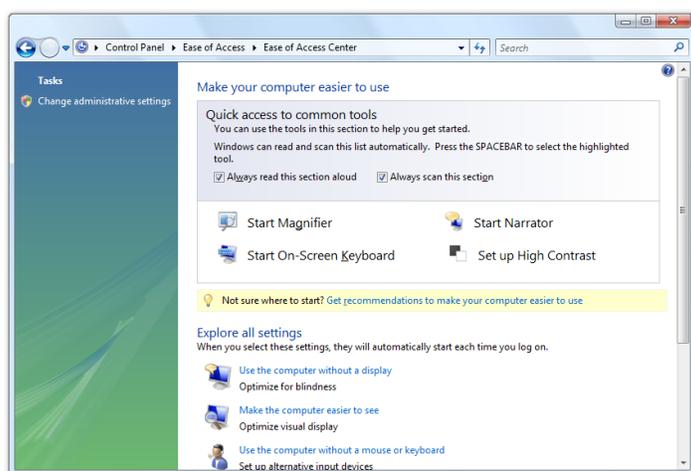
Windows Vista includes built-in accessibility settings and programs that make it easier for computer users to see, hear, and use their computers. To enhance accessibility in Windows Vista, Microsoft invested in more than three years of research to better understand the needs of people who experience a wide range of physical challenges that can impact their computer use. The accessibility settings and programs in Windows Vista are particularly helpful to people with visual difficulties, hearing loss, pain in their hands or arms, or reasoning and cognitive issues.

Major accessibility improvements in Windows Vista include the new Ease of Access Center to help you find the settings and tools that make it easier for you to see, hear, and use your computer. In addition, there are improved text-to-speech capabilities in Microsoft Narrator and the new Windows Speech Recognition experience lets you interact with your computer using your voice.

### Ease of Access Center

The new Ease of Access Center in Windows Vista provides a convenient, centralized place to locate accessibility settings and programs to make your computer easier to use. The Ease of Access Center includes the Quick access to common tools section, a questionnaire that can give you recommendations for accessibility settings and tools, and the ability to explore all accessibility settings by one of seven categories. The Ease of Access Center can be found in the Control Panel of Windows Vista, or by pressing Windows key+U. The Ease of Access icon is also available when you are logging into

Windows Vista. The Ease of Access Center replaces the Accessibility Wizard and Utilities Manager in previous versions of Windows.



### Gain quick access to common tools

Start Narrator, Magnifier, On-Screen Keyboard, and High Contrast quickly from the Quick access to common tools area in the Ease of Access Center. When you start these tools from the Quick access section, the tools will turn off after you log off or shut down. If you want these tools to start automatically every time you log on, turn them on using the Explore all settings categories.

### Get recommendations for settings

Ease of Access includes a new optional questionnaire (it replaces the Accessibility Wizard found in previous versions of Windows) intended to take the guesswork out of selecting settings. Based on your answers, a custom list of recommended accessibility settings is provided so you can choose which options you want to try. You can take this questionnaire and adjust your settings as often as you like.

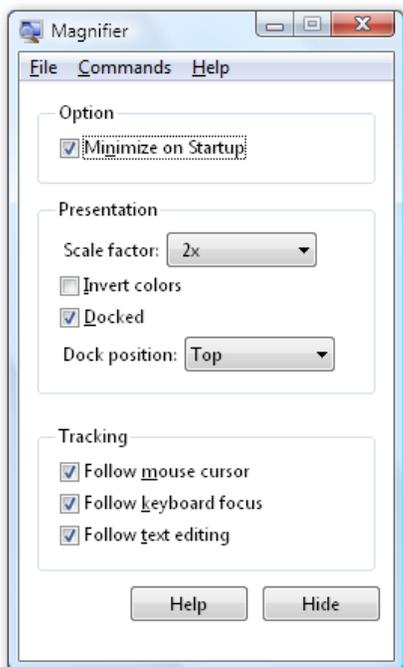
The questionnaire asks questions that relate to eyesight, dexterity, hearing, speech, and reasoning tasks. For example, questions are asked about your ability to perform routine tasks, such as whether you have trouble seeing faces or text on TV, hearing normal conversations, or using a pen or pencil. Based on your answers, Windows Vista provides a personalized recommendation of the accessibility settings and programs that are likely to improve your ability to see, hear, and use your computer.

The questionnaire can be found in the Ease of Access Center (in the Control Panel) by selecting Get recommendations for settings.

### Explore all settings by category

Instead of looking for accessibility settings in various places on your computer, Windows Vista brings all those settings together and has them organized into categories you can explore in the Ease of Access Center.

You can explore seven different categories of accessibility settings and programs, specifically including these options: use the computer without a display, make the computer easier to see, use the computer without a mouse or keyboard, make the mouse easier to use, make the keyboard easier to use, use text or visual alternatives for sounds, or make it easier to focus on tasks.



## Make things on the screen larger with Magnifier

Magnifier is a magnification program in Windows Vista that enables you to enlarge a portion of your computer screen in a separate window to make it easier to see. You can scale magnification levels up to sixteen times the original and choose to track the mouse, the keyboard, or text editing.

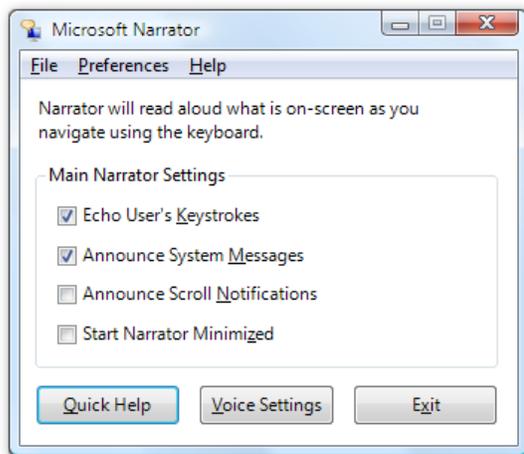
In Magnifier, you can also choose to invert the colors for better screen legibility; move the Magnifier window anywhere on your screen; choose a docking position which places the magnifier window at left, top, right, or bottom of your screen; and adjust the tracking focus so that it follows the movement of the mouse cursor, keyboard focus, or text editing.

Magnifier can be found in the Ease of Access Center.

## Hear text read aloud with Narrator

Narrator is the text-to-speech program in Windows Vista that reads what is displayed on your screen, including the contents of the active window, menu options, or the text you have typed. Narrator is improved in Windows Vista and now reads Narrator menus without leaving the active window and includes a more pleasant, natural sounding voice.

Narrator has a number of options that allow you to customize the way screen elements are read. For example, you can read Narrator menus without leaving the active window. You can also move around the desktop with the number keys using virtual focus, which allows you to move through the objects on the desktop and read aloud any contents they contain, or move around the desktop with the arrow keys using virtual menus. And you can use bookmarks to find commonly used programs.



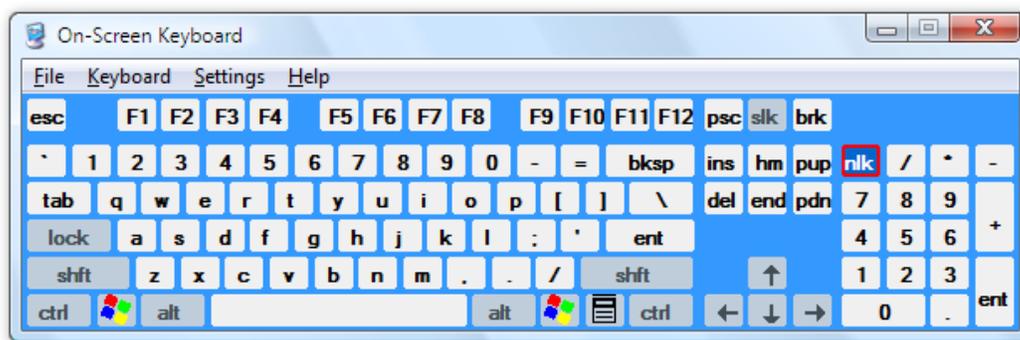
You can choose the text Narrator reads aloud such as keystrokes, system messages, and scroll notifications and you can choose voice settings. Plus, Narrator is compatible with any Speech API (SAPI)-compliant voice for users who can use a different voice.

Narrator can be found in the Ease of Access Center.

## Type with the On-Screen Keyboard

The On-Screen Keyboard in Windows displays a visual keyboard with all of the standard keys on the screen. Instead of relying on the physical keyboard to type, you can select keys using the mouse or another pointing device, a small group of keys, or just one key. Several keyboard layouts are available in the On-Screen Keyboard and views are available to promote faster typing, or to give access to the maximum number of keys. You can choose the typing mode that works best for you—clicking mode, hovering mode, or scanning mode. To make the On-Screen Keyboard keys easier to see, you can change the font, font style, and font size from the Settings menu.

The On-Screen Keyboard can be found in the Ease of Access Center.



To learn more about Speech Recognition please turn to [3.19: Windows Speech Recognition](#) on page 123.

## Interact with your PC with your voice using Speech Recognition

Windows Speech Recognition in Windows Vista allows you to interact with your computer by voice—which reduces or eliminates the need for a mouse and a keyboard—while enabling you to maintain or even increase your productivity.

## Find assistive technology products for Windows Vista

Assistive technology products are innovative technology solutions that empower people with physical and cognitive difficulties to use computers more easily and effectively. Microsoft worked closely with assistive technology companies around the world to ensure specialized products—such as voice recognition software, screen readers, screen magnifiers, and on-screen keyboards—are compatible with Windows Vista. As a result, with more than 300 assistive technology products compatible with Windows Vista, you have more choice in the types of the technology solutions you can use to meet your particular needs. For more information on assistive technology products for Windows Vista, go to [www.microsoft.com/enable/at/](http://www.microsoft.com/enable/at/).

When selecting assistive technology, it is critical to find products that are compatible with your existing software programs, and will address your specific needs. This can be challenging, but experts are available to help. The network of Microsoft Accessibility Resource Centers can help you learn more about assistive and accessible technology and determine which solutions are right for you.

These experts can demonstrate both accessibility settings in Windows and specialty assistive technology products. You can try accessibility settings while you're at one of the centers, or take home a Microsoft Accessibility CD set to explore accessibility on your own. Some centers also have lending libraries, so you may be able to try out an assistive technology product before you buy. To locate a center near you, go to [www.microsoft.com/enable/centers/](http://www.microsoft.com/enable/centers/).

### Accessibility—Key Features

Feature	Brief Description
Captions	Turning this on produces text captions for animations and video.
Ease of Access Center	Provides a centralized location where you can adjust accessibility settings and manage accessibility programs.
Filter Keys	Enables you to have Windows ignore keystrokes that occur in rapid succession and keystrokes that are held down for several seconds unintentionally.
Keyboard shortcuts	Use keyboard shortcuts as an alternative to the mouse. Keyboard shortcuts can be found in the menus of programs or, if a letter is underlined on a menu, that usually means pressing the Alt key in combination with the underlined key has the same effect as clicking that menu item.
Magnifier	Enlarges part of the screen while you work, leaving the rest of your desktop in a standard display.
Mouse keys	Instead of using the mouse, you can use the arrow keys on the numeric keypad to move the mouse pointer.
Narrator	A text-to-speech program that reads aloud on-screen text and describes some events (such as error messages) that happen while you're using the computer.
On-Screen Keyboard	A visual, on-screen keyboard with all the standard keys that you can use instead of a physical keyboard. The On-Screen Keyboard also lets you type using an alternative input device.
Sticky Keys	Instead of having to press multiple keys at once (such as when you must press the Ctrl, Alt, and Delete keys simultaneously to log on to Windows), you can press one key at a time when Sticky Keys is turned on.
Visual Notifications	Replace system sounds with visual cues, such as a flash on the screen, so system alerts are announced with visual notifications instead of sounds.
Windows Speech Recognition	Enables you to interact with your computer using only your voice while maintaining, or even increasing, your productivity.

## 3.22 Windows Update



As a licensed user of Windows Vista, you are entitled to software updates to the operating system periodically released by Microsoft. These include upgrades to Windows Vista features, updates that improve reliability and performance, and updates that provide new security protections against malware and other potentially unwanted software. Microsoft might also provide software updates to improve performance or reliability that are supplied by your computer manufacturer for other software and hardware components on your PC.

Windows Update determines which updates are applicable to your computer and can download and install them automatically if you choose, keeping your computer up-to-date and more secure.

### Advances in Windows Update

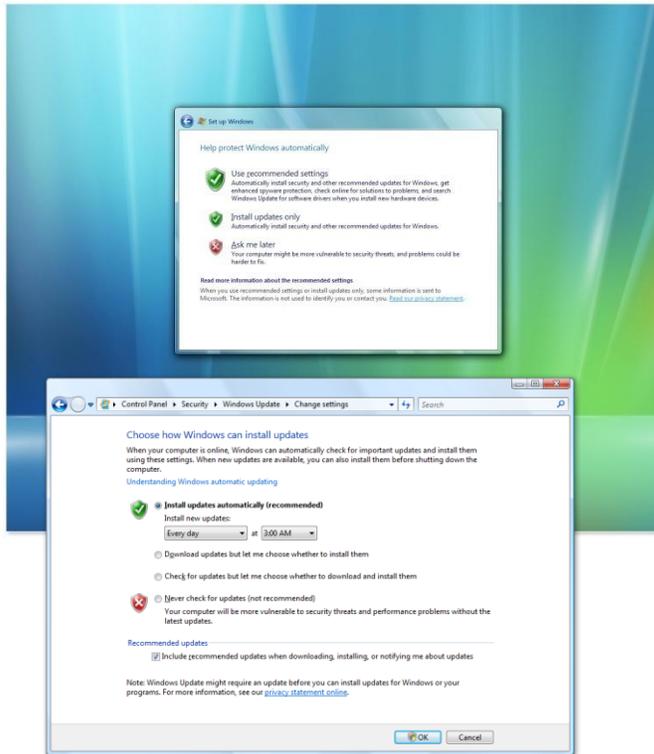
In Windows Vista, the capabilities of Windows Update make updating easier and less disruptive.



- **Easier.** In Windows Vista, Windows Update can automatically download and install both High Priority and Recommended updates. Previously, only updates classified as High Priority could be installed automatically, and users had to manually select and download other available updates.
- **Less disruptive.** Updating occurs in the background, and flexible options are provided for completing the updating process. If an update requires a restart to complete installation, you can schedule this for a specific time when it won't disrupt your work. You can also postpone a previously scheduled restart until your current work is complete. And when a software update applies to a file in use, Windows Vista can save the application's data, close the application, update the file, and then restart the application.

## Using Windows Update

To make sure your computer stays up-to-date, Microsoft recommends using the Automatic Updates feature of Windows Update. This ensures that both High Priority and Recommended updates are downloaded and installed in Windows Vista. This preference option is provided during the initial setup of Windows Vista, or you can set it at any subsequent time.



For users interested in taking a more active role in managing the update process, Windows Vista includes a range of preference options. These provide control over how you are notified about the availability of updates, as well the option to review and approve updates before they are downloaded or installed.

At any time, you can also proactively check to see if any updates are available for your PC. The Windows Update control panel allows you to scan for updates, review details about each one, access your updating history, and manage your updating preferences.

## 3.23 The Genuine Windows Vista Experience

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### Software piracy

Software piracy is a problem that is increasing in size every year, despite a range of efforts to combat it. In May 2006, the Business Software Alliance, a leading software industry forum, reported that 35 percent of all software installed worldwide during 2005 was pirated or unlicensed. Piracy on this scale continues to create great challenges for Microsoft, and also affects consumers, partners, and the broad industry.

While the financial impacts on the software industry and the consumers who are defrauded by counterfeit software are serious, there are also impacts that go beyond dollars. Many consumers who end up with a counterfeit copy of Microsoft software are unwitting victims of a crime. They believe they purchased a properly licensed copy, often have documents to back this up, and yet their copy of Microsoft Windows, the Microsoft Office system, or Microsoft Windows Server is not properly licensed. In addition, counterfeit software is increasingly becoming a vehicle for the distribution of viruses and malware that can target unsuspecting users, potentially exposing them to corruption or loss of personal or business data and identity theft.

For these reasons, Microsoft continually invests in technologies and programs to help protect consumers and businesses from the risks and hidden costs of counterfeit and unlicensed software.

### Microsoft Genuine Software Initiative

The Genuine Software Initiative (GSI) focuses the company's many activities and investments directed at combating software counterfeiting and other forms of software piracy into a single coordinated effort. The initiative focuses on increasing investments across three strategic areas: education, engineering, and enforcement.

### What GSI means for customers and products

Overall, Microsoft is committed to educating consumers and software resellers to better protect themselves from counterfeit software and other forms of software piracy, and to help consumers know how to ensure that their software licensing is in order. Microsoft invests in technologies that make piracy more difficult, alert consumers to the presence of counterfeit software, increase genuine differentiation, and improve software asset and license management. Further, the company supports the legitimate software channel by helping make sure there is a level playing field for providing genuine Microsoft products.

Customers and partners who choose genuine Microsoft software can expect:

- All updates and enhancements.
- Innovative technologies to help protect them against the security and reliability risks associated with counterfeit software.
- Support from Microsoft and industry partners for their software.
- Peace of mind knowing their copy of Microsoft software is genuine.
- Improved software asset management for corporations.

## Software Protection Platform

Microsoft is developing and now releasing the first new technologies that form part of the Software Protection Platform (SP Platform). The platform will help fight piracy, protect consumers from the risks of counterfeit software, and better enable volume license customers to manage their software assets. The SP Platform brings together new anti-piracy innovations, counterfeit detection practices, and tamper resistance into a complete platform that provides better software protection to programs that use it.

Over time and with new versions, every Microsoft product will adopt SP Platform as a way to activate their products, and Windows Vista is the first to ship with this technology included. The SP Platform has been under development for several years and is available as part of Windows Vista and the next version of Windows Server, code-named "Longhorn," via a documented application programming interface.

The SP Platform is the technology that protects Windows Vista from tampering, counterfeiting, and other abuses. The SP Platform introduces changes in how Windows Vista activates, validates as genuine, and behaves when tampered with or hacked.

## Reserving features for customers of genuine Windows Vista

In addition to providing protection from counterfeit software and improving the activation experience, the SP Platform also has a set of technologies to determine whether a copy of Windows Vista is genuine or not. When Windows Vista detects an invalid product key, tampered license files, attempts to hack product activation, or other indications that the software is not or is no longer genuine Microsoft software, it will display messages to the user and some functionality will be affected. Once in a non-genuine state, certain designated features will be disabled and the system may be required to reactivate and/or perform a successful validation to restore those features or prevent further loss of functionality. If the system is required to reactivate, a 30-day grace period will be provided, after which time the system will be moved into a reduced functionality mode (described below) if it fails to activate.

With Windows XP, Microsoft was limited in the type of differentiated experience that it could deliver to genuine customers. Additional programs and updates—for example Internet Explorer 7, Windows Defender, and other popular downloads from the Microsoft Download Center—are reserved for customers of genuine software only. With Windows Vista, the SP Platform is deeply integrated into the product and is responsible for validating that a copy of Windows is genuine, allowing local differentiation from within the operating system. In addition, an online validation tool will be required to access designated content, downloads, and updates. If the validation process within Windows Vista or the online validation tool determines that a copy of Windows Vista is non-genuine, some product features will be disabled. The user will not lose access to their personal data for this reason, nor is personal data transferred to Microsoft. However, it will be obvious to users, and anyone else viewing their PC, that their PC experience is not equivalent to that of users running a genuine copy of Windows Vista.

The following features of Windows Vista require genuine validation:

**Windows Aero:** A professional, attractive, graphically-rich desktop experience that requires a premium SKU (stock-keeping unit, or edition) and takes advantage of contemporary hardware (Windows Driver Display model, or WDDM, drivers). The experience features great design and rock-solid performance. It also includes fluid animation and transparent glass on the Start Menu, window borders, visually stunning window-management tools, Windows Flip, and Flip 3D.

**Windows Defender:** To help protect the greatest number of PCs in the Windows computing ecosystem, Windows Defender removes critical threats from even non-genuine copies of Windows.

**Windows ReadyBoost:** Windows Vista can use available memory on a memory device, such as a USB flash drive, as extra memory cache to provide more consistent and responsive performance.

**Windows Update:** Similar to the Windows XP experience, users with a non-genuine copy of Windows will not be able to access the many valuable Windows downloads and updates that will be available for Windows Vista. New releases of applications, such as Windows Media Player and Internet Explorer, are reserved for genuine Windows customers. However, users of non-genuine Windows Vista will be able to receive critical security updates via Automatic Updates.

When a non-genuine copy of Windows Vista attempts to load or run one of these features a message will appear that alerts the user that validation is required. Below is a sample screenshot of this experience in the case of Windows Aero.



To learn more about Windows Aero, please turn to [3.04: Navigation and Ease of Use](#) on page 27.



To learn more about Windows Defender, please turn to [3.09: Windows Defender](#) on page 82.



To learn more about Windows ReadyBoost, please turn to [3.11: Performance](#) on page 92.

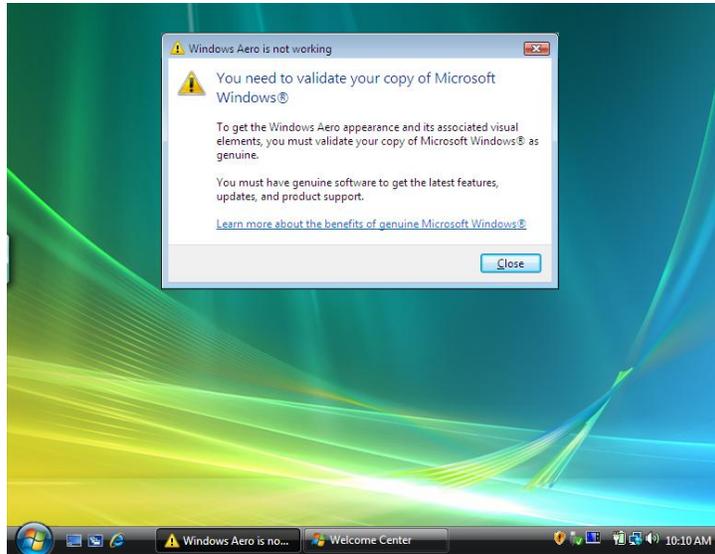


To learn more about Windows Update, please turn to [3.22: Windows Update](#) on page 133.

## Persistent notification

In addition to select features being disabled, Windows Vista also notifies users if their copy of Windows is determined to be non-genuine. The bottom right portion of their screen will display a persistent message that reads “This copy of Windows is not genuine.”

An example of this can be seen in the lower right corner of the screenshot shown here.



## Common scenarios

To help better illustrate how Windows Vista will behave if a system is determined to be non-genuine or fails to activate, two common scenarios are outlined below.

First, a user obtains a copy of Windows Vista from a street vendor or other non-authorized source. To work around product activation, the copy of Windows Vista comes with a hack that tampers with license files and bypasses product activation. In this scenario, the SP Platform will detect that the license files have been compromised and will set the system to a non-genuine state. In that state, the user will have the non-genuine experience described above. The user will be able to go online to learn more about how the computer got into that state and learn about possible remedies if they are a victim of piracy.

A second scenario stems from experience with Windows XP in which Microsoft learned that some range or set of keys will be abused or stolen and used for piracy purposes. In many cases of piracy, an unknowing customer is sold a copy of Windows Vista with one of these keys provided to activate that copy. If the key is already blocked by Microsoft, the user will not be able to activate the copy of Windows, and the system will be moved into reduced functionality mode after 30 days. If the key has not yet been blocked by Microsoft, the system can activate and the user can use the copy of Windows Vista. However, if at some point the key were to be blocked and the user attempted to access content or downloads that required validation, their key would be identified as blocked, the system would be placed in a non-genuine state, and the user would have the non-genuine experience outlined above. In addition, the user might be asked to reactivate; failure to do so within the 30-day grace period would cause the system to be moved into reduced functionality mode.

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## 4.01 Home User Introduction

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Windows Vista Home Premium is the preferred edition of Windows Vista for home desktop and mobile PCs. In addition to the compelling features in Windows Vista Home Basic, it delivers more productivity and entertainment at home and on the go—making it easy to enjoy digital photos, music, TV, games and movies, while providing a whole new level of security and reliability.

### Use your PC more easily

The spectacular Windows Aero user experience features stunning visual effects including helpful animations, transparent glass menu bars that let you see behind your windows, and Live Thumbnail previews of applications, so you can have the most productive and engaging desktop experience. Windows Flip 3D lets you dynamically flip through all your open windows to quickly and visually work with many programs at a time. Instantly find information on your computer such as documents, email, photos, and more with Instant Search integrated throughout Windows Vista. See the information you care about right away with Windows Sidebar, which brings real-time information such as weather and news directly to the desktop as easy-to-use gadgets. And Windows Photo Gallery makes it easy to import, organize, edit, and share a lifetime of photo memories with family and friends.

### Keep your PC, personal information, and family safer than in any previous version of Windows

Windows Defender defends your PC against pop-ups, slow performance, and security threats caused by spyware and other unwanted software. Windows Internet Explorer 7 helps protect your PC and your personal information against malicious software, fraudulent websites, and online phishing scams. Scheduled and Network Backup automatically backs up your files—priceless digital photos, music, movies, documents and more—so you can relax and focus on the things you care about most. Parental Controls make it easy for you to set rules for your kids' PC time, so you can manage access to websites and games, and set time limits. And with standard user accounts, you can confidently allow your children to use the computer, without worrying that they will install malicious software or make harmful changes to the PC.

### Enjoy the best in home entertainment

Use Windows Media Center to enjoy your entire digital entertainment library in full glory on your PC or even on your TV. View your photos in a cinematic slide show, browse your music collection by cover art, easily play DVDs, watch and record TV shows, download movies, and project your home videos—then pass the remote to let friends and family join in the fun! Or take it to the next level and enjoy Windows Media Center entertainment on TVs throughout your home with Xbox 360 and other devices connected to your home network. Burn your photo slide shows and home movies to a professional-looking video DVD with Windows DVD Maker and watch them on a DVD player or PC whenever you like. Play the latest high-performance games with stunning three-dimensional (3D) visuals—from simple to spectacular, there are supported games for every age and ability, on your PC or online. Plus you can use Windows Media Player 11 to

rip CDs to your PC, get new tracks from an online music service, and easily sync music to your portable devices.

## Stay productive, entertained, and connected when using a mobile PC

Stay productive wherever you go: The Network and Sharing Center helps you easily and securely connect to wireless networks when you're out and about. Get your computer up and running faster by pressing the power button to pause and resume your computer session in just seconds, while conserving battery life in sleep mode. Easily tweak your key mobile preferences with Windows Mobility Center, and use Sync Center as the one place to go for keeping all your supported devices up-to-date with your latest calendar, contacts, and music. Handwrite notes or make sketches on the run with a Tablet PC. Or take a break from it all and enjoy your favorite TV shows, DVDs, downloaded movies, music, and games right there on your Windows Media Center-enabled portable PC.

## 4.02 Parental Controls Settings



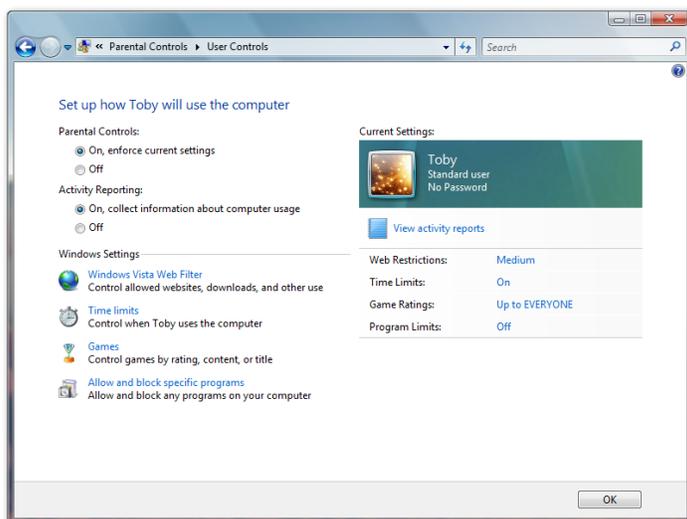
For children, a personal computer is a gateway to a world of incomparable learning, entertainment, and communication opportunities. However, left to use the PC unsupervised, children might access undesirable content online or via games, run inappropriate applications, or spend too much time on the PC.

Windows Vista comes with a set of parental control features offering parents greater peace of mind and greater confidence in their ability to manage the content their children can view on the computer. The parental controls help parents manage which computer games their children are allowed to play and which applications and websites they can use. Parents can also set specific times when their children are allowed to use the computer—and the restrictions will remain in force even when the parent is not at home—making it easier to limit unsupervised time and ensure that their kids aren't playing computer games instead of doing their homework.

Every family and every child is different, and the parental controls in Windows Vista make it easy for parents to set up individual usage profiles for their children, tailored specifically to the age level and personal interests of each child. As children grow and mature, parents can modify the usage profiles to meet their family's evolving needs.

### Parental Controls Panel

The Parental Controls panel, part of the User Accounts and Family Safety Control Panel applet, centralizes all of the key settings of the Windows Vista Parental Controls. From this one location, you can configure the parental controls for your computer and applications, setting appropriate limits on your children's game playing, web browsing,



and overall computer use. The Parental Controls panel provides a centralized location where you can turn parental controls on and off, block or allow specific programs, games, and websites, and set controls for every aspect of your child's computer use. Third-party family safety software and service providers may also choose to have their products and services accessible from the Parental Controls panel in Windows Vista.

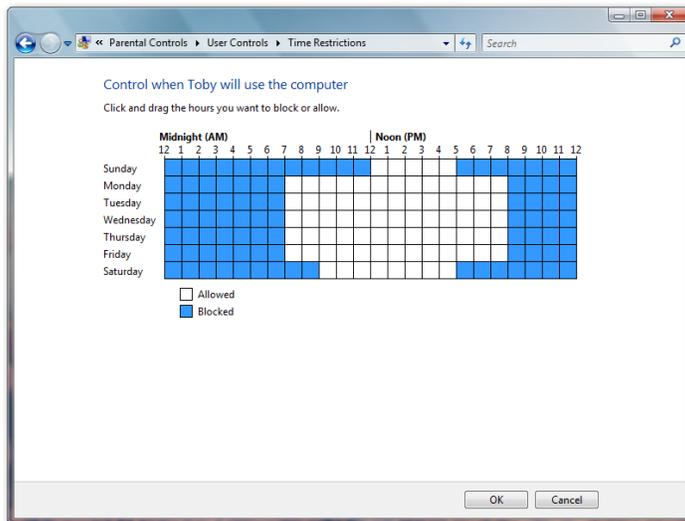
Parental controls features do not work on domain-joined machines, such as in a business environment.

## Activity reports

From the Parental Controls panel, you can review easy-to-read activity reports that show how your children have been using the computer. Monitoring your children's computer behavior not only makes it easy for you to keep track of what they are seeing, hearing, and doing, but it also enables you to refine and modify parental controls based on actual feedback. For your children, the Parental Controls icon in the system tray is always visible to let them know that the parental controls feature is on.

## Time limits for computer use

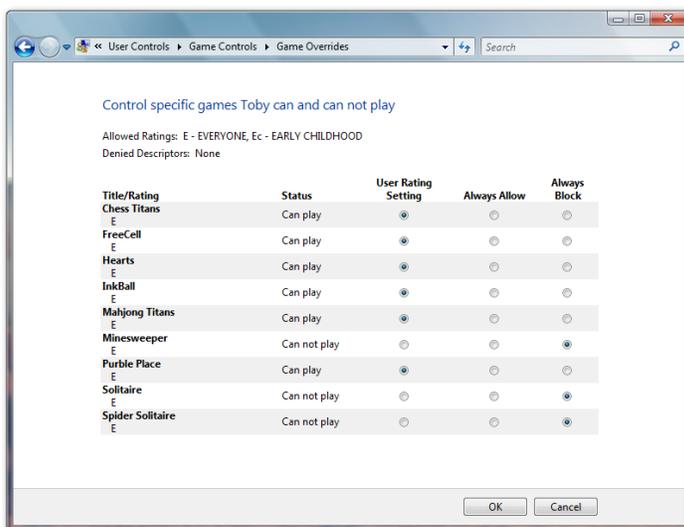
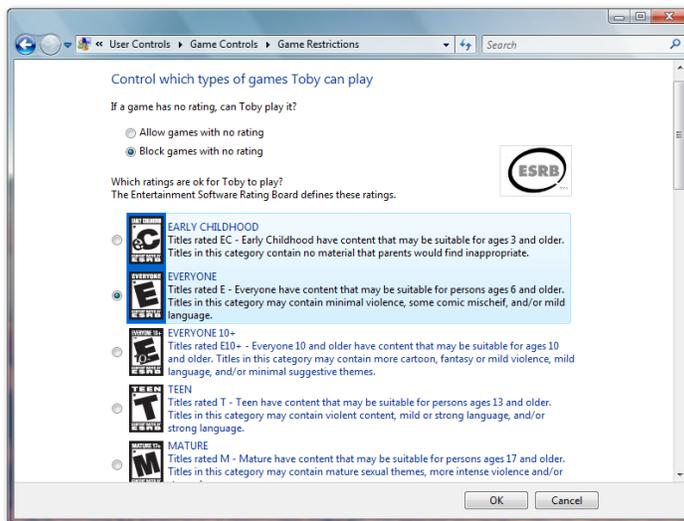
With Windows Vista, you can decide when your children are allowed, or not allowed, to use the computer. You are presented with a grid showing the days of the week and the hours of the day. The default setting is to allow your children to use the computer during all hours of the day and night, seven days a week. To restrict their computer use, you simply click on the specific times and days that you want to block.



As a child nears the end of an approved time period, they receive a 15-minute and a 1-minute notification that their time is about to expire. If their time ends before they log off the computer, Windows Vista suspends their session and displays the login screen so another user can use the computer. The child's session stays active in the background, however, so the next time they log on, they can pick up where they left off without losing any of their work.

## Computer game restrictions

Parents can decide which computer games their children are allowed to play. You might decide to allow your child to play all games deemed appropriate for a certain age level by



one of the game ratings boards. (Windows Vista supports all of the major international ratings boards that are currently active.) You also have the option of refining your choices by allowing or disallowing specific game titles and various types of game content. This enables you to make decisions about games that are unrated.

Parents sometimes might choose to override their own restrictions and make exceptions to the rules they have set. For example, they might restrict certain game titles that are otherwise approved for a certain age group, or they might allow some games that are rated above the age level they have chosen for their child.

When children log on to the computer, they can only play games that conform to the particular ratings and restrictions set by their parents.

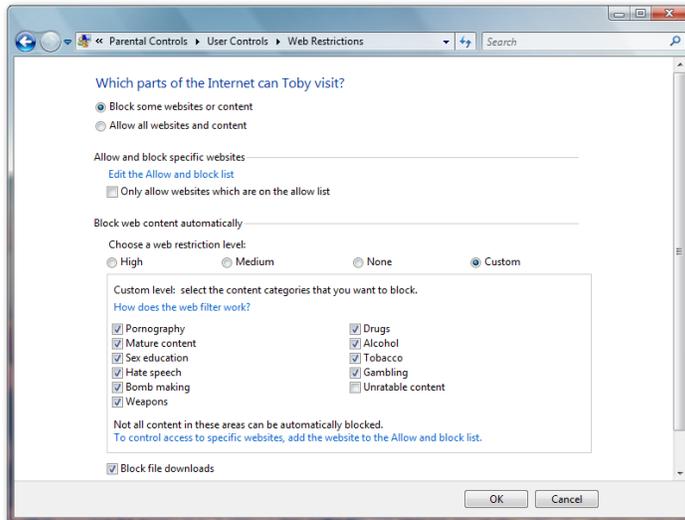
Parents can access parental controls for games through the Parental Controls panel or by clicking the Parental Controls button in the Windows Games Explorer, which displays all of the games available to each computer user.

## Application restrictions

An “over-the-shoulder” request feature enables a child to ask a parent to authorize immediate access to a blocked application. For example, a child might download an application from the Internet that they need to complete their homework. Parents can block file downloads, however even if the download is permitted, when the child tries to run the program, it will fail if it is not on their list of approved applications. In the error dialog box that appears, they can request that their mother or father enter their administrator credentials and approve the new application—the child doesn’t have to waste time logging off so a parent can log in and give approval.

## Web restrictions

Windows Vista comes with a built-in Web Content Filter, which can examine content on various websites and provide parents with information they need to make informed



decisions about the limits they want to place on their children's web browsing. It works with most major browsers, not just Microsoft Internet Explorer.

You can choose a preset web restriction level established by the Web Content Filter or restrict specific websites or even individual webpages within those sites, according to the type of content they contain. For example, parents of a teenager might choose to allow sites that contain sex education information while blocking pornography. You can also explicitly choose which websites you allow your child to visit, overriding any default

content restrictions. You can also import/export lists of sites to explicitly allow or block, creating or modifying lists that may be exported and shared with others to import and use.

Children who encounter websites with content that has been restricted by their parents will see a screen informing them the site is unavailable because parental controls have been applied. The screen will include a message suggesting they check to make sure the web address is correct, and then talk to their parents if they still want access to the site. An "over-the-shoulder" request feature, similar to the one for blocked applications described above, allows children to ask their parents for immediate access to a blocked website without logging off the computer. Parents can simply enter their credentials in the override request dialog box to approve the request and unblock the site by adding it to the "allow" list.

### Parental Controls—Key Features

Feature	Brief Description
Activity reports	Parents can choose to receive and review detailed reports of their children's computer use.
Application restrictions	Parents can block or allow their children's access to any program on the computer (with the exception of programs required for basic Windows functionality).
Game restrictions	Parents can control which computer games their children are allowed to play by allowing or restricting games by content, title, or age rating set by an independent rating boards.
Parental Controls panel	A central location where parents can configure all parental controls and retrieve activity reports.
Time limits	Parents can control which days and times their children can use the computer.
Web restrictions	Parents can place appropriate limits on their children's access to websites, specific webpages, downloads, and so on.

## 4.03 Windows Media Player



The new Windows Media Player 11, a core part of the Windows Vista entertainment experience, offers you unmatched choice and flexibility for managing your digital media. You can easily manage your libraries of digital music, photos, and video on your PC, explore a new world of music through integrated music services, and connect with a wide range of devices so you can have your media collection wherever you want it.



### Updated design and interface

When designing the new Windows Media Player, Microsoft considered the needs of a wide range of users—from people just getting started with digital media to discriminating audiophiles with very large collections on their PCs. Building on this feedback, Microsoft made significant changes to the overall experience:

- **Streamlined interface.** For a sleeker and more functional appearance, the “classic” Windows Media Player menus are now turned off by default and are accessible by right-clicking anywhere on the Player frame. (You can choose to re-enable the menus at any time.)
- **Faster access to settings.** Instead of navigating through menus, you can now quickly access common settings by clicking the arrow below each activity tab (such as Rip, Burn, or Sync).
- **Universal Back and Forward buttons.** Navigating Windows Media Player is easier than ever, with integrated Back and Forward buttons that help you quickly move between screens or retrace your steps if you get lost.
- **Revamped playback controls.** The new playback controls are easier to find and use, are laid out more intuitively, and feature improved repeat, shuffle, and full-screen options.

### More of the music you love

Windows Media Player 11 is filled with smart features that breathe new life into your music collection, provide a more personalized media experience, and offer you cool new ways to discover more of what interests you. Examples include:

- **Simplified Media Library.** A number of improvements in Windows Media Player 11 make it easier for you to keep your music organized and find creative new ways to visualize and explore it. Music now has its own focused media category view, with a simpler list in the Navigation Pane that shows artists, albums, songs, genres, years, and ratings. By right-clicking on Library and selecting Show More Views, you can customize the look of your music collection any way you like.

- **Album art.** Enjoying digital music doesn't mean you have to give up all your album art. Windows Media Player 11 brings album art to the center of your experience, with thumbnail views that appear when you browse your collection, as well as intuitive visual "stacks" of albums when you browse by genre or through playlists. If you're missing album art, Windows Media Player can find it for you or you can replace it with your own images.



- **Library layout and view options.** Your media library views are completely customizable, with Icon, Tile, Expanded Tile, and Detail View options, and you can further customize your layouts to get the experience you want.

## Optimized for large music collections

As people build larger digital music collections by "ripping" CDs, buying from online stores, and downloading from the Web, it's more important than ever to be able to quickly organize and explore all of your music. Windows Media Player 11 is optimized to handle massive collections of music—literally *millions of* tracks—so you can scroll, flip, and browse through your entire library without skipping a beat. Key features include:

- **Instant Search.** Digital music libraries benefit from smart tools built into the Player. Search has been streamlined to make accessing your digital collection extremely simple. If you know exactly what you want (or even if you can remember only part of a song or album title), Windows Media Player 11's Instant Search feature can search across your entire library and return exactly what you're after—*fast*.
- **Ripping CDs.** Adding new music to your library is easier with new enhancements to CD ripping functionality. You can now rip songs from CDs into two new audio formats—Windows Media Audio Pro and lossless WAV. And if your computer has multiple CD drives, you can load them up and start ripping them all at once, so you can digitize your entire CD collection faster.
- **Powerful playlists.** You can still create custom playlists by dragging songs and albums into the List Pane, and a new Shuffle Playlist feature makes it easier to create new playlists out of your favorite tracks with just a single click.
- **Audio fingerprinting.** With large digital music libraries, it's often hard to make sure songs match the media information that describes them. In addition to automated metadata tools that run in the background, Windows Media Player 11

now includes audio fingerprinting technology matching that better pinpoints the exact album information that goes with your tracks.

## Discovering new music

Windows Media Player 11 features a completely new way to add music to your existing collection. Online stores are deeply integrated into the Player, so you can explore what they have available using the same rich, intuitive features you use to search your own music library, including MTV Network's URGE in the United States.

This new music service, from the people who brought you MTV, VH1, and CMT, puts a complete music experience right on your PC. In URGE, you'll find everything you've ever heard of and a lot you haven't. Fall in love with new songs, remember old ones, and get closer to artists than ever before. URGE lives and breathes music 24 hours a day, with 18 genres and countless styles, from pop, rock, and hip-hop to classical, jazz, and polka. With an URGE All Access subscription, you get unlimited access to music for a fixed monthly fee. Or just download URGE and buy tracks as you go. (URGE is available only in the United States.)



Key features of URGE include:

- Two million songs. Stream or download from 18 music genres and more than 400 styles.
- 6,000+ music videos. Brought to you by the people who started MTV, VH1, and CMT.
- Exclusives from MTV, VH1, and CMT. Songs, videos, and playlists you can't find anywhere else.
- Dynamic feeds. Save a feed to your favorite playlist and keep your favorite new music flowing straight to your music library or compatible portable music player.
- 130 commercial-free radio stations. Professionally programmed. CD quality. Every style.
- 500+ playlists. Genre- and style-based. Charts. Moods. Years. Decades. Cities. Celebrity. Auto Mixes. And so on.
- Features, profiles, interviews, and blogs. The best music writing on the Web, each article comes with an attached playlist so you can listen along or download.
- Take URGE on the road. It's everything URGE All Access offers, plus total mobility with compatible portable music players.

Many online stores from previous versions of Windows Media Player are still accessible in Windows Media Player 11—just click on the drop-down menu below the URGE logo on the task bar and select Browse All Online Stores to see a complete list of partners who

have created plug-ins for Windows Media Player. You can then choose a different store to appear by default.

## All of your entertainment in one place

Beyond music, Windows Media Player 11 offers great new ways to enjoy video, pictures, and recorded TV. A number of new features help you get the most out of all of your media—you can playback media items on your PC, easily organize your digital media library, and connect with portable devices to enjoy your media anywhere you like.

- **Simplified media views.** The overall Windows Media Player 11 experience is designed to be simple and uniform, but each media type now has its own specialized view in the Navigation Pane. For example, you can explore video by actor or genre just as easily as you can sort albums by artist. Pictures can be sorted by the date they were taken. And recorded TV can be organized by series. Just as with music, you can quickly and intuitively search for content and explore your library with the same rich thumbnail views and “stacks” of media.

## Enjoy your media everywhere

Storing your entire digital media collection in Windows Media Player 11 has many great benefits, including the ability to stay connected with your library no matter where you are.

- **Share your library.** If you’re running Windows Vista on a home network, you can use Windows Media Player 11 to share the contents of your library with other computers and access all your media from anywhere in the home.
- **Connect with networked digital media players.** You don’t always need a PC in the room to enjoy digital media throughout the home. If you have a networked digital media player or an Xbox 360, you can use Windows Media Player 11 to stream music, pictures, and videos from your computer to that device.



## Connect with portable devices

The PlaysForSure logo program was created to showcase portable devices that work great with Windows Media Player, and to play music and video purchased from the wide selection of Windows Media online stores.

Many new features in Windows Media Player 11 improve the synchronization and digital media management experience with PlaysForSure devices.

These include:

- **Simple device setup.** It is easier than ever to sync portable devices with Windows Media Player 11. A wizard helps you quickly set up your new device the first time it's connected.
- **New sync features.** You can still sync your device automatically or manually, but Windows Media Player 11 also offers a few cool new features:
- **Multi-PC Sync.** Allows you to fill your device from multiple computers, which is great for managing home and work libraries.
- **Reverse Sync.** Enables the transfer of media captured on your device—such as phone/camera photos or music purchased over the air—to your library.
- **Shuffle Sync.** Calculates the size of your device and fills it with a random sampling of your media library with just one click.
- **Smart visual cues.** The Sync tab includes several visual enhancements, including a device capacity meter (which is like a “gas gauge” for your player) and the ability to explore the media on your portable device using the same fast searching and rich visualizations you use with your media library.
- **Troubleshooting.** Some purchased media from online music and video stores include “usage rights” for activities such as CD burning and portable device sync. Windows Media Player 11 includes features that make it easier to understand these rights and troubleshoot any problems that might arise. Clicking on a simple Help icon displays details about the problem and how you can fix it, so you can quickly get back to enjoying your media.
- **Converting files for device sync.** Not all portable devices support all music and video formats, so Windows Media Player 11 can automatically convert many types of media to a format your devices understand—even for protected music and video purchased from Windows Media online stores.

## Burn your own CDs and data DVDs

One of the great things about having a large digital media library is the ability to burn custom CDs with your favorite tracks. Windows Media Player 11's Burn tab has been enhanced to make this experience even better. When you create playlists for burning, a capacity meter dynamically tells you how much space you have left and a new “disc-spanning” feature helps you make longer mixes or back up your collection by automatically burning longer playlists across multiple CDs.

### Windows Media Player 11—Key Features

Feature	Brief Description
Audio fingerprinting	Enhanced metadata matching for pinpointing the exact information that accompanies your media library content.
CD burn disc-spanning	Easily burn large volumes of media to CDs without being limited to one CD or data DVD. Automatically cues up the next disc.
Device browsing	Explore the contents of your portable device in the Sync View of the Player as if it were your local media library. Includes album art views and fast search functionality.
DVD decoder	Some versions of Windows Vista include a DVD decoder that eliminates the need to purchase an additional plug-in to play DVDs.
Instant Search	Powerful keyword search for finding media library content fast. Quickly queries across your entire library metadata to return exactly what you're looking for.
Integrated music services	New integrated music services that provide programming, purchase, and download and subscription options from inside the Windows Media Player library.
Library sharing	If you're running Windows Vista on a home network, you can share your Windows Media Player 11 media library with other computers and networked devices to access your music, pictures, and videos from any room in your home.
Multi-PC Sync	Fill your portable device from multiple PC libraries. Ideal for syncing content between your work and home PC.
Protected File Conversion	Automatically converts media files (including protected audio and video files) to the best size for portable devices.
Quick access tabs	Provide easier access to settings associated with the most common Player activities. They include Rip, Burn, and Sync.
Reverse Sync	Sync media from your device back to your PC. This is perfect for bringing camera phone pictures and music purchased over the airwaves into your media library.
Shuffle Playlist	Create new playlists of favorite music tracks with one click.
Shuffle Sync	Quick sync option for filling your portable device with a random sampling of your media library.
Thumbnail and stacking views	Visual navigation for music, pictures, and video files.

## 4.04 Windows Media Center



Today, Windows Media Center PCs are the world's most popular all-in-one entertainment devices. With a Windows Media Center PC, your music, photos, TV, movies, and the latest in online media are all accessible from the comfort of the couch with a remote control.

Since 2002, Windows Media Center has seen four releases: Windows XP Media Center Edition, Windows XP Media Center Edition 2004, Windows XP Media Center Edition 2005, and a Windows Media Center Edition 2005 update. Windows Media Center now ships into more than 30 locales.



With Windows Vista, Windows Media Center will be enjoyed by people in over 190 locales worldwide as it is no longer a separate edition, but simply an integrated experience within the Windows Vista Home Premium and Windows Vista Ultimate editions.

Windows Media Center in Windows Vista features some great advancements over previous versions, including an improved user interface with easier navigation and

breakthrough media visualization. Windows Media Center also offers built-in support for archiving TV shows directly to video DVDs, faster overall performance, and an improved platform for content owners to deliver new online entertainment services and experiences. Most notably for U.S.-based customers, Windows Media Center offers support for digital cable service, by means of a digital cable tuner.

### Cool new experience

After starting Windows Media Center for the first time, you will be exploring your digital media in no time since the setup experience has been streamlined. In fact, Windows Media Center automatically checks your PC for media files during the setup process so you don't have to waste a minute searching for your content.

Once started, you will notice that Windows Media Center is optimized for widescreen and HD displays—making it perfect for the living room. With the new on-screen layout of photos, music, and videos, you can see up to three times more content on a widescreen display compared to previous versions of Windows Media Center. The clean, simple look ties together with the Windows Aero desktop experience and features transparency effects and smooth animations, giving you a fun and visually stunning way to browse and experience your home entertainment. Designed for a wide range of displays and input methods, Windows Media Center is optimized for use with a remote control but also works well with other input devices such as a mouse and keyboard, touch screen, or even a Tablet PC.

Windows XP Media Center Edition 2005



Windows Media Center in Windows Vista

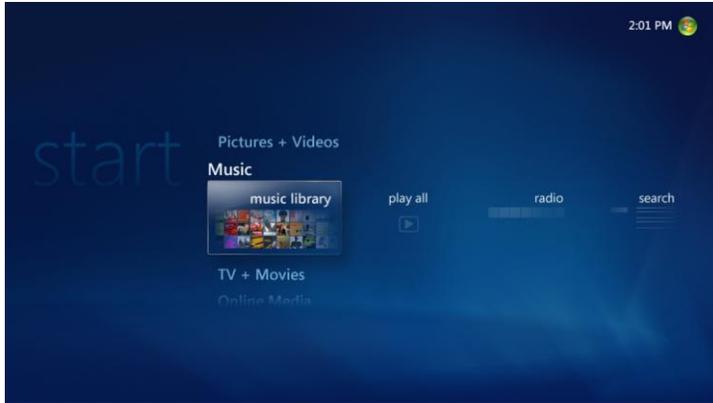
Cool New Experience—Key Features

Feature	Brief Description
Express setup	Windows Media Center features a new, fast setup that gets you to your favorite media in just a few simple clicks.
Mouse and keyboard improvements	Windows Media Center improves control when using a mouse and keyboard for better focus and an easier ability to select interface elements.
Touch screen support	You can now control the Windows Media Center experience using a touch input screen.
Widescreen optimization	Windows Media Center expands the interface to take full advantage of a 16:9 screen, displaying three times as much onscreen content.

## Music in Windows Media Center

Whether your music comes from URGE, a partner PlaysforSure music service, or your own PC, with Windows Vista your music takes the “main stage.” The Music Library takes full

advantage of your widescreen display, displaying the cover art for each album/song you own. The interface looks like a “wall of music” with all of your album covers filling up the screen. All you have to do is use the remote to pick an album, press play, and start grooving to your favorite tunes.



Besides the Album view, there is also the fun Years view. The Years view neatly arranges your music according to the year in which it was released. This makes it easy for you to see all the music for the year you graduated school or the year you got married.

But you can't talk about music without talking about the radio. Everyone has their favorite station, whether it's terrestrial or via the Internet, and Windows Media Center gives you the ability to tune to those stations in a very seamless way. Picking the Radio tile takes you to a view where you can pick and choose between terrestrial, which requires connection to an FM antenna, and Internet radio stations, which requires an Internet connection.

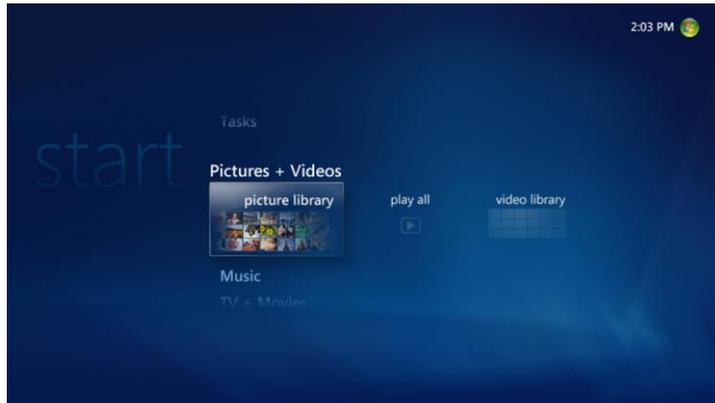
### Music in Windows Media Center —Key Features

Feature	Brief Description
New album views	View your music in a more dynamic way with updated Album, Artist, and Year views. Also view your content using the previously released views like Genre, Playlists, and others.
Radio	Go to one place to access both your terrestrial and online radio sources.
Radio station customization	Add a custom name to each of your radio stations instead of having to find them by frequency.

## Pictures + Videos in Windows Media Center

### Digital memories

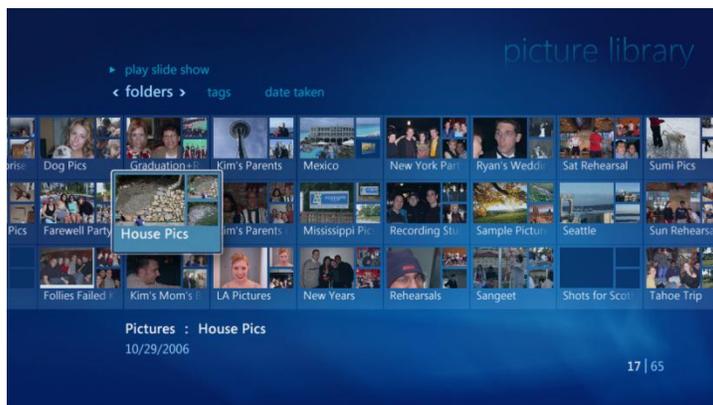
Your photos and home videos are your digital memories, and with every passing day, your life is filled with more and more of them. Windows Vista provides the ultimate end-



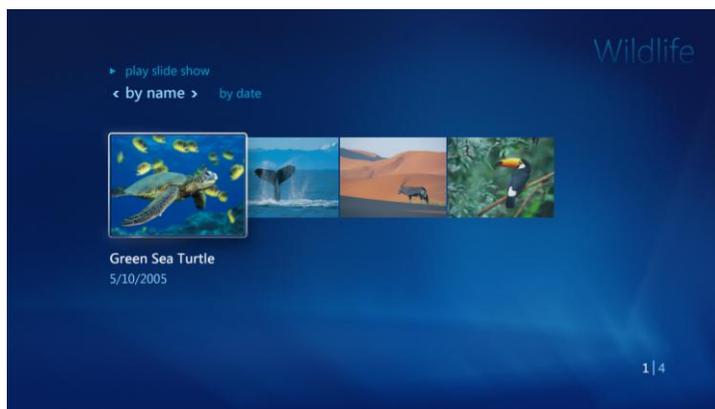
to-end experience when it comes to managing those memories, making it easy to view, organize, and share your many memories with friends and family. When it comes to sharing, Windows Media Center lets you share those memories on the most important screen in your house: your television.

### Want to see pictures from my vacation?

In the past, sharing digital photos was a cumbersome experience that involved crowding around a PC. The Picture Library, found within the Pictures + Videos strip in Windows Media Center, lets you access all of your digital photos in a better way, from the comfort of your couch. The Picture Library allows for easy navigation and highlighting, letting you pick out exactly the photo you want to share.



- **By Folder.** Photos are stored in folders, and the Picture Library will let you view your photos in that context.
- **Date Taken.** Digital cameras automatically store lots of details about a photo, like the resolution, the shutter speed, and most importantly, the date taken.



- Tags.** Windows Photo Gallery introduces a new way to organize your photos: Tags. This new feature allows you to assign/specify a keyword with individual photos or to a collection of photos. Windows Media Center lets you view your photos using those tags. For example, suppose you have a collection of wildlife pictures taken over the years. Those pictures may be stored in a variety of folders on your PC, making it difficult to view all of those wildlife pictures in one view. Since you used Windows Photo Gallery to tag them as "Wildlife" pictures, you need only use your remote control to navigate to the Wildlife collection, and you can see all of those pictures from across the years, no matter where you stored them.

## High Definition (HD) slide shows

Flipping through your photos onscreen is definitely preferable to crowding around a PC. And now Windows Media Center makes photo viewing even more fun with stylish photo slide shows. With the built-in slide show feature, Windows Media Center can automatically add cool cinematic effects, such as fades, pans, and zooms, to really bring your memories to life. Those images will really pop on your high-definition screen as all

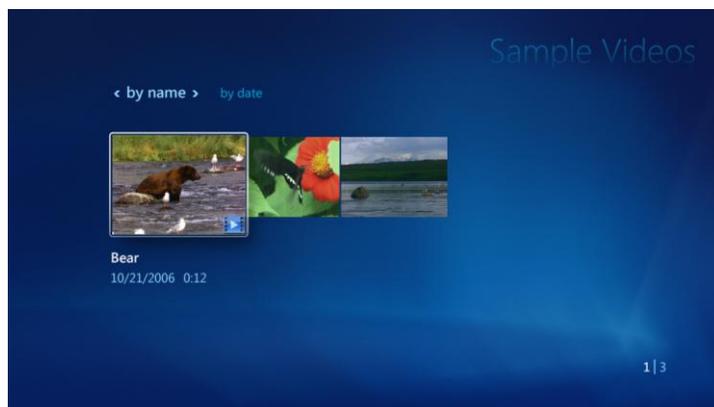


of your pictures can now be shown in the highest resolution your TV supports as opposed to previously, when Windows Media Center would down-sample your pictures. Finally, if your friends and family really love one of your slide show creations, you can burn it to a video DVD, featuring your pictures and music.



## Photo touch-up

While Windows Photo Gallery is the experience that you will want to use to edit the bulk of your pictures, every now and then there might be one that you forgot to fix. With Windows Media Center you can perform basic editing on your photos, using your remote. Tools for cropping, re-orienting, printing, and even eliminating pesky red-eyes are all at your fingertips.



## Videos

With the Videos Library, all of your video memories are found in one, convenient place. You will notice that with your videos, Windows Media Center can actually look inside each one, find a representative shot, and use that shot as the video's thumbnail, making it easier for you to pick out any video you want.

With Windows Vista Home Premium and Windows Vista Ultimate editions, Windows Movie Maker, your integrated video editing experience, enables you to edit high-definition home videos. Windows Media Center then lets you share your high-definition creations on your living room TV with the rest of your family. Who knows? A future Best Director award may go to someone in your own house!

## Pictures + Videos in Windows Media Center—Key Features

Feature	Brief Description
Burn to CD or video/data DVD	Burn a digital memories disc, complete with a slide show featuring both pictures and music or home videos to CD/data DVD/video DVD. The video DVD support is native to Windows Vista Home Premium and Ultimate (without third party codecs) and allows you to create discs that can be played on most consumer DVD players.
HD slide shows	Windows Media Center applies cinematic effects to your photos, making your slide shows more fun. Photos are displayed at the maximum resolution of your screen, which really brings them to life.
Photo touch-up and printing	With the remote, you can conveniently rotate, crop, auto-adjust contrast, fix red eye, or print on your color printer.
Related Pictures	Easily switch between media types when your photographic and video memories are stored in the same folder.
Tags	Apply tags in Windows Photo Gallery to flexibly organize your photos—then use those tags in Windows Media Center to view/share your photos in any way that you want.
WMV-HD support	Windows Movie Maker enables you to create high-definition home videos. Windows Media Center enables you to play them back in your living room.

## TV + Movies in Windows Media Center

### Lights, Camera, Action!

No entertainment experience would be complete without television and movies, and Windows Media Center gives you the best all-in-one entertainment experience with its



deep support for your favorite TV shows and the latest movie blockbusters. Imagine curling up on your couch to watch a recorded show that you missed while on a trip, or catching the last few minutes of your favorite game, or even downloading the latest sci-fi film. With Windows Media Center you can always have something thrilling to watch.

### Easy TV setup

Because Windows Vista Home Premium and Ultimate editions are going to be available worldwide, Windows Media Center will now be available in more than 100 locales versus the 33 countries in which it was previously available. All these markets present unique challenges to the TV setup process, but Windows Media Center in Windows Vista has some new technologies available that will help you get started more easily than ever.

First, when you have a signal connected to your PC's TV tuner, Windows Media Center

automatically detects whether you have a simple over-the-air signal or a cable, cable plus set-top box, or satellite (which naturally includes a set-top box) configuration. If you have a set-top box, you are then walked through the steps to set that up, which includes tweaking the infrared (IR) blaster that controls your set-top box.

In many countries, an accurate list of available channels is not accessible. With Windows Vista, Windows Media Center introduces a new exhaustive scanning feature, for PAL/SECAM countries, which provides a far more accurate way to find channels than previous versions of Windows.

Because different countries have different broadcast standards and Windows Media Center does not support them all, you will want to make sure Windows Media Center supports your particular standard. For a full account of supported signals, please see the chart the next page.



Supported broadcast standards by country

Locale		Analog TV						Digital TV					Transmission Methods					
		PAL B/G	PAL D	PAL I	SECAM L	SECAM D/K	NTSC M	NTSC J	Digital Cable (incl. CableCARD)	ATSC	DVB-T	ISDB-T	DVB-S (FTA)	Analog Terrestrial	Analog Cable Direct	Cable (through STB)	Satellite (through STB)	Satellite direct
Australia		•								•				•	•	•	•	
Austria		•								•				•	•	•	•	
Belgium		•								•				•	•	•	•	
Canada						•								•	•	•	•	
China (PRC)			•											•	•	•	•	
Czech Republic/Slovakia		•								•				•	•	•	•	
Denmark		•								•				•	•	•	•	
Finland		•								•				•	•	•	•	
France					•					•				•	•	•	•	
Germany		•								•				•	•	•	•	
Hong Kong				•										•	•	•	•	
India		•								•				•	•	•	•	
Ireland				•						•				•	•	•	•	
Italy		•								•				•	•	•	•	
Japan								•						•	•	•	•	
Mexico						•								•	•	•	•	
Netherlands		•								•				•	•	•	•	
New Zealand		•								•				•	•	•	•	
Norway		•								•				•	•	•	•	
Poland		•								•				•	•	•	•	
Portugal		•								•				•	•	•	•	
Russia					•					•				•	•	•	•	
Singapore		•								•				•	•	•	•	
South Africa				•										•	•	•	•	
South Korea						•			•					•	•	•	•	
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Taiwan						•				•				•	•	•	•	
Turkey		•								•				•	•	•	•	
United Kingdom				•						•				•	•	•	•	
United States						•		•	•					•	•	•	•	

## TV and movie lovers unite: watch, pause, or record live TV and movies

You can now officially throw away your VCR as Windows Media Center enables you to digitally watch, pause, and record live TV in many countries around the world. Whether



your Windows Vista Home Premium- or Ultimate-based PC has an integrated or external TV tuner, it's as simple as plugging your antenna, cable, or the video output from your satellite set top box into your PC, and then connecting your PC to your television.

Want to see that game-winning play again? No problem. Windows Media Center features an instant replay button that enables you to instantly

jump back in seven-second increments. If you want to record a live show, just press the record button on the remote, and in one simple act, that show will be recorded. More importantly, TV fans will be extremely happy to know that Windows Media Center features multiple tuner support, which means that you can watch a live show on one channel while simultaneously recording a show on a different channel.



Later, when you want to watch a recorded show, Windows Media Center makes it fun and easy for you to find that clip. Rather than showing you just the text names and program

information for your recorded show, Windows Media Center will clip a picture from the actual show and use that as the show's selectable thumbnail icon.

## Multi-tuner configurations

Depending on the setup of your PC, the type of signal you receive, and where you live, Windows Vista can support anywhere from two-to-four separate tuners. Here's a useful breakdown of the different levels of support according to locale and signal type:

Region	Signal Type	Levels of Support
United States (max 4 tuners)	Two tuners	<ul style="list-style-type: none"> <li>• ATSC +</li> <li>• NTSC</li> <li>• Digital cable tuner</li> <li>• Dual ATSC</li> <li>• Dual NTSC where both signals are the same (<i>E.g., Two cable signals with two straight connections or via two separate set-top boxes</i>)</li> <li>• Dual digital cable tuners (with or without two CableCARDS) (<i>E.g., They both have CableCARDS or they both do not have CableCARDS</i>)</li> </ul>
	Four tuners	<ul style="list-style-type: none"> <li>• Dual ATSC +</li> <li>• Dual NTSC (both signals are the same)</li> <li>• Dual digital cable tuners (with or without two CableCARDS)</li> </ul>
South Korea	Two tuners	<ul style="list-style-type: none"> <li>• Both tuners must be same signal input</li> <li>• You cannot have a configuration with two different signal types</li> </ul>
Rest of the world	Two tuners	<ul style="list-style-type: none"> <li>• Both tuners must be the same signal input</li> <li>• You cannot have a configuration with two different signal types</li> </ul>

## High-definition cable support (U.S. only)

In the U.S., HDTVs have recently begun to outsell traditional analog TV sets. People are hungry for HD content as every show, from sporting events to the latest movie releases, looks more vibrant and life-like in high definition. Home theatre enthusiasts will be excited to know that Windows Vista Home Premium and Windows Vista Ultimate are able to carry digital cable service, which includes support for premium high definition content (such as Starz HD, Showtime HD, and other channels). In order to take advantage of this new feature, you need the following:

- Windows Vista Home Premium or Windows Vista Ultimate product editions
- Digital cable-compatible PC—these PCs are only available from larger PC manufacturers whose specified PCs meet the hardware requirements, such as a High-bandwidth Digital Content Protection (HDCP)-compliant graphics card, to provide excellent digital cable service
- Integrated or external USB digital cable tuner, available from participating manufacturers when Windows Vista ships
- HDCP compliant screen/monitor
- Digital cable service from your local cable provider
- CableCARD from your local cable provider. This is the thin card that slides into your digital cable tuner



Windows Media Center will even create a simple DVD menu that is navigable using your DVD remote, so that you can easily pick and choose what you want to watch.

### Keep and share more of your entertainment

Windows Vista Home Premium digitally records your live television shows and movies on your PC's hard drive and therefore you may worry about eventually running out of disk space. The Windows Media Center experience has you covered. With it, you can choose to record shows to another hard drive partition on the same machine or you can choose to record directly to an external hard drive.

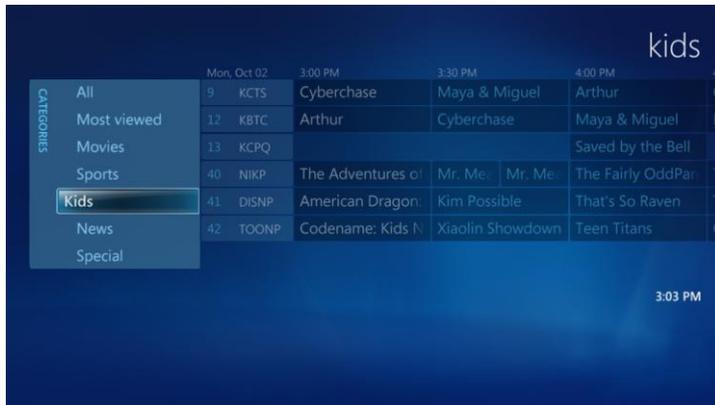
Windows Media Center also includes everything you need to burn your favourite shows to video DVD. You no longer need third party tools to create a DVD that can be played back in a normal DVD player. Just select the show you want to burn, add any additional content, like home videos, music, and photos, and Windows Vista takes care of the rest.



### Your shows on your time

Windows Vista Home Premium lets you watch TV shows and movies on your terms with the Electronic Programming Guide (EPG) in Windows Media Center. The EPG, which is available in select countries, is a free service that provides date and time listings as well as summaries for all the available TV shows and movies available via your local TV service. It covers up to a two-week period, and with it, you can easily

browse and record current and future programs according to their start time. The guide also features robust search capabilities that let you quickly find shows using common categories such as "Kids," "Movies," or "Sports."



Suppose you want to record a show while on vacation. Just find the show in the EPG by navigating to its day and time or by searching for it under the categories view, press the one-touch Record button, and Windows Media Center takes care of the rest. Windows Media Center even gives you the option to automatically record an entire season of a show, while omitting reruns, so you won't miss a single new episode of your favorite show ever again.

### Electronic Program Guide (EPG) is supported in the following countries:

- Austria
- Brazil
- Belgium
- Canada
- Czech Republic
- Denmark
- Finland
- France
- Germany
- India
- Israel
- Ireland
- Italy
- Japan
- Mexico
- Netherlands
- Norway
- Poland
- Portugal
- Russia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Taiwan
- Turkey
- United Kingdom
- United States

### Let's all go to the movies

Windows Vista Home Premium or Ultimate are the perfect additions to any film aficionado's home. In the U.S., Windows Media Center adds the Movie Guide, which makes the movie browsing experience even more enjoyable. With this feature, Windows Media Center pairs the movie schedule information from the EPG with film theatrical posters, which it pulls from a free Internet service. Now, rather than looking at a grid-based TV schedule, you can pick the movies you want to watch or record by their "one-sheet" movie posters which are artfully arranged in a gallery view. If you're wondering who the lead actress is in a film that is currently on, or even who the cinematographer is



for that upcoming, beautifully shot film, the Movie Guide lets you see who's who. Going a step further, you can use the Movie Guide to find all the movies on which that cast or crew member worked. Even though those films may not be coming on over the next two weeks (let alone the next two years), if you choose to record those films, Windows Media Center will remember your selections and record them whenever they come on in the future on any channel.

## DVD playback, with 5.1 / 7.1 audio

DVDs are currently the most popular format for blockbuster home viewing and have



been for a number of years.

Watching DVDs on a Windows Vista Home Premium or Ultimate PC now puts the “theater” back into home theater. No longer do you have to worry about third party DVD codecs to play back DVDs in Windows Media Center. All the necessary codecs are included in the box, making DVD playback easy and seamless. Windows Vista also has new technology that dramatically improves the playback quality of

DVDs, eliminating stuttering and video glitching, thus putting it on par with playback quality of normal consumer DVD players. In the U.S., Windows Media Center supports 200 disc mega-DVD changers, such as those from Sony and Niveus, that connect directly to your Windows Vista PC via a firewire connection.

Finally, no home theater experience would be complete without life-like sound. Windows Vista features a number of sound enhancements, including support for 5.1 and 7.1 audio, that will bring your video entertainment to life.

## Parental Controls and Media Mode

Just because you like to watch the latest mega-blockbuster action film doesn't mean you necessarily want to let your children to watch the same film. Windows Media Center features a set of media-specific Parental Controls that will let you set appropriate ratings for TV shows and DVDs that you deem okay for your kids to watch. The ratings system for TV shows is U.S.-only, but for DVDs, it is supported in many countries worldwide. So in the U.S., for instance, you can make it so your children cannot watch shows rated TV-MA (for mature audiences) while in Japan, a parent

might decide that her children should never watch R and NC-17 rated movies. Finally, one other feature that helps to reassure parents when kids are using the PC is the new Media Mode. Media Mode makes the Windows Media Center interface harder to dismiss, by hiding the controls for shutting down or closing the experience.



## TV + Movies in Windows Media Center—Key Features

Feature	Brief Description
ATSC support	In the U.S. and South Korea, you can receive this digital TV broadcast format natively.
Backup and Restore Center	A new experience in Windows Vista that lets you back up your important data to a CD/DVD, another partition, or a network location.
Channel renaming	Replace the frequency listing of a channel with a more friendly name.
Display Calibration Wizard	A simple wizard that helps you to identify the type of wired connections and type of display you have to optimize the experience for your screen.
Easy TV setup	In most locales, Windows Media Center auto-detects the type of broadcast you have—antenna, cable, or satellite—and whether you have a set-top box and then helps you configure your PC accordingly.
Exhaustive scanning	In PAL/SECAM countries where the channel line-up is not accessible, Windows Vista thoroughly scans the available TV frequencies to identify all the available channels.
Frequency input	For PAL/SECAM users, you can input frequencies to manually add channels to the guide listing.
Record TV to another source	Windows Media Center lets you record television directly to another partition on the same machine or to an external, USB, or firewire hard drive.
TV snapshot	Windows Vista will find a representative shot from your recorded TV show, usually an action shot or an actor's face, and use that to represent the show in the Recorded TV Library.
Video DVD burn	Burn your favorite TV shows, videos, photos, music, or slideshows to a DVD that can be played back on any consumer DVD player. Auto-creates a DVD menu to jump to the right media file quickly.
Watch, pause, record TV	With a supported TV connection, you can tune to a channel, instantly replay something, pause a show, or record it for later. Your TV show is saved to your hard drive.
Let's All Go to the Movies	
5.1/7.1 support	Windows Vista can decode 5.1/7.1 movies natively.
DVD changer support	(For U.S. only) Load as many as 200 DVDs into a compatible changer and then use Windows Media Center to pick and choose any movie you want to watch.
DVD playback	Windows Vista Home Premium and Ultimate includes drivers and codecs for DVD playback.
Media Mode	Hides the max/min/close buttons so children cannot accidentally dismiss the Windows Media Center experience and navigate to other parts of Windows Vista.
Movies Guide	(For U.S. only) Find currently playing or future movies in a movie theater poster gallery. Use the cast and crew listings or similar movies option to find even more movies.
Parental Controls	All countries can set DVD movie ratings. In the U.S., TV ratings can also be set. In both cases, a simple personal identification number (PIN) can be used to lock and unlock content.
Your Shows on Your Time	
Browse by categories	An easy way to browse the guide listings by topic such as kids, movies, sports, and others.

Feature	Brief Description
Conflict resolution	When you have two shows scheduled to record at the same time, Windows Media Center will present both selections and let you choose which show should be recorded and which should not if you have two tuners.
Electronic Program Guide (EPG)	A free guide service that lets you browse, tune, and record all the available TV shows over a two-week period.
One-touch record	While watching a live TV show or when you find a show in the EPG, just press the Record button and Windows Media Center will record it.
Record whole season	When you add a recording, Windows Media Center can also be set up to record all episodes of a show including/not including reruns.
Scheduling priority	For recurring show recordings, you can choose an "uber" priority of importance. In case you are not able to reconcile a scheduled recording, Windows Media Center will automatically default to the show with the higher overall priority.
Search by keyword, title, actors	This simple interface lets you find a show, using the remote, by keying in a few letters from the show's title, or of the name of a cast or crew member.

## Windows Media Center Extenders and PlaysforSure Devices

Not everyone has the space or desire to put a full-size PC in the same room as the TV. With a Windows Media Center Extender and a video capable network, you no longer have to. Windows Media Center technology is built into every Xbox 360 and it is a very simple process to set up. You just connect your Xbox 360 to your television and to your high-

speed network, and then you are able to remotely access the entire Windows Media Center experience. You can watch, pause, and record live TV, browse your photos, listen to your music, or use many of the online media applications. The remote experience sacrifices none of the quality or fidelity of the PC-based experience.

Microsoft has also recently licensed Windows Media Center technology to a number of consumer electronics device manufacturers which means that, in the future, extender technology will be built directly into devices such as television sets, DVD players, and dedicated set-top boxes.



While an extender lets you experience Windows Media Center anywhere in your house, sometimes you want to take your TV and movie experience with you when you are on the go. Windows Vista Home Premium lets you do just that—and on the widest range of devices. Windows Vista Home Premium supports TV and movie synchronization on Windows Portable Media Centers, video-capable PlaysforSure devices, and on Windows Mobile Devices such as PDAs and Smartphones. The really great thing is that Windows Vista handles the transcoding process automatically. It takes a 3 to 4 GB show and compresses it to just a few hundred megabytes.



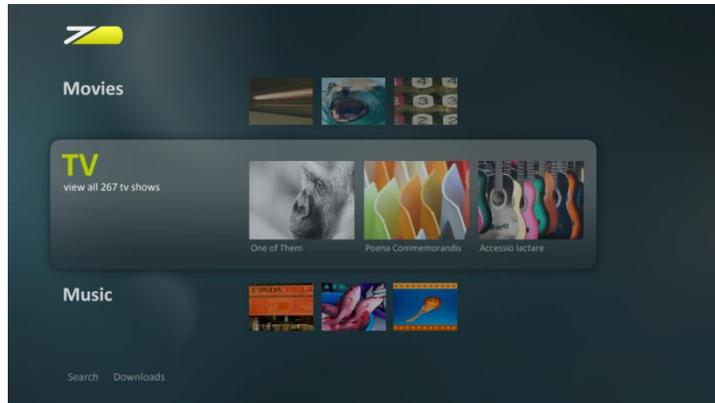
Syncing your content to a portable device is a great built-in service of Windows Media Center, but with the help of a Slingbox, a device from Sling Media, you can access your photos, music, and even “placeshift” your live and recorded television to almost any location in the world. All you need to have is Windows Media Center, a Slingbox, a broadband connection, and a compatible portable device.

### Windows Media Center Extenders—Key Features

Feature	Brief Description
HD Extender support	Compatible Windows Media Center Extender devices can stream HD media all around your house over a video-capable network.
Media sync	On PlaysforSure devices, sync music, photos, and even video from your Windows Media Center. Your PC handles the transcoding so the picture is optimized for your device's screen.
Placeshift	With a Slingbox, a third-party device from SlingMedia, you can access your Windows Media Center content from almost any broadband connection on the planet. Listen to music, view your photos, and watch, pause, and record TV.
New form factors	Extender functionality will soon be available in other consumer electronics devices such as set-top boxes, TVs, DVD players, and others.
Network tuner	A new experience that graphically shows the performance of your network and lists the type of media, photos, music, video, HD video, and so on that your network can support.

## Online Media

Online Media is a new feature in Windows Media Center that is a launching point to new entertainment experiences delivered on-demand over a broadband connection. This

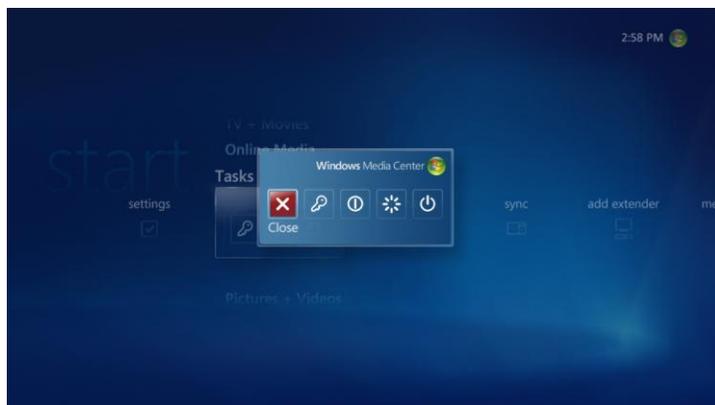


experience combines what was formerly called “More Programs” and “Online Spotlight” in Windows XP Media Center Edition 2005. Because of the innovative experiences it enables, you’ll see major content providers, such as TV networks and movie studios, utilizing it as an exciting, new way to distribute TV shows, movies and music online.

The online services in Online Media are optimized for use with a remote

control and can combine downloaded and streamed content, with high-fidelity graphics and animation to provide a true “TV experience”. Because these experiences can utilize the horsepower of a full PC, they provide an experience that is richer than the typical set-top box. Imagine downloading and watching your favorite movie or television show. While watching it, a small notice comes up and lets you know that the studio has made some cast and crew “extras” available for you to watch. You select the menu, your show is paused, and now you are watching an interview with the director about the making of that episode. Online Media represents a new way for you to get the latest in entertainment, and provides that high-quality TV experience that previous online applications have not been able to provide. Online Media content is only available in certain countries, and requires an Internet connection.

## Shutdown and Windows HotStart



Although we may wish we could, we can’t watch TV, listen to music, or view our photos all day and all night—at some point we have to sleep! Closing down Windows Media Center is a snap since all the controls for enabling sleep, shutting down the experience, and even shutting down your PC are easily accessible from the Tasks menu. Later, when you come back, Windows Media Center is ready to entertain you once again. In fact,

with the new Windows HotStart feature, when you resume from sleep, PC manufacturers can opt to resume directly into the Windows Media Center experience, getting you back to your media faster than you can say “I’ll be back.”

### Shutdown/Resume—Key Features

Feature	Brief Description
Windows HotStart support	PC manufacturers can configure PCs to resume directly to the Windows Media Center experience.

## 4.05 Audio



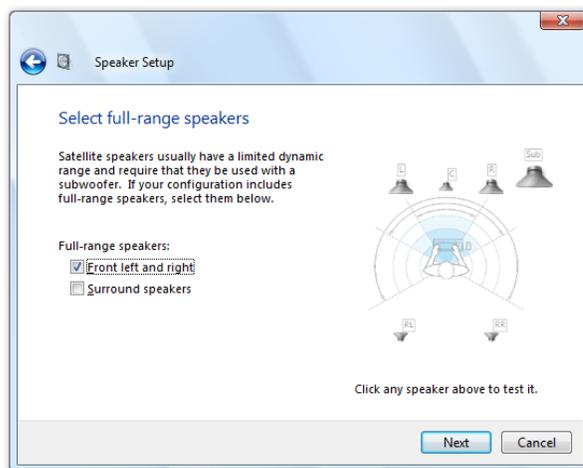
Windows Vista introduces advanced sound and communication functionality that offers a high-end music and movie audio experience and great hands-free voice support.

The new audio features can be broadly classified into three categories:

- High-end music, television, and movie audio playback
- Virtualized surround sound and Bass Boost for portable computers
- Advanced voice communication

### High-end music, television, and movie audio playback

Today, people use their PCs to enjoy a variety of entertainment choices. It's not uncommon for music, television, and movie playback capabilities to be integrated into your computer. And with Windows Media Center, the PC is increasingly used in the living room as an entertainment hub for the entire household. Windows Vista takes the audiovisual experience to a new level with theater-quality sound that puts audio fidelity on a par with the kind of theater-quality picture people have come to expect from their PC.

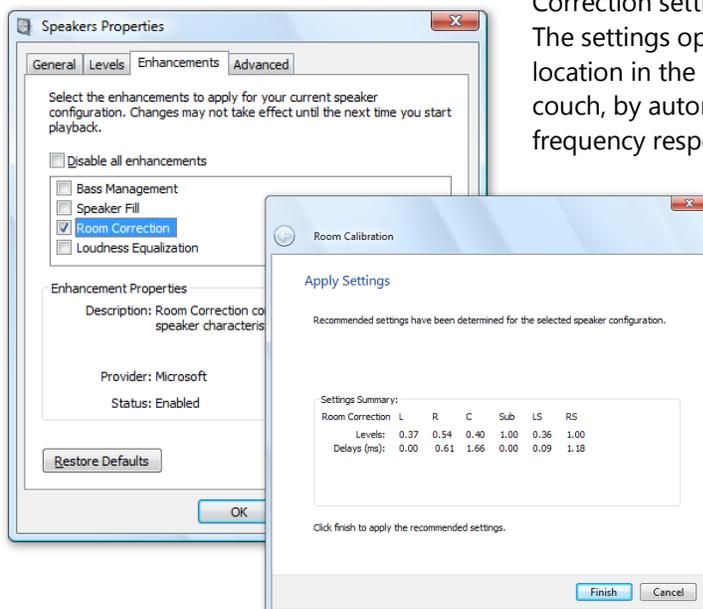


### Room correction

Configuring audio in a home theater can take a lot of time to get just right. You want the dialogue and special effects to sound as life-like as possible. Windows Vista features Room

Correction settings that can help you find that sweet spot. The settings optimize the listening experience at a particular location in the room, such as the center cushion of your couch, by automatically calculating a combination of delay, frequency response, and gain adjustments. This technology

works differently than similar features in high-end receivers because it reproduces sound the way the human ear actually processes sound. With this advance, sound is better matched to the on-screen image. This feature also works great for desktop users, who are more apt to have speakers placed in odd locations. Room Correction requires the use of a microphone to tune the settings, but with these new capabilities, Windows Vista can optimize the sound



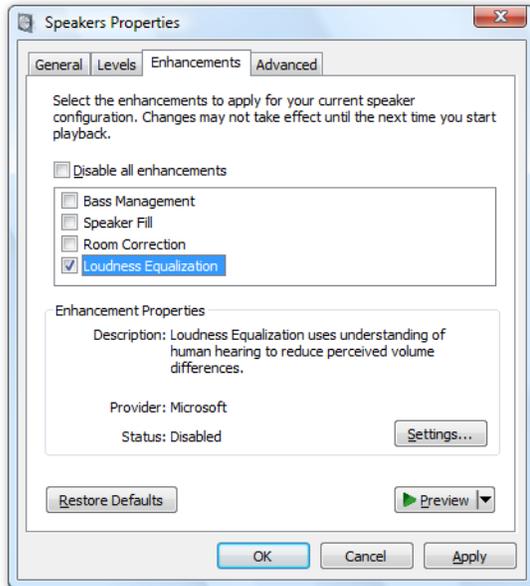
for your movies and television, giving you a great cinematic experience.

## Loudness equalization

One of the frustrating things about typical integrated media experiences is getting the volume levels right. One minute, a television show is too soft; the next minute, a

commercial comes on and makes it almost impossible to carry on a conversation. Today, some high-end televisions feature the ability to equalize volume so that sound is kept at the right level. That's fine if you rely on your television for sound, but most home theater and music enthusiasts connect their PCs directly to their sound systems.

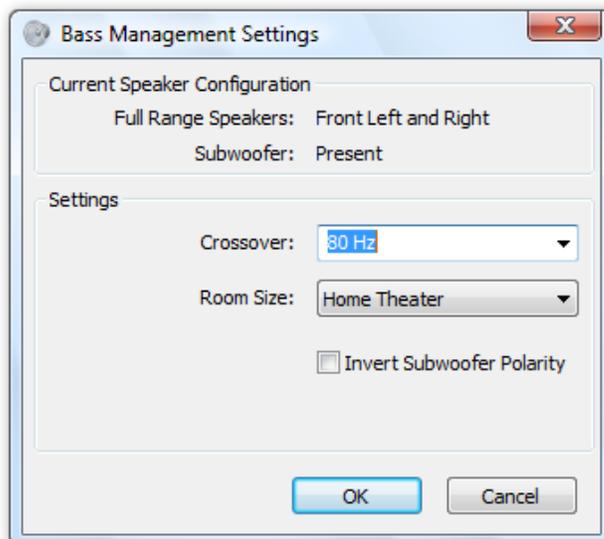
Another challenge is that television-based solutions are less effective across digital signals. Windows Vista can maintain a consistent volume level across different audio files or sources. This means the volume is always within a constant range when you switch between an NTSC/ATSC TV broadcast and a locally stored Windows Media Audio (WMA) format or .MP3 file, or when you're listening to a playlist that contains files authored in different formats and at different volume levels.



## Bass management

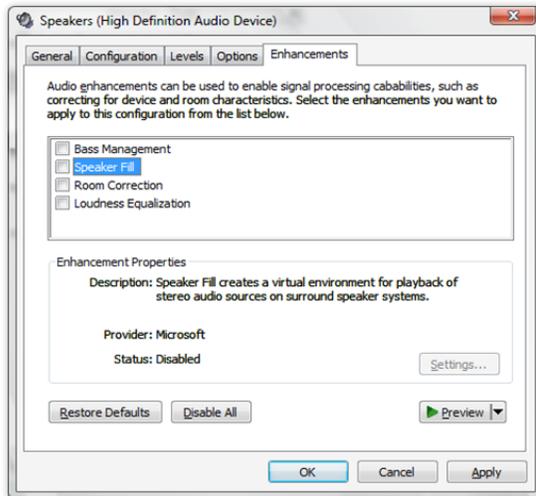
No home theater is complete without bass that you can "feel." Windows Vista enables you to adjust the movie or music playback experience to the speakers in your home

theater so you can maximize the bass effects. With Forward Bass Management, you can optimize the bass sound channel so that all low frequencies are sent to your subwoofer. If you don't have a dedicated subwoofer, Reverse Bass Management allows you to send the lower frequencies to any full-range (bass-capable) speakers you have.



## Speaker Fill

Most digital music is recorded in two-channel sound, and thus is not optimized for the typical audio-video enthusiast's multi-channel audio equipment. Having your music emanate only from your front left/right speakers is a less-than-perfect audio experience. With Speaker Fill, Windows Vista can simulate a virtual multi-channel speaker setup, enabling all of the speakers in your room to play your music in perfect harmony.



## Virtual Surround

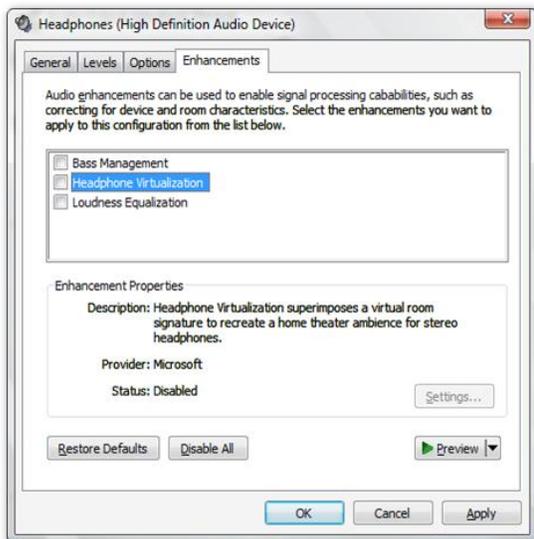
Virtual Surround uses simple digital methods to combine multi-channel signals into a 2-channel signal that can be decoded back into multi-channel signal using Pro Logic decoders available in most of today's audio receivers. This setting is ideal for a scenario that includes a two-channel sound card and a receiver with a surround sound enhancement mechanism.

## Speaker Phantoming

In a multi-channel setup, it is generally expected that all the loudspeakers (center and satellite loudspeakers) are always present. However, this is not always the case. Users may not have all the loudspeakers or they may choose to selectively turn off one or more loudspeakers in a multi-channel setup. Reproduction of the sound from the missing channel by splitting it between the adjacent loudspeakers is referred to as Speaker Phantoming. A common example is absence of the center loudspeaker in a multi-channel setup. However, phantoming of other combinations such as rear left and right pairs or side left and right pairs is also possible.

## Headphone Virtualization and Bass Boost for laptop computers

Of course, you won't always watch your favorite movies and television from the comfort of your couch. More and more people are watching movies and television on their laptops on airplanes or while they are on vacation. Windows Vista enables you to take your home theater experience with you when you're on the road, using a laptop.



### Headphone Virtualization and Bass Boost

A feature known as Headphone Virtualization takes audio playback on your laptop to the next level by enabling a surround-sound experience with just stereo headphones. Normally with headphones, you just hear the combined sound from the left and right earpieces. But with Headphone Virtualization, the effect is similar to what you hear when you're surrounded by multiple speakers. You can distinguish sound from side to side and from front to back, getting a rich audio experience. And for movie and music aficionados who absolutely must "feel" their movies or music even when they are mobile, Bass Boost raises the lower frequencies on your media,

giving you a better auditory experience.

### Advanced voice communication

Many computers and other digital devices have an embedded or external microphone that can be used for dictation, speech recognition, or Voice over IP (VoIP) telephony. Under typical conditions, ambient noise and reverberation can make it difficult for a single-microphone device to capture a good signal. Expensive teleconferencing equipment solves these problems by using an array-based microphone (which is actually a set of small microphones) that greatly enhances the quality of conferencing and hands-free communication. Windows Vista supports this underlying technology and features acoustic echo cancellation, noise suppression, and automatic gain control features that do a great job of isolating sound sources such as your voice and rejecting ambient or background noise. With Windows Vista and an inexpensive universal serial bus (USB)-capable, array-based microphone or a laptop array-based microphone, you can get professional-level hands-free conferencing support without the high-end price.

### Audio—Key Features

Feature	Brief Description
Bass Boost	Boosts the perceived quality of bass output from a laptop speaker by providing more gain in the mid-bass range.
Forward Bass Management	When some or all of the speakers are not full-range speakers, bass from all channels is forwarded to the subwoofer.
Headphone Virtualization	Provides an encompassing audio playback experience, when enjoying multi-channel audio content over headphones.
Loudness Equalization	Keeps the loudness of your media within a constant range.
Reverse Bass Management	When full-range speakers, usually in the front, are used, bass from all channels will be forwarded to those speakers.
Room Correction	Automatically adjusts delay, frequency response, and gain to optimize the listening experience for your room.
Speaker Fill	Optimizes dual channel music for multi-channel systems.
Speaker Phantoming	In cases where one or more speakers are missing in a multi-channel setup, sound from the missing speaker is reproduced by splitting it between the adjacent loudspeakers.
Support for microphone arrays	With the right hardware, the system provides better audio capture alleviating the need for users to wear tethered microphones.
Virtual Surround	When using a sound card with only two-channel outputs, this feature combines multi-channel signals into a two-channel signal that can be decoded by any Pro Logic decoders.

## 4.06 Windows Photo Gallery



Windows Photo Gallery offers a more intuitive, easy-to-navigate, and robust way of interacting with your photos and home movies. A streamlined process simplifies acquiring and importing images and videos, and new organizational options make it easier to find and enjoy your memories. And from within Windows Photo Gallery, you have the flexibility to launch any of your other photo- and video-related applications.

A toolbar across the top of Windows Photo Gallery offers shortcuts to tasks and information, while the familiar left-hand navigation bar provides easy access to organizational elements. A control bar at the bottom of the screen enables you to launch

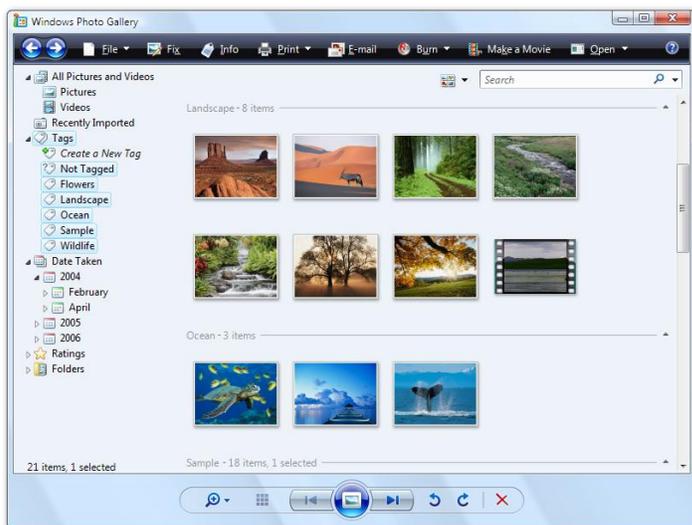
a slide show with a single click, and a slider lets you quickly resize your thumbnails to a size that is comfortable for viewing.

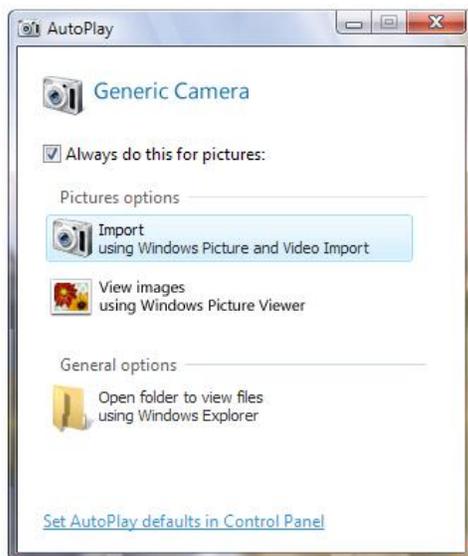
Slide show themes make sharing your photos and home videos a richer overall experience.

Windows Photo Gallery offers basic photo editing, allowing you to touch up your images and revert to the original when necessary.

The Photo Print Wizard lets you easily share your memories via a local printer, or you can use the Online Print Wizard to send them to a retail photo finisher

for printing. You can also easily resize your photos and attach them to emails by clicking the E-mail button. Saving your photos and videos to a CD or DVD is a great way to preserve and share them, and the integration in Windows Vista between Windows Photo Gallery, Windows Movie Maker, and Windows DVD Maker allows you to express yourself in a home movie using cool effects and transitions, and even create professional-looking video DVDs.





## Acquiring and importing photos and videos

Windows Vista makes the process of acquiring and importing photos and videos easy, and it even offers a one-click option to move your pictures onto your PC.

Windows Vista streamlines the default acquisition and import experience for all users and enables more advanced users to customize an Options dialog box to simplify common acquisition tasks, such as changing the import destination and renaming and replicating photo and video files.

The acquisition and import process in Windows Vista also takes advantage of the new Windows Media Transfer Protocol (MTP), which provides a number of key enhancements compared to the process in Windows XP, including:

- Support for a wider range of devices, including portable media players and mobile phones
- Faster transfer of photo and video files
- Improved support for audio and video formats
- Support for wireless connectivity to cameras and devices with wireless capability

You can also tag your images with one or multiple keywords when you import them, so they are immediately organized in a way that makes them faster and easier to find.

## Finding, organizing, viewing, and editing photos and videos

Windows Vista makes it faster and easier to find the photos you're looking for and provides several ways to organize and view them to suit your personal preferences. Instant searching is a cinch in Windows Photo Gallery.

For starters, Windows Vista maintains a library that stores and indexes your photos and videos on your PC for fast, efficient retrieval. You even have the option to customize this function and decide which folders are indexed. What this means is that the search field is your friend—indexed information enables instant search and retrieval so you can find the right photo fast. You can search on almost all file metadata, including keyword tags, filenames, or captions—and when you edit this information, it is written back to the file itself so that you can transfer the file without losing the information.



## Finding Photos and Videos

**Instant Search.** Windows Photo Gallery features Instant Search, a quick and simple way to search simultaneously across tags, folder names, filenames, and captions.

**Hover thumbnail.** To make it quick and easy to find the photo or video you want, Windows Photo Gallery displays a larger thumbnail and metadata preview of any file in the gallery when you hover your mouse pointer over the item.

**Navigation tree.** The navigation tree in Windows Photo Gallery offers several methods to help you find photos and videos on your PC. The navigation tree itself enables basic search requests such as “Find all photos of Steve,” and you can also use Ctrl+click on multiple items in the navigation tree to build more sophisticated search options such as “Find all photos of either Steve or Frank, taken in July, with a rating of at least 3 stars.”

Other search options enabled via the navigation tree include:



**Search Folders.** Several predefined queries enable you to quickly view items in Windows Photo Gallery. For example, All Pictures and Videos is an option that shows everything in Windows Photo Gallery. Use thumbnails and mouse-over previews to quickly browse this view. You can also view only photos or only videos. Images that you have imported into Windows Photo Gallery within the last 30 days are available in the Recently Imported view.

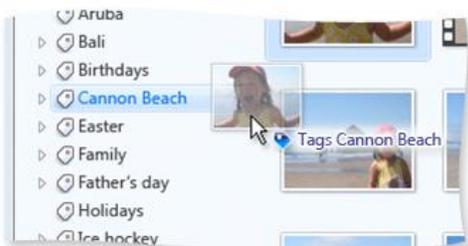
**Tags (keywords).** Tags are meaningful pieces of information that help you organize and find the right photo or video. You can apply multiple tags to a single image or apply a single tag across multiple photos. If, for example, Bill takes a photo of Steve and Frank, he can create separate tags for Steve and for Frank and apply both to the same photo. Later, he can find this photo by searching for either name. Like folders, tags can be arranged in hierarchical tree structures to help keep them organized and to group them in a way that makes sense to you.

**Date Taken.** Digital cameras automatically record when a photo was taken, and this information is imported with your images, letting you browse your photos by the year, month, or day they were taken.

**Ratings.** As we all know, not all photos are “equal,” so Windows Photo Gallery allows you to apply a one-to-five-star rating to help you identify and find your favorites (or delete the ones you don’t like).

**Folders.** If you’ve been using folders to organize your photos and videos, you’ll feel right at home with the folders in Windows Photo Gallery. Any folders you add to Windows Photo Gallery appear in the navigation tree, and any changes you make in either the Pictures Explorer or Windows Photo Gallery are reflected in both locations.

## Organizing your photos and videos using tags



You can apply tags in a variety of ways to help you organize and find your photos and videos. You can add tags when you first add a photo or video to your collection, or you can select a photo, or multiple photos, to tag at any time. You can also add tags by dragging and dropping items onto the tag in the navigation tree, just as you are used to doing with folders.

Windows Photo Gallery also introduces the Info Pane, a new mechanism for tagging photos and videos. You can open the Info Pane to view basic information about a photo or a video, including the filename, caption, date taken, file size/type, rating, and any assigned tags. You can change most of this information just by clicking and typing. You also can add previously used tags simply by starting to type the name of the tag and then selecting the tag from the auto-complete list.

## Viewing and fixing photos and videos

The Windows Photo Gallery Viewer enables you to easily view and enhance your photos and video clips. In Windows Photo Gallery, you can increase or decrease the size of your thumbnails using a simple slider,



helping you view groups of photos in ways that are convenient and comfortable. As you browse, you can choose to see more or fewer thumbnails in one view by adjusting the slider. You can also view a larger thumbnail preview of a photo by simply hovering your mouse over the thumbnail—allowing you to quickly preview a photo without having to open the file.

**Viewing.** The Windows Photo Gallery Viewer provides a large view of individual photos or clips with

options to zoom, pan, and rotate photos; pause/play video files; and bring up the Info Pane. You can quickly navigate from one photo or video clip to the next. The Viewer is an effective tool for managing your photos and videos after you have transferred them from your camera.

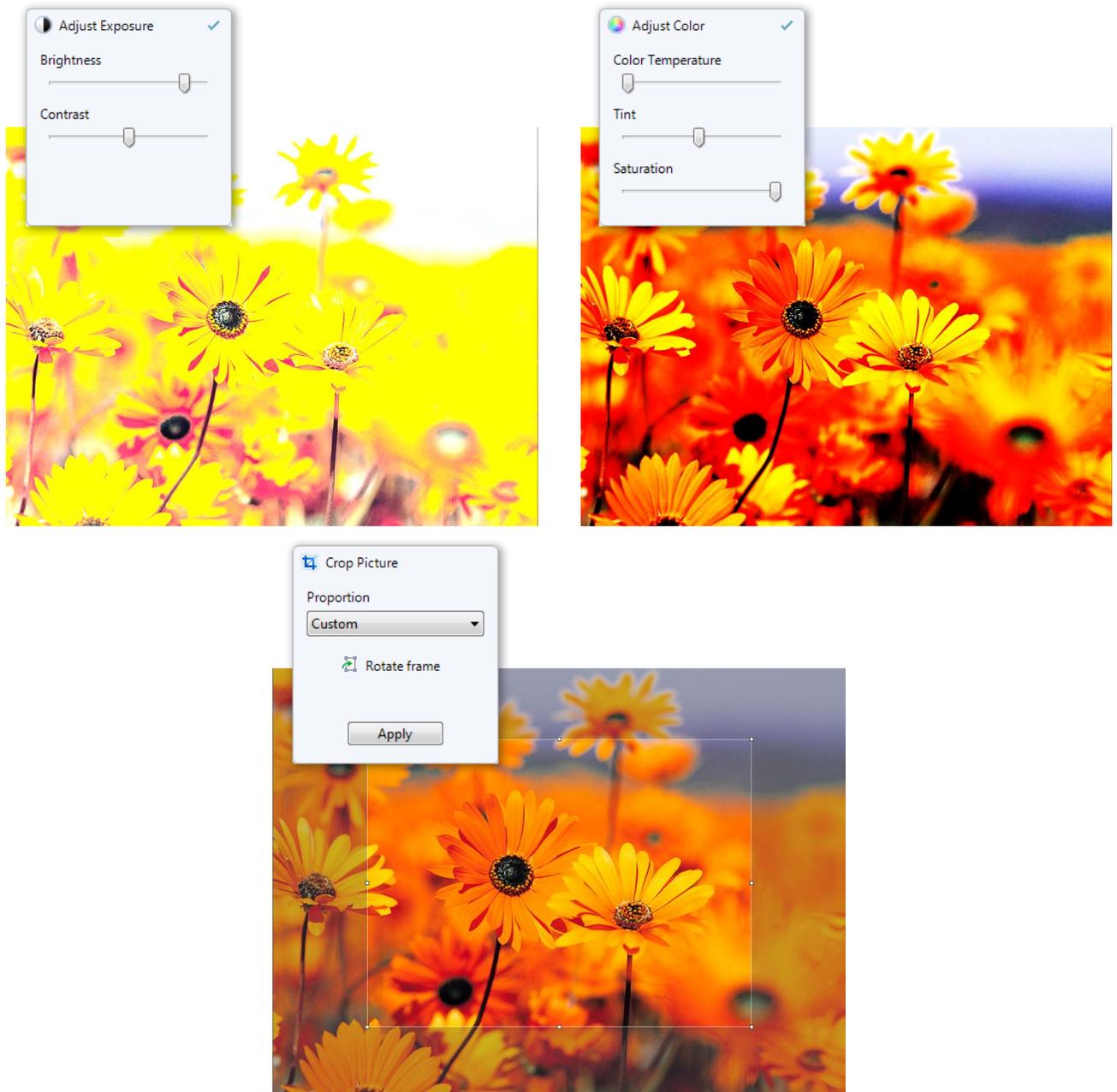
**Edit photos.** The Viewer also has built-in editing capabilities to help you make your photos look great.

The Viewer provides solutions to the most common editing tasks that you can apply to any image in Windows Photo Gallery. You can access these tasks by simply clicking the Fix option on the menu bar in the Viewer.

You can use the Auto Adjust button to automatically correct the exposure and color of an image if you prefer not to make the changes manually. In addition, the basic editing tasks allow you to:

- Manually adjust exposure
- Manually adjust color
- Crop a photo to a specific size
- Fix red-eye effects caused by a flash

The Viewer is smart whenever any edits are made to a photo—it automatically preserves your original photo in case you want to see it again or reuse it in a different way. If you ever want to access the original image, you just choose the Revert To Original option.



## Creating and viewing slide shows

Remember when a slide show was just a series of photos? Not anymore. Windows Vista Slide Show sets a new standard for creating and presenting your digital memories full-screen, using photos, videos, and themes that make your slide shows more compelling and unique. You can make your slide shows more engaging by including video as well as still photos—another benefit of the slide show functionality in Windows Photo Gallery.

Slide show themes are easy to apply with a single click, and they allow you to quickly incorporate cool visual effects and transitions. Choose from a variety of themes based on which photos you are viewing as a slide show. Windows Vista Home Premium and Windows Vista Ultimate have more slide show themes than those found in Home Basic.



## Slide Show Screen Saver

In Windows Vista, a new desktop Slide Show Screen Saver feature allows you to choose photos, videos, and even themes to be displayed in Screen Saver.

The Slide Show Screen Saver also introduces powerful queries in its settings, allowing you



to choose slide shows based on tags and ratings that were applied in Windows Photo Gallery. This makes it easy to set slide show content with simple queries such as “All four-star pictures” or even more complicated queries such as “All four-star pictures, from the beach, but not the ones marked 'private.'”

## Sharing photos and videos via email

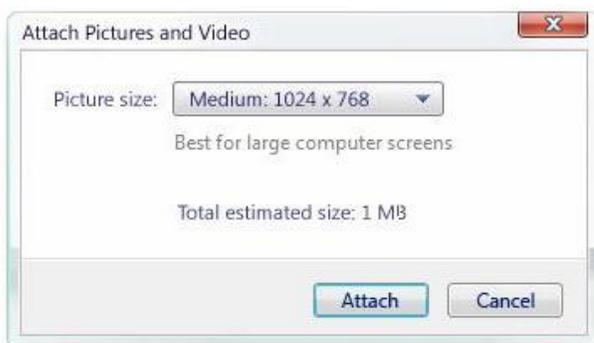
The Windows Vista Photo-Video E-mail Wizard provides an integrated and flexible photo email experience that enables you to easily select, compress, and send photos and videos.

### Select your photos

The Photo-Video E-mail Wizard can be accessed from Windows Photo Gallery and from regular Windows folders. You select one or more files and then choose Send To, E-Mail Recipient from the right-click shortcut menu or choose the email task available on the task bar.

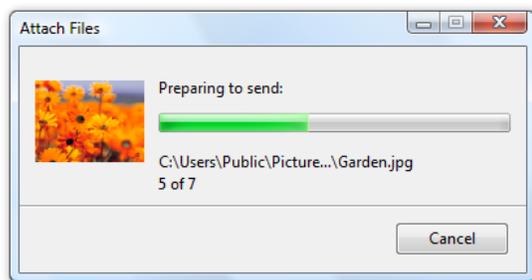
### Compression options

Once you select the email task, a Picture Size drop-down menu offers compression options, with the default set to Medium. However, the settings you choose will stay the same from session to session, and include the following options:



- Tiny: 640x480
- Small: 800x600
- Medium: 1024x768
- Large: 1600x1200
- Original Sizes

If you have selected videos to send, the drop-down menu does not show resolution information—only the terms Tiny, Small, and so forth. The Total Estimated Size is updated as you choose various compression options.



## Attach

Once you make the adjustments you want, you can choose to attach your photos or videos. At this point, you'll see a status bar as the images are compressed and attached to a new email message in the selected email application.

## Printing photos

Two methods are available for printing photos in Windows Vista: the Online Print Wizard and the Photo Print Wizard. With either method, you select photos and then a Print task from Windows Photo Gallery or the Pictures Explorer.



## Online Print Wizard

The Online Print Wizard makes it easy for you to order professional-quality prints in a variety of sizes and finishes over the Internet, for mail delivery, or for pickup at a nearby store.

When you select Order Prints Online, you can choose from a list of available retail or online photo finishers. You always see your most recently selected option, so if you

have a preferred vendor, you can quickly select that one. Because the Online Print Wizard identifies your country/region from your Control Panel settings, you are always presented with vendors in your area.

The Online Print Wizard steps you through the process of selecting print options, including size, number of prints, and effects, and it enables you to purchase your prints for in-store pickup or mail delivery to an address you specify.

## Photo Print Wizard

The Windows Vista Photo Print Wizard provides an easy-to-use, high-fidelity photo print experience, with simpler workflow and smarter defaults. Within the wizard, a simplified Hub page gives you a single place to go for all local photo printing activities.

The Photo Print Wizard takes advantage of new print functionality in Windows Vista so you can easily and consistently get to all the printing options you care about, such as paper size, paper type, and print quality, regardless of which printer you use.

The Photo Print Wizard has more templates than Windows XP and includes support for borderless printing, larger paper sizes, and international picture sizes. And with this new wizard, you can preview your entire photo print job, not just the first page. The improved color management in Windows Vista ensures that your print colors are more accurate than ever. Windows Vista also offers support for viewing and managing RAW photo images.

Within the Photo Print Wizard, a simplified Hub page allows you to:

- Select a printer
- Select a paper size (e.g., Letter, Legal, Tabloid, or any other paper size supported by the printer)
- Select a paper type (e.g., Regular, Glossy, High Gloss, Photo Film, Matte, or any other type supported by the printer)
- Select the print quality (e.g., Draft, Photo Color, etc.)
- Select among layout options, which change depending on the paper size you choose (e.g., 4x6, 8x10, index sheets, wallet sized, etc.)
- Select the number of copies of each photo
- Preview the final output
- Specify whether photos should fill the frame
- Access printer properties

Once you have made your selections and clicked the Print button, the Photo Print Wizard disappears and a status bar appears as the photos are sent to the printer.

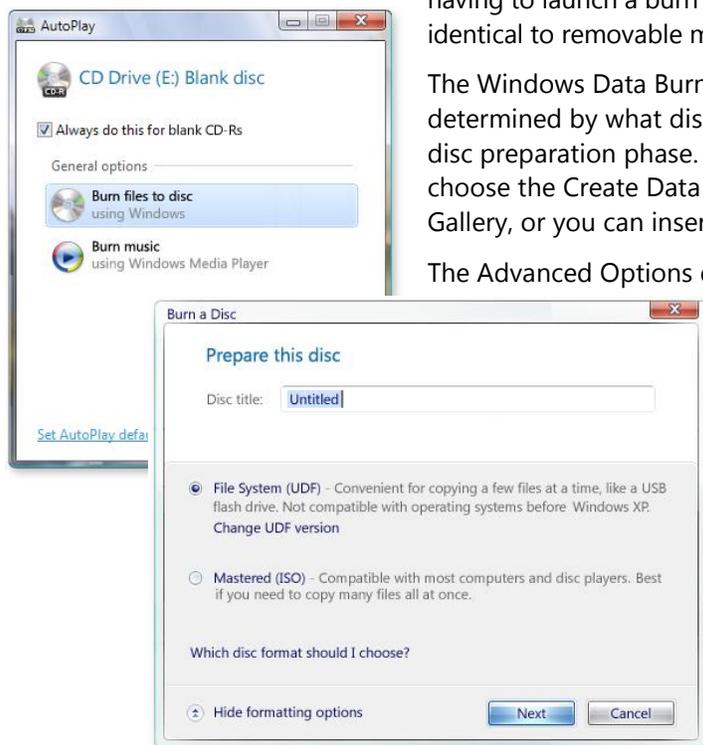
## Burning CDs and DVDs

The Windows Data Burning experience in Windows Vista goes beyond anything the Windows platform has offered before. For example, with Windows XP you can use only a single recordable drive and burn only to CDs. With Windows Vista, Microsoft has added support for multiple recordable drives and DVD media.

Windows Vista introduces a new technology called UDF (universal disk format) burning, which allows you to add and remove files from your CDR/RW and DVDR/RW without ever having to launch a burn task. It makes CDs and DVDs virtually identical to removable media of any sort.

The Windows Data Burning experience in Windows Vista is determined by what disc format option you choose during the disc preparation phase. You can select photos and video and choose the Create Data Disc task from the Windows Photo Gallery, or you can insert a blank CD.

The Advanced Options dialog box contains further formatting options for more proficient users.



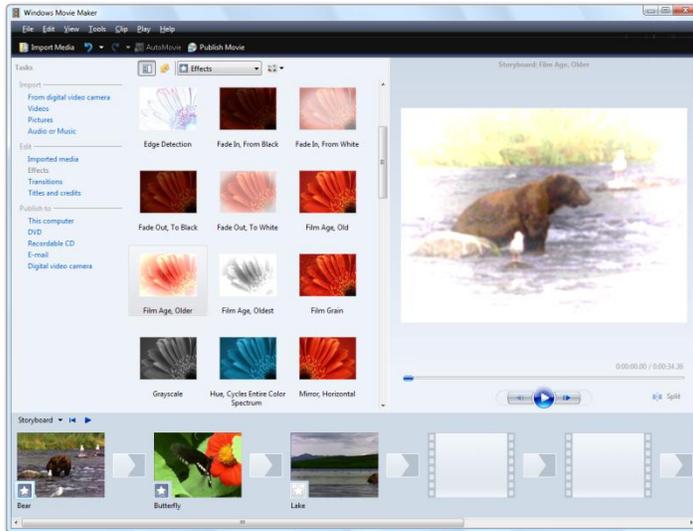
### Windows Photo Gallery—Key Features

Feature	Brief Description
CD and DVD burning	Burn your movies, photos, music, and files to CDs quickly and easily.
DVD authoring	Seamlessly create a video DVD using Windows DVD Maker.
Email photos	Compress your photos easily for convenient sharing over email.
Fix (common editing tasks)	Adjust exposure and color; fix red eye, and crop photos.
Hover thumbnail	Quick previews of photo thumbnails and metadata mean you don't have to open a file to see what it is.
Instant Search	Search based on keywords, caption, or metadata to quickly find a photo.
Keyword tagging	Keyword tagging helps you to add context and easily find and organize your photos.
Make a movie	Create an enjoyable home movie with the click of a button thanks to integration with Windows Movie Maker.
Online Print Wizard	Order professional-quality prints from a local retail photo finisher (mail order or pickup).
Photo Import Wizard	The streamlined import experience and Windows Media Transfer Protocol (MTP) provide improved support for a variety of devices and audiovisual file formats, faster transfer of files, and wireless connectivity.
Photo Print Wizard	Choose multiple options for the right prints on your local printer.
Photo star rating	Rating your photos helps you to organize and find them.
Slide show	Enjoy your photos and home videos via themed slide shows.
Slide Show Screen Saver	Protect your desktop privacy and share memories at the same time.
Undo and Revert To Original	Undo edits you have applied, or revert to the original file.
View/organize by date taken	View and organize photos by date taken, broken down by year, month, and day.
Windows Photo Gallery Viewer	Provides a variety of ways to view your photographs and movies.

## 4.07 Windows Movie Maker



Windows Vista introduces a rich suite of tools that makes it easier than ever to create, manage, and share home movies that you've recorded using your digital video camcorder or digital camera. Windows Movie Maker in Windows Vista makes it easy for you to import, edit, and manage digital home videos—including those in the new high-definition video (HDV) format. You can even save your videos to DVD and view them on consumer DVD players, making it easy to share videos with your friends and family.



Windows Movie Maker in Windows Vista provides a new, easy-to-use interface and even more tools to help you create and manage compelling video memories and movies. With improved effects and transitions and graphics performance due to the high-end graphics power of today's PCs, the new Windows Movie Maker in Windows Vista can turn almost anyone into a great movie maker.

Importing and capturing video is easier and more reliable than ever before. After connecting a digital video or still camera, AutoPlay

detects the device and displays the import wizard for digital video or digital still cameras. With digital video cameras, users can choose to automatically import from tape and burn directly to DVD.

The Import Video Wizard introduces the ability to record directly to DVD. Now you can capture your digital videotapes to your computer and create a professional-looking DVD with just a few simple steps that let you protect your digital memories by archiving them to the PC and to DVD at the same time. It's never been easier.



Windows Movie Maker is closely integrated with Windows Photo Gallery. Imported videos are added to the Videos folder and can be managed from within the Photo Gallery. Videos can be previewed, rated, and tagged with labels and comments in Windows Photo Gallery. You can easily find and locate memories by using Photo Gallery's rich sorting and filtering features. Need to find photos and videos from your daughter's last birthday party? Simply select the appropriate tag in the navigation page or use the built-in Instant Search to instantly filter and display photos and videos.

Making a home video from photos and videos you have on your PC is easy—you can access Windows Movie Maker directly from All Programs or if you are in Windows Photo Gallery, you can choose to Make a Movie of your selected photos and videos. This easily creates a home movie, complete with titles, credits, and transitions, by launching Windows Movie Maker, importing your chosen content, and generating an AutoMovie. Of course, you also have the option of manually importing and manipulating your content in Windows Movie Maker, to create a totally unique home movie experience with custom effects and transitions.

Millions of people are now enjoying high-definition (HD) television in their homes. Now with Windows Vista Home Premium and Ultimate editions, Windows Movie Maker supports editing of content from HD cameras that support the HDV format and allows editing of native MPEG-2 content. HD content can be published to Windows Media HD for playback on PCs and Xbox 360. Windows Media HD allows you to preserve the high-definition quality while reducing the storage space required on the hard drive.

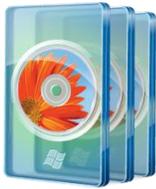
Windows Movie Maker's new video rendering technology allows you to preview your video at the actual resolution of the preview monitor. You can even preview HD content in full-screen view at full HD resolution if your hardware supports it. Using the power of your PC's graphics processing unit (GPU) allows Windows Movie Maker to render HD quality for smoother overall performance, adjusting the size and resolution to deliver the best quality possible for your hardware.

Ready to share your home movie? Publish your movie to your PC with Windows Media, send it in an email, or burn it to DVD using Windows DVD Maker. Once you have created your movies in Windows Movie Maker, Windows Photo Gallery allows you to view and manage all of your videos and photos from one place, and even to incorporate video into your picture slide shows. Windows Photo Gallery can handle large volumes of information without running out of memory, so you can import your video as well as hundreds, or even thousands, of photos.

### Windows Movie Maker—Key Features

Feature	Brief Description
DVD burning	Seamlessly burn your personal videos, photos, and files to video or data DVDs.
Improved graphics performance	Behind-the-scenes software enhancements leverage the power of the GPU, freeing up the CPU for other tasks. The end result is much faster graphics performance and better support for HD display.
Integration with Windows DVD Maker and Windows Photo Gallery	Easily manage and view all your photos and videos from one place, and create a video DVD of home movies and slide shows to share with your friends and family.
Support for HD video	Create, edit, and manage high-definition videos with Windows Vista Home Premium and Windows Vista Ultimate editions.

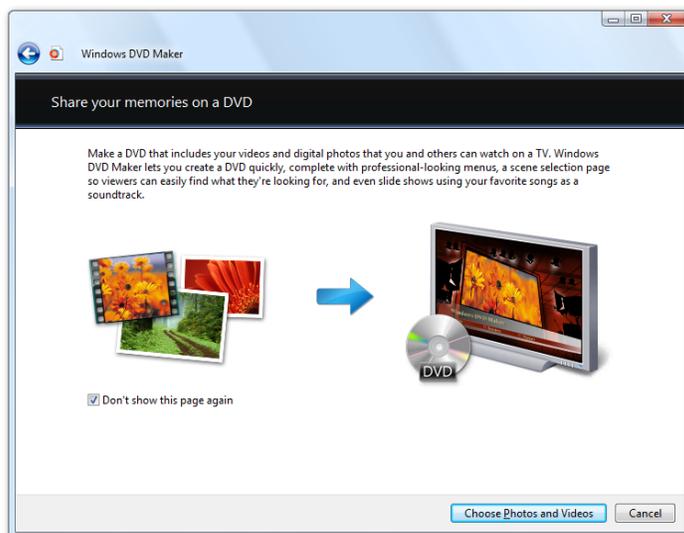
## 4.08 Windows DVD Maker



Windows DVD Maker, available in Windows Vista Home Premium and Windows Vista Ultimate, enables you to create professional-looking video DVDs of your home movies and photos that can be viewed on consumer DVD players, regardless of geographical region codes.

Transferring your Windows Movie Maker creations to a video DVD has never been easier. You can directly access Windows DVD Maker through All Programs, or use Windows Movie Maker's Publish menu to transfer your videos to a DVD format. Because Windows DVD Maker is also integrated with Windows Photo Gallery, simply selecting Burn Video DVD lets you select photos and videos to publish without leaving the Windows Photo Gallery.

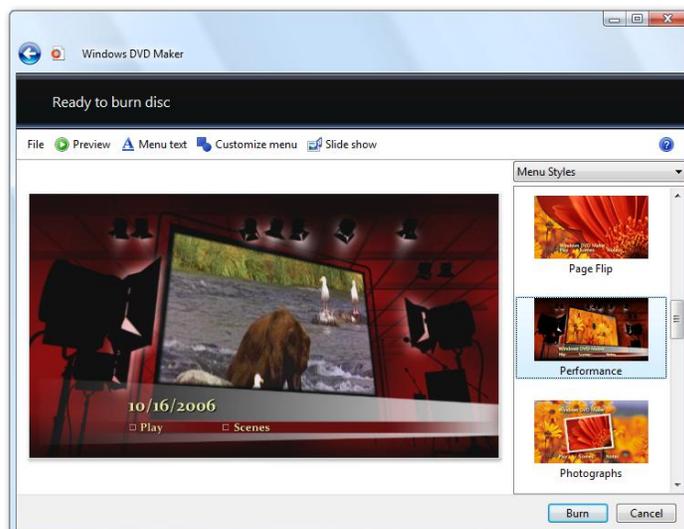
DVD Maker in Windows Vista publishes directly to MPEG-2 format, allowing you to burn



DVDs directly from your video camera. Windows DVD Maker also supports a variety of publishing styles for your movies, focused on highlighting your content and creating a customized look and feel. You can choose to customize the DVD further by adding a disc title and a notes page, and editing the menu text. In addition, Windows DVD Maker gives you maximum choice and control over the quality and size of your video files when you are encoding; and you can even choose widescreen or standard format to publish a slide show or movie that looks best on your TV.

Built-in slide show support in Windows DVD Maker allows you to share and enjoy photo and video slide shows, as well as home movies, using a consumer DVD player. Images added to the DVD are included as a slide show with fade and cut transitions between

photos along with background music you provide.



A software development kit (SDK) from Microsoft enables third-party developers to create additional styles and transitions for even more creative DVD production.

Windows DVD Maker automatically creates intelligent chapter points by analyzing the photos and videos and creates compelling motion video thumbnails. Using your remote control, you can easily navigate

between chapters when viewing the DVD.

Preview your DVD using the built-in DVD preview option and then burn your video DVD. With just a few clicks, you can create a professional-looking video DVD to share with friends and family.

## Windows DVD Maker Menu Styles

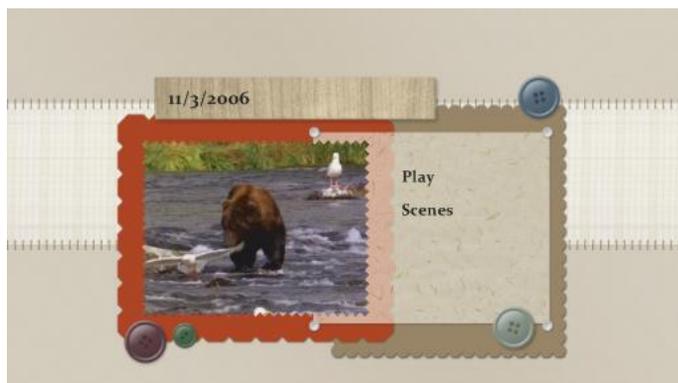
### Photographs



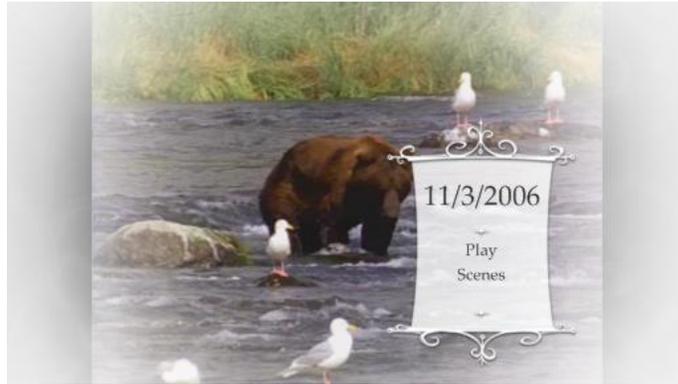
### Reflections



### Scrapbook



## Special Occasion



## Vintage



## Windows DVD Maker—Key Features

Feature	Brief Description
DVD authoring	In Windows Vista Home Premium and Ultimate editions, easily create professional-looking DVDs from home movies or slide shows, to share with family and friends.
DVD Styles	Whether you are celebrating a new baby or creating an independent film, Windows DVD Maker has styles that compliment your content.
Slide show support	Create a slide show with music and transitions to share on a video DVD using Windows DVD Maker.
Software development kit (SDK)	Third-party developers can create additional styles and transitions for creative video DVD production.

## 4.09 Windows Games



Gaming is one of the top three activities people do on their PCs, third only to email and surfing the Web. Windows Vista offers a dramatically improved gaming experience that, for the first time, places Windows gaming on par with what consumers have come to expect from the most advanced gaming consoles.

Windows Vista includes enhancements that make it easier to access, play, and manage your computer games while also letting you experience the next generation in gaming graphics. And it delivers all of that while still allowing you to monitor and set age-appropriate boundaries for your children's gaming activities.

The next-generation gaming support in Windows Vista includes the Windows Vista Games Explorer, Parental Controls, DirectX 10 graphics technology, and compatibility with Xbox 360 game controllers and accessories.



## Easily find and access all your games

Anyone who plays games on their PC loves the seemingly limitless choices of games compatible with Windows. But finding and launching those games hasn't been that easy. Some games install into the Start Menu. Other games put icons on the desktop. With Windows Vista, finding and playing the games you want is easier than ever before.

The Games Explorer, which is listed on the Start Menu in Windows Vista, provides a convenient list of all games currently installed on your PC. Icons for each game provide



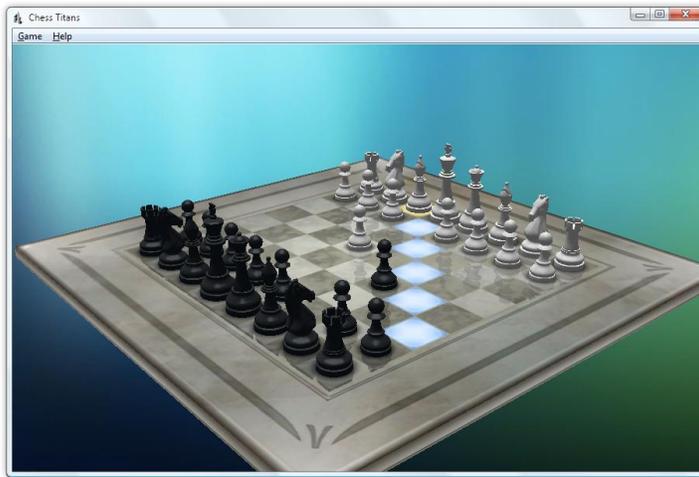
easy access to the games and also display detailed information about the game, such as the game publisher and developer; when you last played; which version of the game you own; box cover art; and the release date, genre, and rating for each game. The information not only provides useful information about each of your games, but it can also be used to sort and organize the games in your Games Explorer.

Right-click on a game's icon for easy access to a menu of play tasks (which can be customized by the game developer for each game) and any online options, such as linking to the game's website .



You can also easily access any game-related settings for your software or hardware directly from within the Games Explorer, using the Games Explorer command bar, including accessing the player community for each game; getting help, support, and important publisher updates; or easily adding or removing games.

Of course, you shouldn't forget about the games that are included "in the box" with



Windows. Windows Vista includes updated three-dimensional (3D) versions of several classic games, including "Solitaire" and "Minesweeper." There's also a new game designed just for kids, "Purble Place," now included. In addition, Windows Vista Home Premium and Windows Vista Ultimate include two brand-new games, such as "Mahjong Titans" and "Chess Titans."



To learn more about Parental Controls, please turn to [4.02 Parental Controls Settings](#) on page 143.

## Family safety and Parental Controls

Windows Vista allows parents to set appropriate boundaries around what the gaming experience will be for their children. With Windows Vista Parental Controls, parents are in control of their children's gaming activities. You can create personal settings for each child, restricting their access to games according to game title; game rating, such as the ESRB (Entertainment Software Ratings Board) rating system in the U.S., or the PEGI (Pan European Games Information) system in Europe; category; and type of content, regardless of the game's rating.



For example, you may choose to allow Cartoon Violence while blocking Intense Violence. You can also decide which days and times you want to allow your children to play. You can even block specific games.

Parental Controls help ensure a safe and appropriate entertainment experience for everyone in your family.

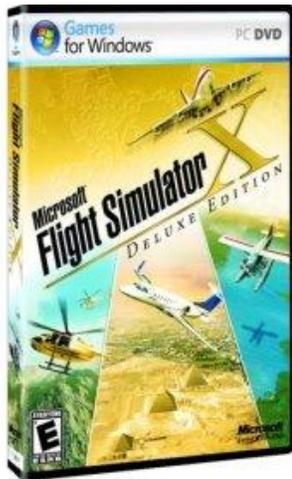
## Unmatched library of gaming choices

Windows Vista is compatible with many of the games that work with Windows XP and earlier versions of Windows. In addition, Windows Vista automatically detects when you install many of these games, and automatically places the game icon in the Games Explorer and downloads the title, rating, and box art. Windows Vista performs this

automatic download for approximately 1500 games that existed before the operating system was developed. New games can also add this information easily during their installation process. If you happen to install a game that Windows Vista doesn't automatically recognize, you can easily drag the game shortcut into the Games Explorer.

At the same time, Microsoft is also working with the industry's leading game publishers to ensure that new games take advantage of everything Windows Vista has to offer.

Games that carry the new *Games for Windows* branding on their packaging take full advantage of the new Windows Vista gaming features. These include support for the Games Explorer; game ratings that work with Parental Controls; the ability to be launched from within Windows Media Center; support for the Xbox 360 controller (if the title supports gamepad control); and more. Games for Windows branded titles can also support easier installation, getting you into your game faster. Popular games are already available with this support, including "Flight Simulator X" and "Age of Empires III: The Warchiefs" from Microsoft Games Studios, "Lego Star Wars II: The Original Trilogy" from LucasArts, "Company of Heroes" from THQ, and many more.



## Next-generation gaming graphics and gaming hardware



DirectX 9.0

DirectX 10  
(Artist's Rendering)

One of the most exciting developments in Windows Vista is the groundbreaking graphics platform technology. The Windows Vista graphics platform makes the gaming experience better in two ways: First, an improved graphics driver model delivers more overall stability and reliability when playing games. Second, many of the hottest Windows games will take full advantage of the next-generation graphics technology available exclusively in Windows Vista called DirectX 10. DirectX 10, which requires a DirectX 10 compatible graphics card, provides a revolutionary experience for gamers of every type because it allows games to have an unprecedented level of realism. Along with richer graphics, game designers will be able to more easily add enhancing details and complexity to gaming worlds, such as dynamic lighting, weather conditions, and more. The net benefit to Windows gamers is that DirectX 10 games can be more advanced than even the games on the latest gaming consoles.

PC gaming has always lacked a solid controller for action, sports, and racing games. Thus Windows Vista includes native support for the Xbox 360 wired controller, letting you play those game genres as they were meant to be played. Simply plug in the Xbox 360 controller to your Windows Vista-based PC's universal serial bus (USB) port and you're ready to go. Even better, Microsoft is also introducing new gaming accessories that work with your PC, such as the Xbox 360 Wireless Gaming Receiver for Windows, which lets you use the Xbox 360 wireless controller and wireless racing wheel on your Windows Vista-based PC.



With more user- and family-friendly features, a huge catalog of games, new titles optimized specifically for Windows Vista, and more powerful graphics technology than ever before, Windows Vista will make gaming on the PC easier and more fun for everyone.

## Windows Games—Key Features

Feature	Brief Description
DirectX 10	The next-generation graphics platform, available only on Windows Vista, that will enable games that feature an unprecedented level of graphics and realism.
Games Explorer	The central hub for finding and enjoying all of the games installed on your PC.
Improved graphics driver model	Makes it easier to install new graphics cards for a more exciting visual experience, and provides more reliable and stable game play.
Parental Controls	Allow or restrict your children's access to games according to game title, rating, category, or content—and monitor and enforce those restrictions.
Support for existing and new games	Play from the largest library of titles offered on any game console. Windows Vista supports many older titles as well as supporting titles that take advantage of the new gaming features, such as DirectX 10.
Universal controller support	Use the wired or wireless Xbox 360 game controller or racing wheel with your PC.
Windows Vista premium games	Two new games, Chess Titans and Mahjong Titans, feature a mix of strategy and stunning graphics. Available only on Windows Vista Home Premium and Ultimate product editions.

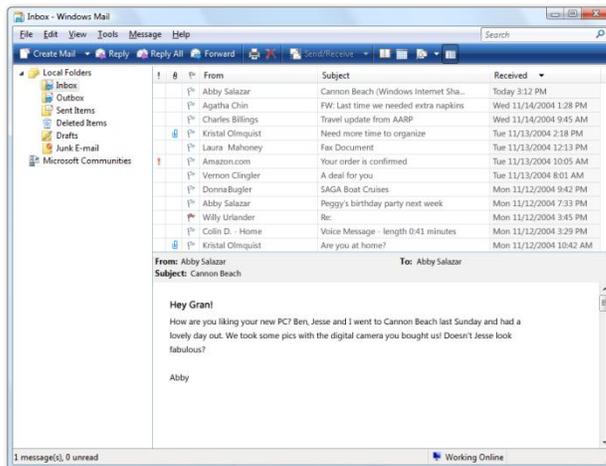
## 4.10 Windows Mail



If you're like most people, emailing is one of your most important computer activities, allowing you to keep in touch with family, friends, and colleagues across town or around the world. As the popularity and importance of email have grown over the years, annoyances and risks have also emerged. These include junk mail, viruses delivered through email and attachments, and phishing attacks aimed at acquiring your personal information and enabling criminals to steal your identity.

Windows Mail addresses these serious concerns while adding new features that enable you to search and manage the increasingly large number of messages you receive.

Windows Mail is designed to let you easily read your email while keeping you safe, and to make all of your email communication fun and hassle-free.



### Instant Search

With thousands of messages in your Inbox, it can be a challenge to find the one email you are trying to locate. This is especially true for saved email, which might be months or years old. Windows Mail includes a built-in Instant Search field, just like the one in the Windows Vista operating system. Instant Search enables you to search across all of your email instantly—without ever leaving Windows Mail. You can also find your email by using the Instant Search field on the Start Menu. In addition, the Search Explorer in Windows Vista is integrated with Windows Mail, so when you search your PC hard drive for a particular subject, relevant email messages will be found along with documents and other files.

### Junk Mail Filter

Unwanted junk email—also known as *spam*—continues to be a serious problem because it forces you to wade through irrelevant or offensive messages to find the email you care about. To reduce this hassle, Windows Mail includes a built-in Junk Mail Filter that automatically screens email to identify and separate out junk email. Unlike other approaches, which require you to “train” a filter to correctly identify junk email, Windows Mail starts identifying and separating junk mail the first time you use it, without any need for special settings or laborious user feedback.



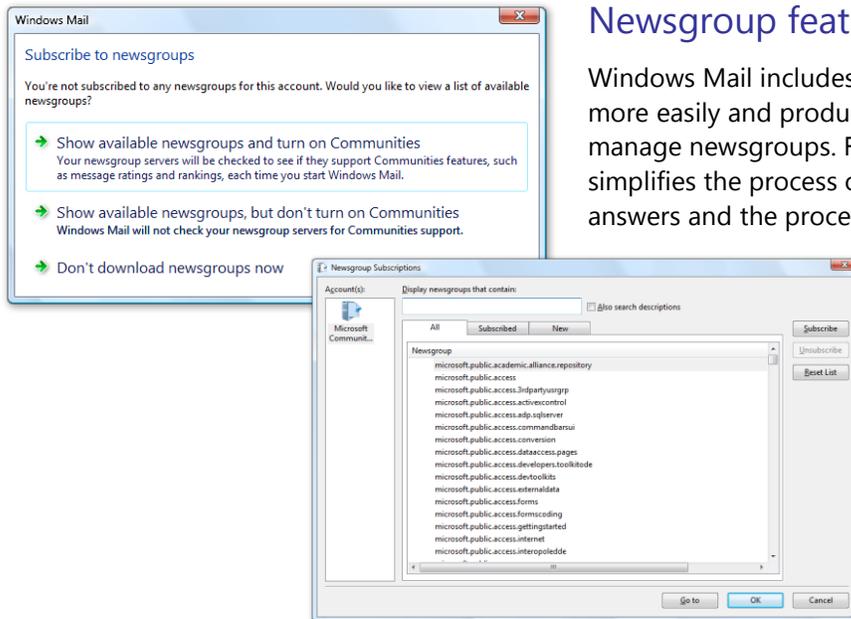
To learn more about Microsoft Phishing Filter, please turn to [3.07: Internet Explorer](#) on

## Phishing Filter

*Phishing* is a deceptive practice designed to help scam artists steal your identity by tricking you into disclosing valuable personal information, such as passwords, credit card numbers, and bank account data. Phishing scams start with phony email messages that claim to be from a trusted financial institution or online service. By including links to fraudulent websites, phishing emails attempt to trick you into entering your personal information so it can be captured and misused by criminals. Windows Mail includes a Phishing Filter that analyzes email to detect many of these fraudulent links and to help protect you from this online deception.

## Reliability

In the past, Microsoft Outlook Express users occasionally experienced problems when opening large data files of saved email. Windows Mail is based on new technology for storing email and provides significantly improved reliability. As a result, you can be more productive and have more confidence when using email.



## Newsgroup features

Windows Mail includes new features to help you more easily and productively contribute to and manage newsgroups. For example, Windows Mail simplifies the process of posting questions and answers and the process of rating the usefulness of information posted by other people.

## Windows Mail—Key Features

Feature	Brief Description
Instant Search	Allows users to search across all email messages instantly.
Junk Mail Filter	Automatically screens email to identify and separate out junk email.
Newsgroup features	Helps you contribute to and manage newsgroups more easily and more productively.
Phishing Filter	Analyzes email to detect fraudulent links and to help protect users from identity theft.
Reliability	Uses new storage technology to provide increased reliability.

## 4.11 Windows Calendar



There are 24 hours in each day, but it doesn't always feel like it. As the pace of life accelerates at work and at home, many people find it helpful to use a PC-based calendar to manage their time and coordinate their schedule with family, friends, and colleagues.

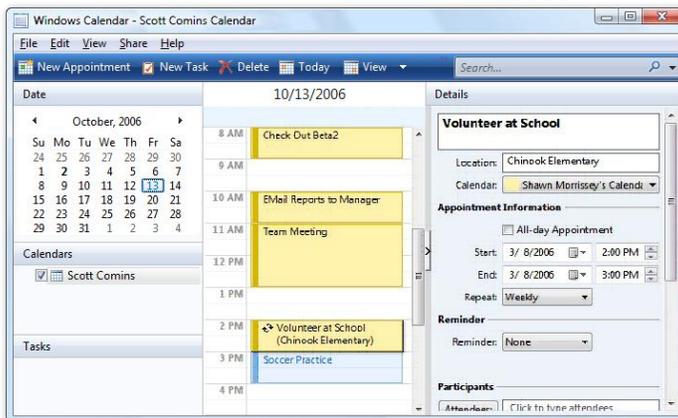
Windows Calendar is a flexible, easy-to-use calendar included with the Windows Vista operating system. It enables you to plan and manage all of your activities and coordinate your schedule with others. Windows Calendar also includes a feature that allows you to create a personal task list and to receive automatic notifications and reminders about specific tasks or upcoming appointments.

Windows Calendar provides a broad range of features to help you manage your personal schedule.

### Personal time management

#### Creating appointments

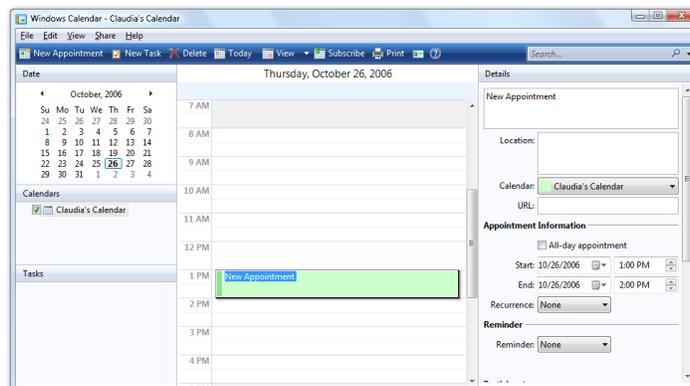
Windows Calendar lets you easily create appointments. Once an appointment is on your calendar, you can set up an alert to remind you when the appointment is approaching.



You can set Windows Calendar to alert you minutes, hours, or even days ahead of time, depending on how much advance notice you want.

You can also set up recurring appointments. Perhaps you attend a weekly book club meeting, have a standing haircut appointment every six weeks, or pay your mortgage on the same day each month. With Windows Calendar, you can create one appointment and then instruct the calendar to set up a series of

similar appointments at the intervals you choose.



## Managing tasks

Windows Calendar includes a personal task list, which makes it easy to organize and manage the things you need to do. For each task on your list, you can describe what you need to do, set a deadline for completion, choose a priority ranking so you tackle the most important tasks first, and keep track of your progress. You can also set reminders to let you know when a task is nearly due. And as you complete each task, you can simply check it off your list and have the satisfaction of watching it disappear.

## Shared calendars

Windows Calendar allows you to set up individual calendars for multiple people. This is especially helpful for families or other groups who share a single PC. Windows Calendar makes it easy for people who use the same computer to coordinate their personal schedules by letting them compare information from any or all personal calendars, side-by-side in a single view.



Imagine a busy family with two parents and three children aged 10, 12, and 15. Because everyone in the family has access to a shared PC running Windows Vista, each person can use Windows Calendar to set up and manage his or her own personal schedule. Windows Calendar enables each family member to view the others' calendars, either selectively or all at once.

As the parents plan for the week ahead, they can overlay their children's calendars and spouse's calendar onto their own to see what everyone in the family has planned and to make sure no one overlooks any important activities. After reviewing all of the schedules together, they might notice that they need to schedule time to attend one child's soccer game, another's school play, and a parent-teacher conference for the third child. Or they might choose to compare their schedule only with their spouse's calendar to make sure at least one parent will be home by a certain time each evening. Appointments from each calendar are displayed in a different color, making it easy to tell whose schedule each item belongs to.

## Calendar subscriptions and publishing

Windows Calendar is fully compatible with the popular iCalendar format, so you can import and export calendar information to and from other applications and websites.

Using Windows Calendar, you can subscribe to calendars hosted on websites in the iCalendar format and then view those calendars alongside your own. For example, you can subscribe to the season schedule of your favorite professional baseball team, the activities calendar for your child's middle school, or the annual schedule of a civic organization whose meetings you attend—and automatically stay up-to-date with any changes in those events.

The iCalendar compatibility of Windows Calendar also makes it easy to publish your own calendar on the Internet through a web host. If, for example, you chair a committee, organize a carpool, or coach your child's basketball team, you can use one of the calendar views in Windows Calendar to create a schedule and then publish it to the Web so others can see and share that information. If you want, you can publish your personal schedule with password protection, so only designated friends and family members can access and view your calendar.

## Email invitations

With Windows Calendar, you can use email to send and receive appointments and invitations. This makes it even easier to keep your family or other groups in sync.

### Windows Calendar—Key Features

Feature	Brief Description
Alerts	Automatic alerts remind you when an event is approaching or a task is nearly due.
Calendar publishing and subscribing	Using the open-standard iCalendar format, you can publish your calendar for others to see or subscribe to other calendars available on the Web.
Email invitations	You can send and receive invitations to events and appointments as email attachments.
Personal calendaring	Easily create appointments and events to manage your personal schedule.
Shared calendars	Multiple users in a family can create their own calendars and then share them with other family members so everyone can see all the calendars in one view.
Task management	Create lists of tasks that you can track to completion.

## Section 5: For Business Users

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## 5.01 Business User Introduction

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To thrive in today's changing market, businesses small and large must constantly strive to maximize their competitive advantage. Today's business software gives the unparalleled ability to expand the impact of the most valuable asset in those businesses—you.

Windows Vista is at the heart of any competitive organization's information technology (IT) investment. Windows Vista empowers people to work more efficiently, helps your teams collaborate and communicate more effectively—regardless of their location, enables your IT managers to lower costs and increase security, and improves your organization's ability to comply with reporting and regulatory requirements.

### Easier

Windows Vista makes everything easier. With a new user interface; easier ways to find, organize, and use your information; and built-in help, Windows Vista Business helps you use your PC more effectively.

With ubiquitous Instant Search capabilities and its smooth, elegant interface, you will find what you need in an instant and feel more in control of your work environment.

### More secure

With innovative security features such as integrated anti-malware and anti-phishing, advanced new tools for backing up your PC, and built-in diagnostics that can warn you of impending hardware failures, Windows Vista helps you keep your PCs running smoothly and securely.

The new Internet Explorer and the clear security menus will make you feel safe and confident about using your computer's power and possibilities to their limits.

### Connected

It's quite simple: If you're somebody that wants to take technology with you, Windows Vista is the most mobile PC operating system we've ever conceived.

By making it easier to securely connect to business networks, Wi-Fi hotspots, or other mobile devices and by including features such as Windows Mobility Center, improved Tablet PC support, and Windows Meeting Space, Windows Vista helps you get more done and stay better connected when using your mobile PC. You will be able to share your resources with your colleagues and business partners—both on and off the network.

## 5.02 XPS Documents

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With the new XPS Documents capability in Windows Vista, you can transform any on-screen content into a document that can be easily viewed, printed, full-text searched, and securely protected and authenticated with the latest rights management and digital signature technologies. This set of capabilities is enabled using the new open XPS Document format.

Knowledge workers in particular can benefit from these easy-to-create, paginated, fixed-format documents. XPS Documents can be created directly from any Windows application and viewed in Microsoft Internet Explorer (or within any other browser, if an XPS viewer can be hosted by that application), making this format ideal for:

- Users who need to securely share content with others who might not have the original authoring application
- Users who want to create a paginated reading experience with non-paginated content (such as a webpage)
- Workflow and business applications that need to create a fixed-format, archivable record or output

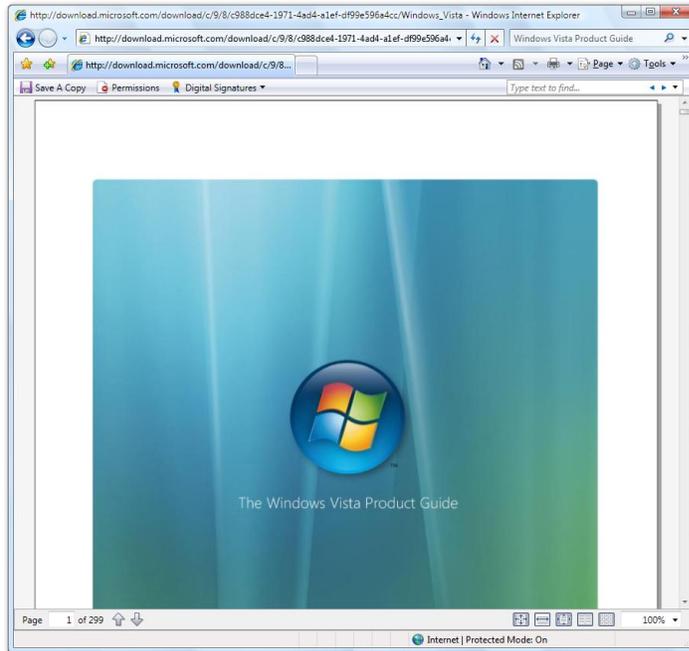
An XPS Document is basically a page-by-page view of content as it would be rendered by a printer. In other words, it turns on-screen content into true “electronic paper.” The format retains all of the fidelity of the original source material and all of the necessary resources for rendering, such as fonts and images. Because this format is meant for creating the most accurate representation of on-screen content, XPS Documents do not contain scripts or macros. This makes it a trustworthy format for sharing or archiving content.

### XPS Document creation

You can easily create XPS Documents whether you are working with Win32-based applications or those built on the next-generation .NET Framework 3.0. An XPS Document can be generated from any Win32 application using the Microsoft XPS Document Writer included with Windows Vista. This printer driver allows you to create XPS Documents as easily as you select a printer in the Print dialog box. When applications based on .NET Framework 3.0 become available, you will be able to create, change, and manage XPS Documents directly from those applications.

## XPS Document viewing

With .NET Framework 3.0 installed as part of Windows Vista, the document simply opens up in Microsoft's XPS Viewer, which is hosted in Internet Explorer. This viewer always



validates and opens the document in protected memory, preventing your system from being compromised by a malicious file posing as an XPS Document file.

Microsoft's XPS Viewer supports a full-fidelity experience and the application of rights management and digital signatures from within the viewer.

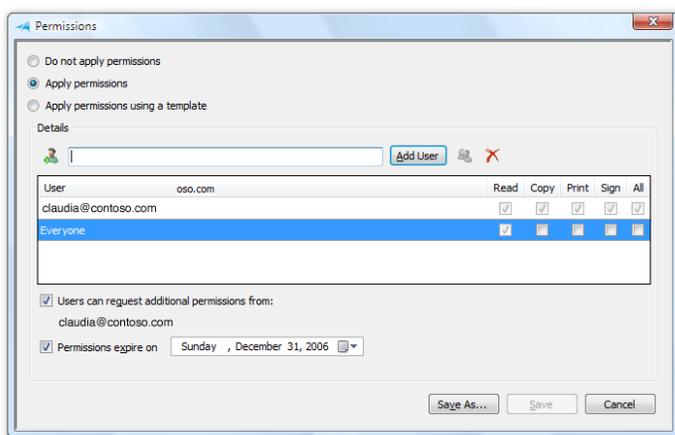
Because the format is an open specification available with a royalty-free license, software vendors can enable XPS viewing from within their own applications or create their own custom XPS viewers for other platforms.

## XPS Document graphics fidelity

The XPS Documents feature supports high-fidelity, vector-based graphics, which means an XPS Document can be magnified many times over, with the text always gracefully scaled up. You will not see jagged or pixelated text. This fidelity carries over to printing. The Windows Vista print subsystem natively supports the XPS Document format to enable higher-quality output and faster performance when it comes to printing graphically rich documents. WYSIWYG (what-you-see-is-what-you-get), high-fidelity graphics printing is made possible with XPS Documents and enabled hardware devices.

## 2007 Office system, Rights Management Services, and Digital Signature support

The 2007 Microsoft Office system provides support for XPS Document publishing, which means 2007 Office system users have the option to “Save as XPS” from within Microsoft Office system applications (including Microsoft Office Word, Microsoft Office PowerPoint, and Microsoft Office Excel).



If an organization uses Windows Rights Management Services, users can set specific access rights to their XPS Documents, thus protecting the information after it is published and shared. Permissions can be applied from within the XPS Viewer or from within an authoring application that natively supports XPS and Windows Rights Management.

Finally, you can sign XPS Documents, guaranteeing their integrity along a workflow. With an existing Windows

Server infrastructure that is capable of issuing X.509 certificates, users can digitally sign an XPS Document directly from within the viewer. These signatures can be legally valid and ensure the authenticity of a document, enabling organizations to establish timely and effective document flow policies in a cost-efficient way.

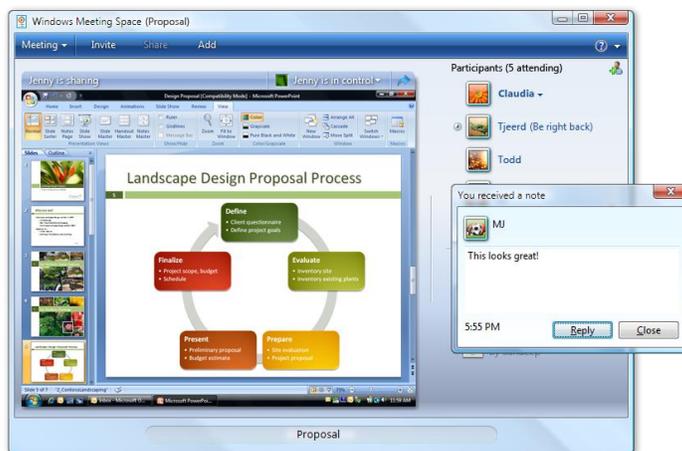
### XPS Documents—Key Features

Feature	Brief Description
Digital signature support	Users can digitally sign documents through an interface in the XPS Viewer. Signed documents display an icon to indicate that they have been digitally signed. Users can see the digital signature and date/time stamp from the properties page and can countersign from this page. The digital signature ensures that the document wasn't tampered with.
Embedding fonts	XPS Documents contain all fonts in the document. Recipients who might not own the fonts used in the document can still see the document as the author intended.
Microsoft XPS Document Writer	Windows Vista users can create an XPS file from any Win32 application by simply choosing Print from the File menu and then selecting Microsoft XPS Document Writer in the Print dialog box.
Microsoft XPS Viewer	A .NET Framework 3.0-based viewer that is hosted by Internet Explorer and features controls that enhance the reading experience of XPS Documents.
Rights management support	With Windows Rights Management Services support, users can assign access rights to their documents on a per-recipient basis.
Shell support for XPS Documents	XPS Documents support Live Icons, and users can perform full-text searches of XPS Documents.
XPS Document	A new fixed-format document that can be directly generated from almost any on-screen content on the Windows Vista desktop.

## 5.03 Windows Meeting Space



Collaboration is becoming more essential to organizational productivity and success. However, obstacles to collaboration abound. For instance, it is challenging to share a file with your team members in meeting rooms without network access or in a café without a Wi-Fi hotspot. Most of the time, users are forced to use alternative methods such as a universal serial bus (USB) drive. Doing a presentation or showing your desktop to another person is also challenging. Oftentimes, users are forced to turn their laptop screen around or invite someone to look over their shoulder. Projectors solve some aspects of the projection challenge, but one might not always be available. Even if there is a projector, some documents (such as Microsoft Office Excel and Microsoft Office Word documents) are hard to read because of small fonts.



Windows Meeting Space, the new collaboration feature in Windows Vista, is a simple yet powerful tool that enables face-to-face collaboration among small groups of Windows Vista users—anytime and anywhere.

Whether you are making a Microsoft Office PowerPoint presentation or revising a spreadsheet, Windows Meeting Space enables face-to-face collaboration by as few as two or as many as 10 people over a wired network, a wireless local area network

(WLAN), or an ad hoc wireless network. Connections are established quickly, easily, and securely. One person simply initiates a session in Windows Meeting Space. Others can join it, share files, or see the same view of an application or desktop and collaborate in real time.

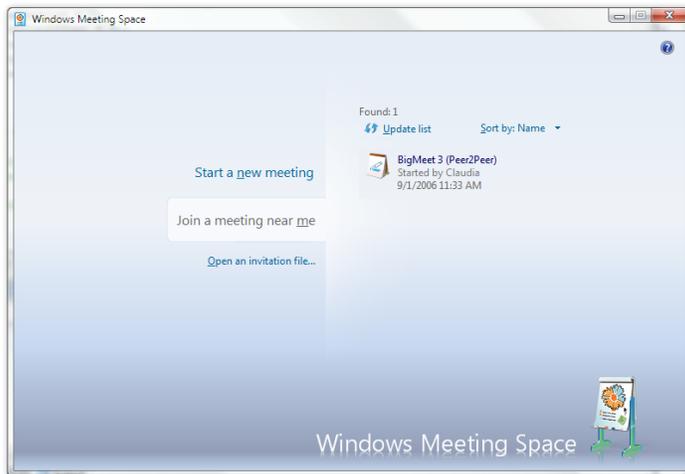
### Ad hoc collaboration—anywhere, anytime

Windows Meeting Space works on your current network (wired or wireless). Even if you don't have a network, Windows Meeting Space will create an ad hoc network for you as long as you have a laptop with network card. Users don't need special knowledge about creating or joining an ad-hoc wireless network. The process of creating or joining the meeting is exactly the same as if you were joining a meeting on an infrastructure network. This ad hoc feature is perfect for collaboration when participants do not have access to a network infrastructure—for example, in a coffee shop that has no Wi-Fi hotspots, or when you have a meeting with customers who do not have corporate network access. Windows Meeting Space and its inventive use of ad hoc wireless network integration opens up a range of new and more flexible collaboration possibilities.

## Discovering sessions and people near you

Discovering and joining sessions is a breeze using the built-in Sessions Near Me feature. People can easily discover the sessions occurring nearby on the local network or on private ad hoc wireless networks. To join a session, you simply enter the password for that session.

Windows Meeting Space also takes advantage of the People Near Me feature, which allows you to check who is available on the network you are using and invite them to join your



collaboration group or another People Near Me-enabled application. People Near Me makes explicitly inviting a person to a session simple and easy.

Remote participants can be invited via email or a file if your network supports Internet Protocol version 6 (IPv6) global connectivity. You simply start a session in Windows Meeting Space and send invitations via email. When the participants get the invitation, they simply click it and type in the password.

## Making meetings more productive

Sharing and collaborating on files with groups is much easier with Windows Meeting Space than with traditional methods such as paper handouts, sending files through email or instant messaging, uploading files to common network shares, or passing around a USB key. Windows Meeting Space allows participants to instantly start a meeting that enables multi-party file sharing. Users simply add a file to the handouts area and everyone receives a copy. If one member of the group makes a change to a file as a result of collaboration and saves it in the session, those changes are replicated immediately to everyone else in the session. When users leave, all can save a "final" copy of the handout to their local hard drive. This alleviates the pain of managing multiple versions. Participants can always have the identical copy after collaboration.

Getting feedback from other participants is very easy as well. Unlike standard presentations, where changes can be made only from the presenter's PC, Windows Meeting Space allows the person who initiated the application or desktop sharing to pass control to other users, who can make revisions to the presentation even while the original is being broadcast from the presenter's computer.

Windows Meeting Space takes the collaboration to the next stage. By broadcasting Microsoft OneNote, for example, a group instantly has a shared whiteboard space that can capture ink, pictures, text, and so on, which can be saved and shared with the meeting. Any Microsoft or third-party application or file can be broadcast or streamed to a group using Windows Meeting Space. Multiple files of any type can be broadcast to the group by anyone in the meeting.

## Secured collaboration

Windows Meeting Space—and the entire peer-to-peer developer platform in Windows Vista—are designed with security in mind. Invitations and participant authentication are handled by using certificates derived through a common password exchange and verification between the session creator and other attendees.

## Easy deployment and secure management

### Minimal network configuration required

Windows Meeting Space requires minimal network configuration for face-to-face meetings. Remote attendees can also be invited if an IPv6 ISATAP server, like the one in Windows Server 2003, is available on the network.

### Respects current security constraints

By default, Windows Meeting Space requires passwords to be the equivalent strength of a domain user account password. (This requirement can be turned off for the entire Peer Grouping infrastructure and Windows Meeting Space. By disabling this requirement, passwords for meetings must only be eight characters in length.)

Windows Meeting Space abides by the rules set up for the Attachment Manager. This allows an information technology (IT) administrator to limit the file types that can be shared via Windows Meeting Space, in the same way the IT administrator limits the file types that can be sent via a mail client such as Microsoft Office Outlook.

### Flexible Group Policy and auditing controls

Windows Meeting Space respects system Group Policy settings (that is, the ability to create ad-hoc wireless networks) and provides the ability to disable the entire feature or particular aspects (that is, file sharing). The built-in logging feature can track usage, activity, etc., to the event log during a Windows Meeting Space session.

## Windows Meeting Space or Live Meeting?

Both Windows Meeting Space and Microsoft Office Live Meeting help people communicate and collaborate in a rich way, and you can take advantage of these products for different purposes. Office Live Meeting is designed to help people collaborate from different locations, across corporate boundaries, and on different networks over the Internet. Office Live Meeting operates on a server infrastructure and can support up to 2,500 concurrent users, enabling larger, more formal meetings that are often planned and scheduled in advance. Office Live Meeting is browser-based and can be used with any Windows operating system that supports it. However, it is not the out-of-the-box solution with Windows Vista, and it also requires an Internet connection.

Windows Meeting Space is a peer-to-peer application that operates directly between personal computers. No server infrastructure is involved even when you use the application over a corporate local area network (LAN) or wireless LAN (WLAN). Also, Windows Meeting Space is designed to enhance and support spontaneous and informal small-group collaboration (up to 10 concurrent users) anywhere, anytime. Lastly, Windows Meeting Space is delivered as a built-in feature of the Windows Vista operating system, and participants only need to be running Windows Vista on their PCs.

### Windows Meeting Space—Key Features

Feature	Brief Description
Anywhere, anytime face-to-face collaboration	Supports both infrastructure and ad hoc wireless networks.
Auditing	Auditing of particular meeting activities.
Compatibility	Any file or application can be broadcast or streamed—not just Microsoft applications.
Domain password requirements integration	Meeting passwords must comply with domain user password requirements.
Multi-party file sharing and collaboration	Everyone can change and save files, and if one person saves a change in the session, it is replicated immediately to everyone else in the session.
Password protection	The session initiator decides who can join the session.
People Near Me and Sessions Near Me	Check availability of others on the network and invite them to join your collaboration group, or search for relevant sessions and ask to join.
Shared control of presentations	Allows the initiator to pass control to other users, who can make revisions even while the original is being broadcast from the initiator's computer.

## 5.04 Sharing



With Windows Vista, sharing files and folders with other users and computers on the same network is easy, unlike with previous versions of Windows. Windows Vista lets you easily share information the way you want by bringing sharing features to the forefront and seamlessly integrating them with features for acquiring, creating, and storing data.

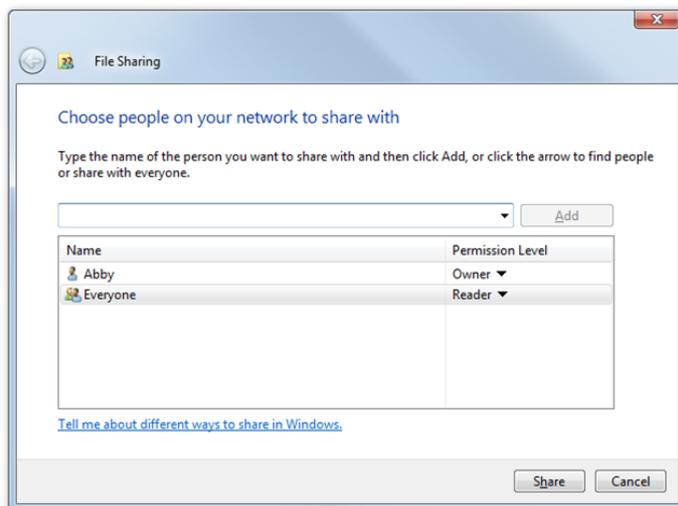
### Same-computer sharing

When you share a Windows Vista-based PC with multiple users, it's easy to share files or folders with specific users or all users on that computer.

Windows XP makes it simple for you to share a single business or home computer with multiple users through the Log On/Log Off capability, but it can be difficult to understand where and how to save documents and media intended for private use versus public use (that is, available to all users). Another challenge is that Windows XP provides no easy way to share content with specific individuals. When data is shared, by default it is shared

with anyone who might use that computer—or no one at all.

Windows Vista solves these file-sharing issues in two ways. First, when you save a file, it is easy to determine whether the file is being saved into a personal profile or into the public profile. Next, across all Windows Vista sharing scenarios, a new Sharing Wizard helps you specify other users with whom you want to share a file. The wizard shows every person who has an account on that computer, enabling you to easily choose someone and share a file.



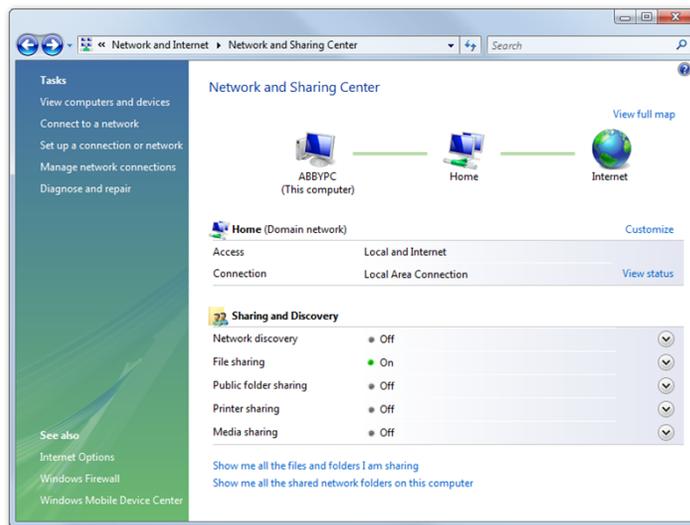
### Network sharing

With Windows Vista, sharing files and folders with co-workers on the same network is also simpler. Network folder sharing is available in Windows XP, but the feature is not widely known and using it is a complex process, so sharing a file through a file server or email is often easier.

Windows Vista network sharing is extremely easy to execute. With Windows Vista, you can share individual files, whereas with Windows XP you have to share an entire folder if you want to share content.

The Sharing command is now featured prominently on the Explorer Command Bar. When you choose to share content, the setup process is quick and easy with the new Sharing Wizard (mentioned above). You simply select colleagues from Active Directory or the Windows domain, workgroup, or PC, and then you set the level of access you want to enable for that file or folder: Reader, Contributor, or Co-Owner.

Windows Vista even helps you notify colleagues with whom you've chosen to share content. The Sharing Wizard features an E-Mail Link option that automatically composes an email from you with a hyperlink to the shared content embedded within the message. When your colleagues receive the email, they simply click on the link, which takes them directly to the shared folder or file. Windows Vista also improves the sharing experience by allowing you to more easily keep track of shared content by using the Search Folders available within Windows Explorers that can display all shared content on a PC.



Windows Vista also has a new integrated control panel called the Network and Sharing Center. This Network and Sharing Center allows users to easily understand and configure the major options for sharing and networking in Windows Vista. The center makes it easy to see what network you are connected to, what you are sharing, and whether or not you have access to the Internet. It is the place that can answer all of your network- and sharing-related questions.

### Sharing—Key Features

Feature	Brief Description
Command Bar Share task	The Share task is noticeably displayed on the Command Bar. You no longer have to right-click to share a file.
Network and Sharing Center	Allows you to easily understand and configure the major options for sharing and networking in Windows Vista.
Share an item or a folder	You can share individual items as well as folders.
Sharing Search Folder	A Search Folder that enables you to see all content on the PC that is shared.
Sharing Wizard	A richer user experience for sharing that makes it easy to find a person to share content with and then set appropriate access rights.
Simplified Navigation Pane	A new pane that clearly shows users if they are saving/accessing files from their private or public profiles.

## 5.05 Corporate Roaming



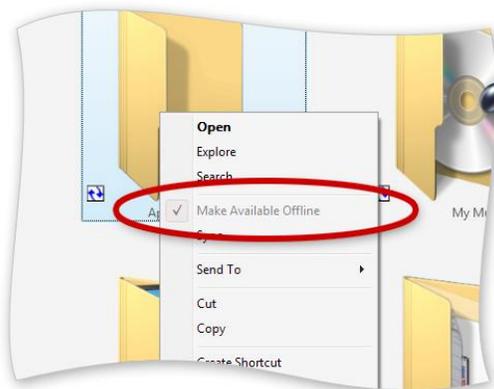
In a Group Policy–enabled environment, an information technology (IT) professional can configure computers running Windows Vista so that user data is secure and stored on a server but users can still take their data offline or efficiently access their data from multiple PCs on the network.

### Roaming User Profiles and Folder Redirection

In large organizations, IT administrators need a way to securely and efficiently store user data and settings on a central server for several reasons:

- To manage, secure, and back up desktop and laptop user data
- To ensure that users with more than one computer—a corporate laptop and a desktop, for instance—can use either PC and keep documents, media, and favorites in sync on all their machines
- To enable a customized and secure computing experience for multiple users who are using the same computer in a kiosk environment

With Windows XP, users can achieve stateless computing in two ways: through Roaming User Profiles (RUP) and Folder Redirection (FR). While RUP enables you to roam all of your important data, including application data, it is inefficient. When you log on, the computer copies all of your files, forcing you to endure a long wait as they load onto the desktop. This is the only way to roam all of your important files and settings in previous versions of Windows. Folder Redirection allows more efficient roaming of data because



files can be locally cached. But the drawback of FR is that it permits you to roam only a small number of folders. For example, you cannot roam data such as Favorites, registry settings, or application data. This renders many applications useless for roaming users.

For organizations that use Group Policy, Windows Vista addresses these issues by allowing the deployment of RUP and FR with local caching enabled. Deploying all of these technologies concurrently achieves the goal of seamless data roaming without sacrificing usability.

In such a scenario, an IT pro can choose to roam only certain user settings but not the bulk of a user's data, such as documents or application data. The roamed user settings will contain the appropriate FR settings, so when a user logs on for the first time, his or her documents will start to sync with the PC's local cache. All of that synched content will, of course, work with the new search and organization features in Windows Vista.

As part of this solution, numerous improvements have been made to both RUP and FR. By itself, RUP in Windows Vista sees fewer user profiles because of a more aggressive synchronization mechanism. But if an organization couples RUP with FR, users will notice a more immediate logon experience. Windows brings down the critical elements of the profile first and brings down the user's documents in the background, enabling users to access a functional desktop much faster than before.

With FR in Windows Vista, an IT administrator has more control over which folders get roamed. In Windows XP, if the Documents folder is roamed, it includes Music and Pictures, which might not be necessary to roam. With Windows Vista, the administrator can choose to roam only documents (or any other folders) without the user's pictures or music. Only the registry settings cannot be redirected (although these few settings can be deployed via RUP). The key to this implementation is that all of the user's content is gradually synched to the local PC in the background.

The local cache also includes enhancements to make this implementation more efficient and stable. In Windows XP-based FR, when a user connects to a network to edit a document, the server copy is always held open for both reads and writes, tying up precious network bandwidth. This can also create a less-than-desirable experience if the network connection is tenuous, such as in a branch office scenario or when you are using a wireless connection, because the handoff between online and offline states typically creates an unstable user experience.

With Windows Vista FR with local caching, you perform writes to the server copy but all reads are satisfied out of the local cache, even when you are connected to the server. This preserves network bandwidth and provides you with a more stable experience between online and offline states. For example, a user editing a set of documents always reads the local copy, even when connected to the network. Writes are immediately passed through the cache to the server. If the server connection goes down or is tenuous, the user is not aware of the varying states and can continue working uninterrupted. The user might edit a series of documents while in the unconnected state. Upon reconnection, all the changes to those documents are seamlessly synched in the background without any action needed from the user.

Another user experience improvement to FR with client caching is support for the "ghosting" of unavailable content. As a user logs on to a PC that is not connected to the network and opens the Documents Explorer, instead of seeing only the files that have been downloaded from the server, the user sees both downloaded files and ghosted items. The ghosted items represent the files that have not been downloaded, preserving the context of the user's files. Ghosting support requires that auto-caching on the server be turned on.

FR with client caching in Windows Vista also supports a new feature—Delta Sync—that streamlines the overall sync experience. Delta Sync syncs only the changes to a document rather than the entire document when syncing from client to server. Windows Vista also includes streamlined sync algorithms that can better determine the exact changes between server and client copies, thereby increasing sync speed. The combination of these two Windows Vista features adds much more efficiency to roaming user data within the corporation.

### Corporate Roaming—Key Features

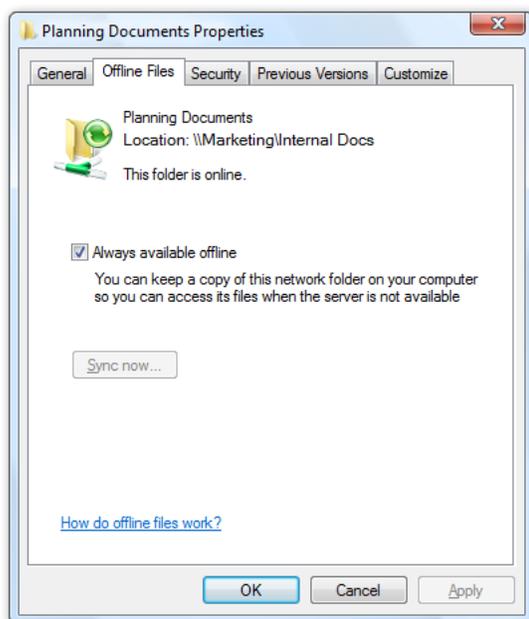
Feature	Brief Description
Background sync	When you reconnect to the server, changes you made to files while offline are automatically synched in the background.
Conflict resolution	An interface for reconciling two versions of the same file when the client copy does not match the server copy.
Fast Logon	With RUP, the system downloads the critical user files first, allowing you to get to a usable desktop quickly. Less critical files are downloaded in the background.
Ghosting	When you are offline, unavailable (not yet downloaded) items appear as ghosts, preserving the viewing context of all user files. Clicking a ghosted item immediately initiates a download of that item.
Redirect Any Known Folders	IT administrators can set up FR so that any profile folder can be roamed, not just the five hard-coded folders from Windows XP in the user profile.
Search and organize redirected content	The groundbreaking search and organize features in Windows Vista work seamlessly over roamed content when local caching is enabled.
View All Roamed Folders/ Sync Progress	A view in Sync Center that helps you manage content sync activities.

## 5.06 Offline Files and Folders



With Windows Vista, taking remote folders offline is faster than ever, with smooth transitions between offline and online states and a new sync algorithm that reduces overall sync times. This feature is a boon for:

- Mobile workers who need content from servers or other PCs while traveling
- Workers in branch offices who are subject to highly variable bandwidth connections back to the central office



The ability to use offline files and folders is a useful feature in Windows XP because it allows you to point at any remote folder on another PC or file server and create a sync relationship between that location and your PC. The sync infrastructure and user interface track changes between the local version, which is stored in the local cache, and the remote version, and they enable you to reconcile versions if conflicts exist. With Windows XP, you must sync the entire document, even if you made only a few changes. This can make syncing a time-consuming process, especially if you have many documents to sync.

Windows Vista makes the sync process for offline folders much faster, with support for Delta Sync. Delta Sync lets you send only the changed blocks of a file rather than the whole file when you synchronize client changes to the server. The advanced sync algorithm in Windows Vista is also

much better at determining which files or directories need to be synchronized, adding even more efficiency.

Windows Vista also supports “ghosting” of online files and folders. When you make only a few files from a directory available offline, Windows Vista creates ghosted entries of the remaining items to preserve the online context for you. When you are not connected to the remote data source and you navigate to the remote location, you will see these ghosted online items alongside the offline files.

### Offline Files and Folders—Key Features

Feature	Brief Description
Background sync	When you reconnect to the server, changes you made to files while offline are automatically synced in the background.
Conflict resolution	An interface for reconciling two versions of the same file when the client copy does not match the server copy.
Delta Sync	Syncs only changes to a file, rather than the entire file.

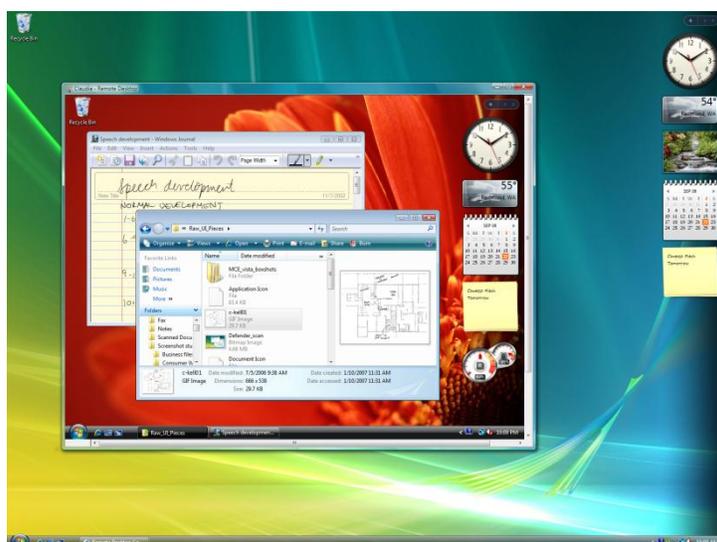
←  
For more information on improvements to the local cache, please turn to [5.05: Corporate Roaming](#) on page 212.

## 5.07 Remote Access



If you travel as part of your job or divide your work time between home and the office, you need secure and dependable remote access to your corporate network, at any time and from any place. The Windows Vista client, teamed with the forthcoming new version of Windows Server (code named “Longhorn”), offers a better solution that simplifies remote access and ensures a high level of security—without requiring a virtual private network (VPN) connection.

Whether you are a mobile user working from the road or a remote user working on a home computer, Windows Vista makes it quick and easy for you to access your corporate network whenever you need it.



### Simplified remote access

The Remote Desktop Connection feature in Windows Vista enables easier remote access to any resource or application that your organization has made available to you. For example, if you are a salesperson who requires remote access to a financial application or a customer relationship management (CRM) application, Windows Vista enables the corporate information technology (IT) manager to place an icon for that application on your desktop. You just click the icon, and an automatic Terminal

Services Remote Program connection is made back to the company over the Internet and to the Terminal Server in Windows Server “Longhorn,” with no need for a VPN.

Your organization’s personal computers can be preconfigured to provide direct access to applications and data that you and other employees need while working remotely, but

what if you need to access the corporate network through your home PC?



Terminal Services Gateway in Windows Server “Longhorn” provides additional features for home computers that are used to access corporate networks. If you log on to your home PC, you simply access the corporate website over the Internet and click the links that take you straight to the corporate resource you want to use.

## Improved flexibility and control

Windows Vista also gives corporate IT managers enhanced control over which applications and information they make available to remote users. By eliminating the need for a VPN connection, Windows Vista enables the IT manager to grant granular and secure remote access to *specific* corporate resources—Terminal Server–based applications and desktops designated by the IT manager—rather than full network access.

Whether you are using the Remote Desktop feature on your office mobile PC to access the corporate resources you need or are accessing the corporate network from your home computer through the Terminal Services Gateway, Windows Vista simplifies the user experience for you while giving your company additional security and management controls.

### Remote Access—Key Features

Feature	Brief Description
Remote Desktop	Enables secure remote access to selected corporate resources without the need for a VPN connection. IT managers choose which resources to make available, and users simply click a desktop icon to make the connection and access the application or information.
Terminal Services Gateway	Provides secure remote access to corporate resources over the Internet from a home PC.

## 5.08 Windows Fax and Scan

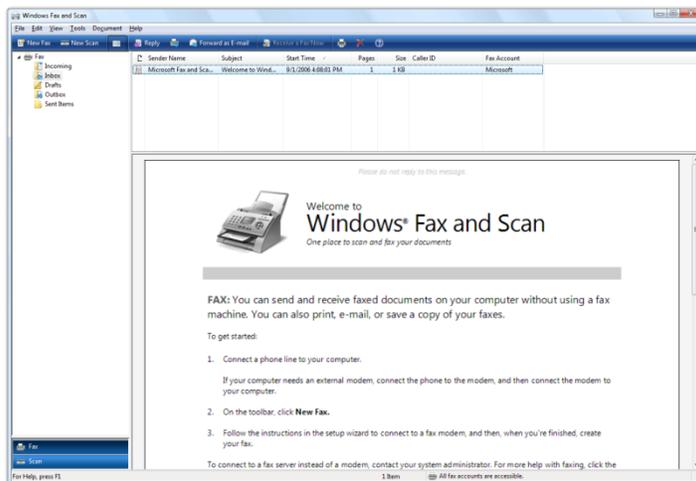


Windows Fax and Scan in the Windows Vista operating system provides flexible, integrated faxing and scanning capabilities that make it easy to send and receive faxes, scan documents and images, and share those resources with other users. Whether you are a home user or a business professional in a small or medium-sized business, the new enhancements in Windows Fax and Scan can help you send information, handle documents, and save time.

### Easy-to-use Fax and Scan

Windows Fax and Scan can be found by default on the main All Programs menu of the Windows Vista Business and Windows Vista Ultimate editions. It can be installed as an optional component in Windows Vista Enterprise. Windows Fax and Scan enables you to perform all faxing and scanning tasks and manage all of your faxes and scanned documents from one location.

Windows Fax and Scan offers several preset categories and folders to help you organize your faxes and scanned documents more easily, and it enables you to create customized



folders. To file faxes and scans, you simply drag and drop them into the appropriate folder, just as you file and organize email in Microsoft Outlook. Terminology and functionality familiar to users of other Windows applications make using Windows Fax and Scan simple and intuitive.

In addition, Windows Fax and Scan supports multiple user accounts on the same computer. This is particularly useful for small businesses that have several employees sharing a single computer.

Different employees can log on to the same computer to send faxes, and each one will be appropriately recognized and identified as the sender of his or her own faxes. So instead of receiving generic faxes from the business, customers and suppliers will get the personal touch.

## Faxing

With Windows Fax and Scan, sending and receiving faxes is as simple as using email. Simply select New Fax from the File menu to get a fax template with all of the fields you need.



The To line in the fax template links directly to your address book—either the address book in Outlook or the Windows Address Book. Just click on the name of the contact to whom you want to send a fax, and Windows Fax and Scan retrieves the fax number. If you prefer, or if you are sending a fax to someone not listed in your address book, you can type in the fax number instead. Next, you just fill in the Subject field and type any notes you want to add to the fax cover sheet. Attach the document you want to fax, just as

you would add an attachment to email, and the pages of the attachment become the pages of your fax. To send more documents in the same fax, simply add them as additional attachments.

## Scanning

Windows Fax and Scan offers one-click scanning of documents and images from locally connected or network-connected scanners and multifunction print/scan/fax devices. Windows Fax and Scan lists all of your scanned files, plus other useful information such as the scanner used to create the file and the day and time the document was scanned.

You can adjust the settings for documents you are scanning, selecting the correct paper size and controlling colors, resolution, and so on, and then store those settings as a scan profile. Windows Fax and Scan allows you to create and store multiple scan profiles to make it easy to get consistent quality every time you scan, without the need to reselect all of your settings for different types of documents and images.

Before you do a full scan of a document, you can use the Live Preview feature to see how it will appear on your computer after the final scan. Live Preview creates a low-resolution cached image of the document that you can easily modify. It allows you to experiment with changes and view them instantly.

Earlier versions of Windows offer scan support, but only for scanners connected directly to your PC. Windows Vista improves scanning in three key ways. First, it supports scanners that are connected across a network, making it easy for you to share scanners with your family members or colleagues. Second, it offers an enhanced user experience by providing integrated support for scanning, faxing, and email so that all three features work together seamlessly. Third, it enables you to easily manage documents after you have scanned them into your system.

## Sharing scanned documents

Windows Fax and Scan enables you to set up routing lists for scanned documents. From the File menu, choose Set Up Routing, and then designate the email addresses and server shares that should receive your scanned documents. Whenever you scan a document from that scanner, you can choose from among the routing lists you previously set up.

For later sharing, simply right-click on the icon for email or for faxing (both are built in to the task bar of Windows Fax and Scan), which brings up an email or fax template, respectively, with the scan file attached. From there, you can simply send the email or the fax as you normally would.

### Windows Fax and Scan—Key Features

Feature	Brief Description
Drag-and-drop functionality	Makes it easy to file and sort all of your faxes and scanned files.
Fax and scan routing	Allows you to create routing lists of designated email addresses and server shares to automatically receive copies of scanned documents.
Live Preview	Lets you see how a document will look before you scan it and adjust settings instantly to get it just the way you want it.
One-click faxing and scanning	Makes faxing and scanning documents as easy as using email.

## 5.09 Small Business Resources



The new, easy-to-use tools in Windows Vista Business are designed to help businesses large and small work more efficiently and protect vital business data. But smaller organizations, particularly those without in-house information technology (IT) personnel, might be reluctant to try some of those new and improved features without a clear understanding of their business benefit and ease of use.

That's why Small Business Resources was created.



Small Business Resources is an online experience specially designed to highlight the full spectrum of Windows Vista features most relevant to small businesses, as well as other compelling Microsoft small business resources available online. This experience will be localized for many of the languages that Windows ships in and will be refreshed as new features and/or initiatives emerge.

Small Business Resources focuses on the many ways Windows Vista Business can help smaller organizations improve the way they use technology to streamline operations, be more productive, and safeguard vital data.

Here are a few areas of emphasis:

- **Windows Backup and Restore** offers multiple automated tools to help small businesses protect data against hardware failure or user error.
- **Improved security in Windows Vista Business** protects PCs from the latest generation of security threats and promotes a safer online experience.
- **Windows Fax and Scan** makes faxing—which many small businesses rely on as a primary means of communication—more convenient, more flexible, and more confidential.
- **Search and Organize** features improve workplace productivity with more intuitive file organization and fast, simple searching for files and email.

Text, graphics, and video options are all part of the Small Business Resources online experience, along with opportunities for users to delve deeper into the subject matter by following links to additional resources related to specific Windows Vista features and topics. The objective is to help users understand how a feature can benefit their business and what they need to do to get started using it.

Small Business Resources also introduces Windows Vista users to other free online services developed by Microsoft to help its small business customers get more value out of the technology they use everyday. Specifically, these are:

- **Microsoft Small Business Centers.** These web portals are designed for small business owners and managers who are seeking reliable information on Microsoft products, advice on business issues, and tips and tools for using technology to run their business more successfully.
- **Microsoft Small Business+.** A personalized online resource that offers small businesses an opportunity to get more value out of their relationship with Microsoft through free online software and business training, free online support, newsletters, and more.

Ultimately, the goal of Small Business Resources is to equip small business customers with the information they need to realize full value from their Windows Vista investment and to strengthen their relationship with Microsoft.

## Section 6: For IT Professionals

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## 6.01 IT Professional Introduction

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Windows Vista advancements in security and reliability, along with its cost and operational efficiencies, give both information technology (IT) professionals and users confidence in their company's PCs. With Windows Vista, users have clear ways to organize and view their information, enabling them to focus on the most important aspects of their job. Windows Vista communication, mobility, and networking features keep users connected to people, information, and devices. In combination, these benefits bring clarity to the world of the IT pro and to the world of end users.

These capabilities make Windows Vista a great operating system solution for company PCs. From the perspective of an IT professional, Windows Vista is easier to deploy, and less expensive to maintain, than any earlier version of Windows. From the perspective of end users, the improved performance and reliability of Windows Vista enables people to be more effective in performing their jobs.

### Find and use information

The success of a business depends on the success of its people. Making employees more productive and facilitating communication is the main reason you invest in information technology. Yet, with most tools today, it is difficult for employees to quickly find the information they need and leverage information technology to its full potential. Windows Vista is designed as a People-Ready solution so they can easily find and use information.

Search, organize, and information visualization tools in Windows Vista help users get to critical data faster. New Live Icons give users the ability to clearly see the document previews and go directly to the items they need—resulting in time savings and increased user productivity.

### Enable your mobile workforce

While mobile PCs can help improve employee productivity, supporting mobile users in the enterprise can add complexity to the IT environment. Securely granting access to employees when and where they need it often requires multiple sign-ons. Additionally, portable computers can pose risks to sensitive business information. New tools in Windows Vista can enable your organization to realize the benefits of mobile computing while helping to reduce complexity and risks.

Windows Vista offerings for mobile workers also include more secure wireless access; improved power management to expand the battery life; improved offline folder and sync management; integrated tablet functions; Windows Meeting Space to enable peer to peer meetings; enhanced network diagnostics to help resolve connectivity issues; and more. To help address the security risks of mobile computing, Windows Vista includes the latest wireless security protocols so users can connect to Wi-Fi networks more securely. BitLocker Drive Encryption in Windows Vista Enterprise helps keep the data on a lost or stolen portable computer from falling into the wrong hands.

## Improve security and compliance

Unfortunately, in today's digital world, computers are becoming an increasingly attractive target for criminals hoping to steal information or do harm to your business, people, or customers. Sophisticated social engineering attacks can trick your employees into revealing confidential information or target your customers and damage your reputation. On top of that, new government regulations require high standards for security and data protection to avoid penalties. To help your company address the risk and expense associated with security and compliance, we are committed to providing multiple layers of protection in Windows Vista.

User Account Control in Windows Vista increases security and improves total cost of ownership (TCO) by reducing the need for users to work in administrator mode. To mitigate threats from malicious software such as viruses, spyware, and root kits, Windows Vista includes Internet Explorer 7 Protected Mode, which is unique to Windows Vista and prevents the silent install of malicious code. And Windows Defender provides built-in spyware protection. Additionally, granular event logging—auditing and tracking for security events in Windows Vista—make it easier for companies to achieve compliance with both internal policies as well as government regulations.

## Optimize desktop infrastructure

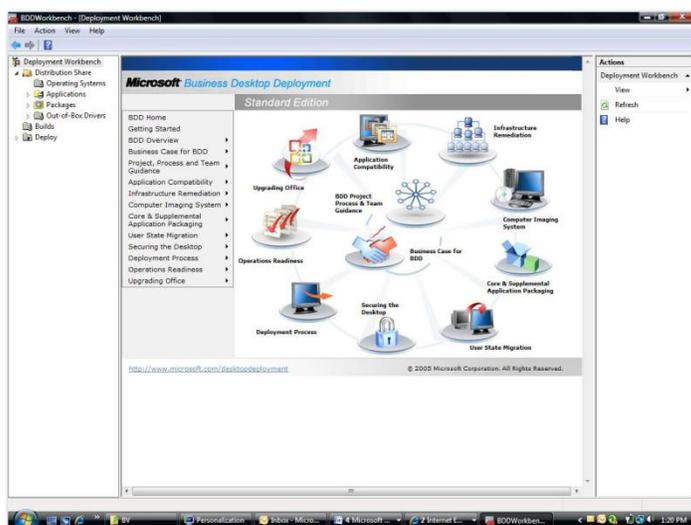
Windows Vista helps empower people to make a greater impact, but are the benefits outweighed by the costs of upgrading and maintaining a new operating system? Windows Vista enables IT efficiencies by providing technology, tools, and best practices to optimize desktop infrastructure and help reduce IT costs.

With the new imaging technology in Windows Vista, companies can deploy a single operating system image to different types of computer hardware and machines in different languages. To ease the initial migration to Windows Vista, Microsoft will provide the Application Compatibility Toolkit version 5.0. Windows Vista also has new tools to help enable a company to manage its desktops after they are deployed. This includes providing more than 500 new Group Policy objects to address the most critical management scenarios.

## 6.02 Deployment



With Windows Vista, Microsoft has redesigned the Windows operating system to significantly reduce the cost and complexity of desktop deployments and upgrades. Information technology (IT) professionals can take advantage of new capabilities and new deployment tools in Windows Vista to enable easy, quick, and seamless deployment of the operating environment and associated applications on the end-user desktop. These new capabilities also support the preliminary steps of planning, application compatibility testing, migration analysis, and desktop engineering.



Deploying information technology successfully requires careful planning and implementation using the right tools. The suite of tools in Windows Vista is designed to complement the workflow and phases that IT professionals go through when planning, engineering, and deploying desktop images.

### Deployment innovations

Windows Vista enables a great deployment experience through architectural redesigns and changes to the core of the operating environment. These advances include:

**Modularization.** The Windows Vista operating system is built on the principle of modular design. This approach offers several advantages, including enabling IT professionals to customize the platform to a certain degree, service individual components, and minimize the need for testing during deployment. In addition, languages can be installed as optional components without the need for a separate image for each language, thereby reducing the number of images a global organization must maintain.

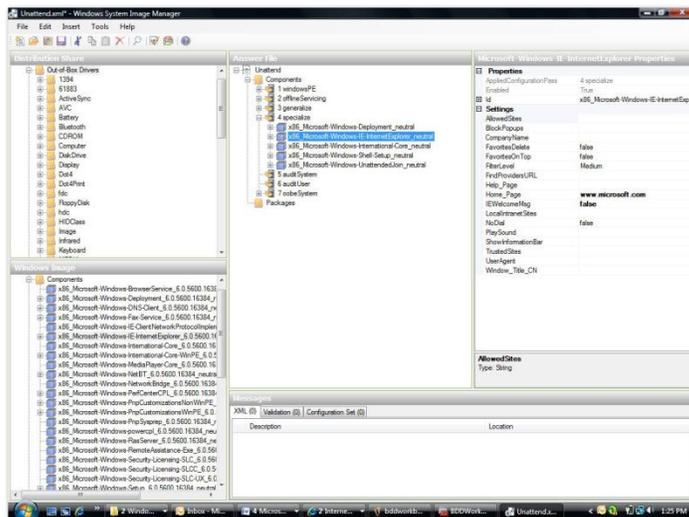
**Worldwide deployment with Multi-lingual User Interface (MUI).** With Windows Vista Enterprise, IT pros can configure a disk image that includes all Microsoft user interface languages. The MUI packs are available only to business customers using Windows Vista Enterprise or Windows Vista Ultimate.

- A single, multi-lingual disk image enables worldwide deployment to all PC form factors (desktop, laptop, tablet, etc.).
- Significant cost savings by reducing the number of images an IT pro needs to deploy and manage.
- End users can toggle between languages installed on the PC.

- Support for a total of 36 languages.

**File-based image formats.** Windows Vista is distributed in the new Windows Imaging Format (WIM), a hardware-agnostic image file format. This means that an organization needs only one image to address a range of hardware configurations. This format also allows multiple images to be stored in one file—that is, multiple Windows Vista SKUs (stock-keeping units) can be in a single file, and Microsoft can ship a single worldwide binary to its customers (one each for 32-bit and 64-bit architectures). WIM also uses compression and single instancing, thus reducing file size significantly. The WIM file format also enables IT professionals to service the image offline, including adding and deleting optional components such as patches and drivers without starting up the desktop or creating a new image. This dramatically reduces the number of images an organization needs to maintain.

**Nondestructive imaging.** Windows Vista allows an easy in-place migration path from previous versions of Windows. Its new image-based setup and built-in migration capabilities ensure that user data and state/profile information can remain on the hard drive while Windows Vista is being installed. This is different from the upgrades of the past, in which registry settings and partial files were replaced and edited. Windows Vista is cleanly installed, and the data, settings, and applications are then applied to the new operating system. The Windows Vista upgrade process will also automatically roll back the upgrade and restore the user's original desktop (if a failure occurs at any point before the first logon).



**XML-based unattend files.** The new Windows Vista setup uses unattend files based on XML to enable remote and unattended installations. Unlike earlier versions of Windows, Windows Vista uses this single unattend file format for the entire deployment process rather than using multiple unattend files (such as Unattend.txt, Winbom.ini, and Sysprep.inf). With XML comes the ability to automate ever-larger portions of the desktop engineering and deployment process. For example, the component settings are exposed in a consistent way, allowing

tools such as System Image Manager to create, manipulate, and validate complete unattend files. This has the potential to make installations faster, more manageable, and less error-prone.

**Windows PE technology.** Windows PE (Preinstallation Environment) is a Win32-based, minimal operating system that simplifies the deployment, testing, diagnostic, and recovery processes in a secure and flexible environment. Many of the deployment tools are built on a Windows PE foundation.

**Application compatibility and migration.** One of the biggest challenges any organization faces when deploying a new desktop environment is migrating applications without breaking them. Significant strides have been made in ensuring that applications can migrate to the new Windows Vista environment with less effort and testing. They include the ability to virtualize file and registry settings in a restricted-user mode. This enables older applications that write to Windows Vista–protected areas (for example, the \Windows directory) to continue to work because the target location is virtualized and the applications can run unchanged.

**Script–based installations.** Windows Vista includes extensive support for using command-line and scripting capability to enable remote, automated, and repeatable deployment scenarios.

### Deployment Innovations—Key Features

Feature	Brief Description
Command-line capability	Windows Vista provides extensive scripting and command-line capability to automate deployment.
Comprehensive suite of deployment tools	You can use this suite of tools from the planning stage to engineering to deployment.
Core deployment platform	Windows PE is the stable core platform for all deployment tools. Windows PE can be run from a hard disk drive, media, USB flash drive, or network (Preboot Execution Environment—PXE).
Image integrity	Windows Vista performs consistency checks to make sure the image is true before deployment.
Network boot support	Windows Vista supports PXE as the network boot environment.
Neutral partition size	Enables Windows Vista to be deployed on partitions of any size by moving away from sector-based images.
Recovery	Rapidly restores the operating system by using the standard image.
XML-based unattend files	Windows Vista uses XML-based unattend files for the entire deployment process.

## Deployment tools

Windows Vista comes with a comprehensive suite of tools and technologies that enable IT professionals to plan, test, build, and deploy desktops across the organization. These tools are designed to address the issues that IT pros face when planning and executing desktop deployments and are organized according to the relevant deployment lifecycle phase.

### Application and migration planning

The migration planning tools help ensure that applications and data migrate well. Users want their desktop environment to be set up exactly the way they are used to, for an easy transition with no loss in productivity.

Migrating a desktop involves careful planning, taking inventory of all the applications in the environment, and testing those applications thoroughly to make sure there are no migration issues. The application compatibility and migration features of Windows Vista are described in the upcoming table.

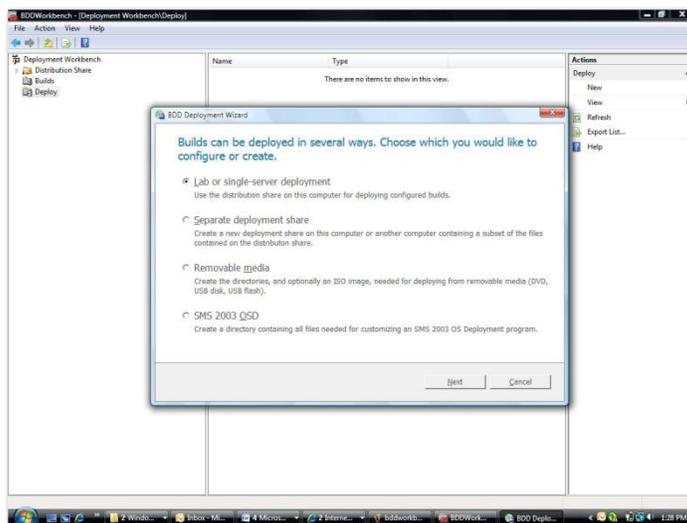
### Engineering the perfect desktop

Windows Vista enables the creation of the gold or standard images that can be installed onto desktops. Because Windows Vista is component-based, the System Image Manager can develop an unattend file to customize the image by selecting optional components along with required components. For example, language packs are optional components that can be installed based on local requirements. An IT professional can install the desired applications onto the build PC and then create an image of the desktop for distribution. Tools such as the System Image Manager and ImageX are used during this phase.

### Implementing the deployment process

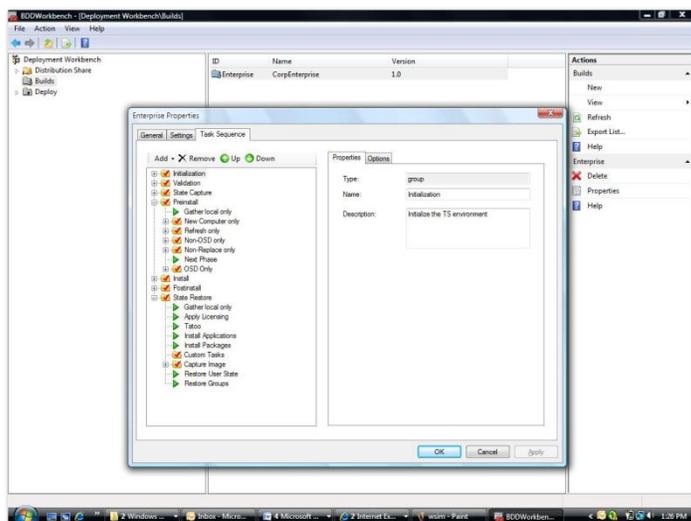
In this phase, the gold or standard image is deployed remotely or locally by using a media or network boot from the desktop. Windows Vista has many tools for migrating a

user's data and settings when it is installed on a new PC. Windows Vista looks at the work done in the planning stages for application compatibility and uses that information to determine which applications and data will migrate seamlessly.



## Deployment Tools—Key Features

Feature	Brief Description
<b>Application and Migration Planning</b>	
APIs for ISVs	Windows Vista provides extensibility and an application programming interface (API) set for independent software vendors (ISVs) and third-party applications through a software development kit (SDK).
Compatibility mitigation	Windows Vista creates custom compatibility databases based on analysis and tests the fixes to make sure they will work.
Filtering analysis reports	Reports provide information about application compatibility issues and mitigation information. This information is improved with user input.
Software Inventory Analyzer	Inventories all the applications installed on user desktops across the enterprise, stores them in a central location, and performs compatibility analysis against a compatibility database.
<b>Engineering the Perfect Desktop</b>	
Customization of images	Add, update, and remove optional components (including languages, drivers, and service packs) to create a custom image.
Desktop image creation	Takes an image of an existing PC for distribution or for backup. You can save to a distribution share, from which users can install the gold image or IT professionals can push the image to the desktop.
Hardware abstraction layer (HAL) independence	Retail versions of Windows Vista can be HAL-independent.
Offline image servicing	You can patch and service an offline image without creating a new image for distribution.
Scripting support in image creation	You can use scripting tools to create and edit images.
Unattend file manipulation	You can create and edit XML-based unattend configuration files for automating installation.
<b>Implementing the Deployment Process</b>	
Critical update installation	Add critical updates to the standard image at installation by using image-based setup.
In-place upgrade	You can upgrade the user's PC in place and upgrade data and settings. You do this by using a wipe-and-reload (clean install) of the operating system that stores existing data locally or remotely on a network share.
Multiple boot options	Boot from the network (PXE boot), CD, DVD, hard disk, or RAM disk.
PXE server support	Allows remote installations using the PXE boot process to install the operating system.
Scripting support	Enables administrators to script and automate large wipe-and-reload deployments, installations, and migrations.
Secure remote deployment	IT professionals can install the new desktop remotely.



## Deployment scenarios

Multiple deployment scenarios are possible, depending on the unique characteristics of the customer or original equipment manufacturer (OEM) environment. The following examples highlight some of the new capabilities enabled by Windows Vista, which can lower costs, reduce complexity, and expedite desktop deployment.

### New computer installation

1. The IT professional modifies the Windows Vista image using the desktop engineering tools so it has the necessary drivers and optional components.
2. The IT pro installs this image on a test PC along with other applications required by the business (such as the Microsoft Office system and a firewall), and the image is saved onto a network share or media (DVD/CD).
3. The end user can use the media to install Windows Vista or press F12 to enable a network boot.
4. The user is asked a few questions about the language of the installation and a few other questions used for personalization.

### Upgrade installation: wipe and reload

1. Follows the first two steps above.
2. The end user uses a media disk to install Windows Vista locally.
3. The user is not asked any questions, and the whole setup is done by migrating the user's data, settings, and applications over to the new Windows Vista desktop. In most cases, the old data is moved over to a network store, the local hard drive is formatted, and a new Windows Vista image is cleanly installed. The user data and settings are then put back onto the new Windows Vista desktop.

### Computer-to-computer deployment: migration

In a corporate scenario, the steps are the same as for an upgrade, except the data is gathered from the old machine and the new installation is done on the new system. The user is not asked any questions.

In an end-user scenario, the user can install Windows Vista on a new system and then migrate data and settings directly from the old computer to the new computer.

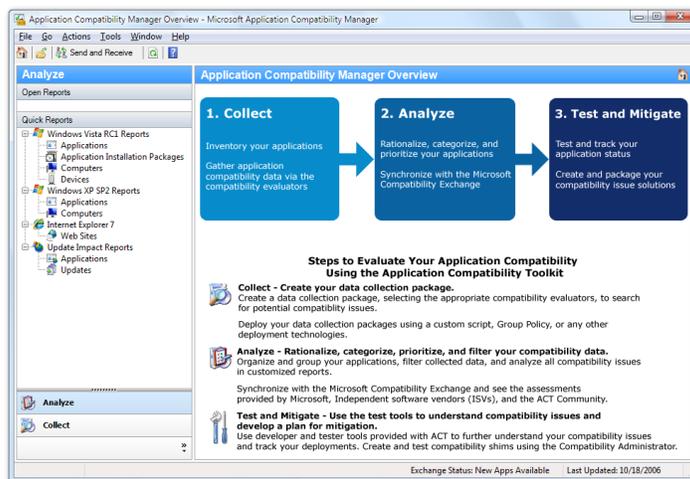
## 6.03 Application Compatibility



The increasing availability of applications from a wide variety of software manufacturers has created many new opportunities for using computers in our business and personal lives.

One of the most important questions faced by individuals and organizations when they deploy a new operating system is, “Will this new system be compatible with my current and planned software applications?” Application compatibility has been a major area of focus in the development of Windows Vista.

- **Designed for compatibility.** During the Windows Vista engineering process, Microsoft’s development teams tested more than 1,900 applications from over 250 independent software vendors (ISVs) against daily test builds of the operating system, ensuring the highest possible levels of compatibility. If an application-specific issue was discovered in testing, the engineering team was asked to immediately address it during Windows Vista development.
- **Responsive to security enhancements.** As security-enhancing changes were designed into Windows Vista, design changes were made to minimize the impact on application compatibility.



those needs:

- Windows Vista automatically helps you make basic compatibility-mode changes as needed through the Program Compatibility Wizard, The Program Compatibility Assistant, and the Program Compatibility Tab on the properties dialog of the application’s executable file.
- Microsoft’s Application Compatibility Toolkit 5 (ACT 5) release coincides with the release of Windows Vista. ACT 5 helps enterprise IT pros understand the company application portfolio, identify applications that need enhancements for Windows Vista compatibility, and create and deploy fixes for those applications.

### Improved application compatibility resources

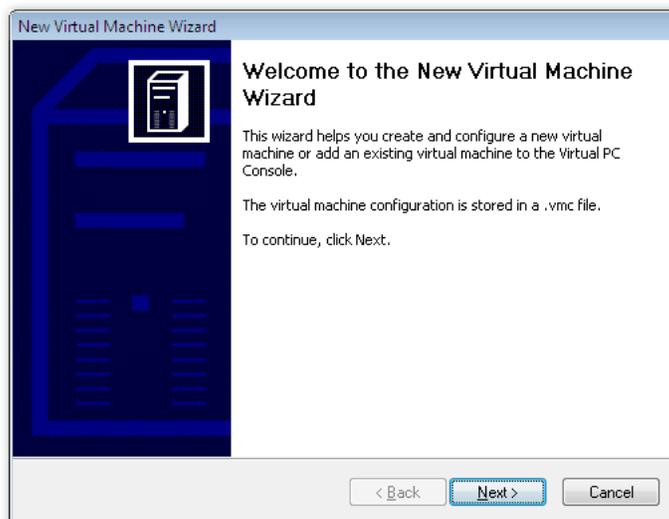
We know from customer feedback that the User Account Control (UAC) changes available with Windows Vista are extremely important for achieving a secure, stable, and compatible computing environment. However, some applications might still require changes to meet UAC compatibility requirements. With the following enhancements to Windows Vista, Microsoft has created an environment to assist with meeting

- Microsoft hosts an online Compatibility Exchange web service that provides application compatibility testing results from ISVs and customers. This online community provides results from thousands of application test efforts, giving you a large database of compatibility information to draw from when planning your own application compatibility testing.
- Microsoft offers excellent “bridging” technologies to assist you during the migration process. Using Microsoft’s Virtual PC 2007, Virtual Server, and Terminal Server environments, you can continue to run applications in legacy operating system environments, ensuring continued use of mission-critical applications.
- New deployment technologies and guidance such as Microsoft’s Solution Accelerator for Business Desktop Deployment (BDD) help you deploy applications faster and more cost-effectively.

## Application compatibility tools

Windows Vista ships with tools that help you save time and money when managing application compatibility and deploying Windows Vista.

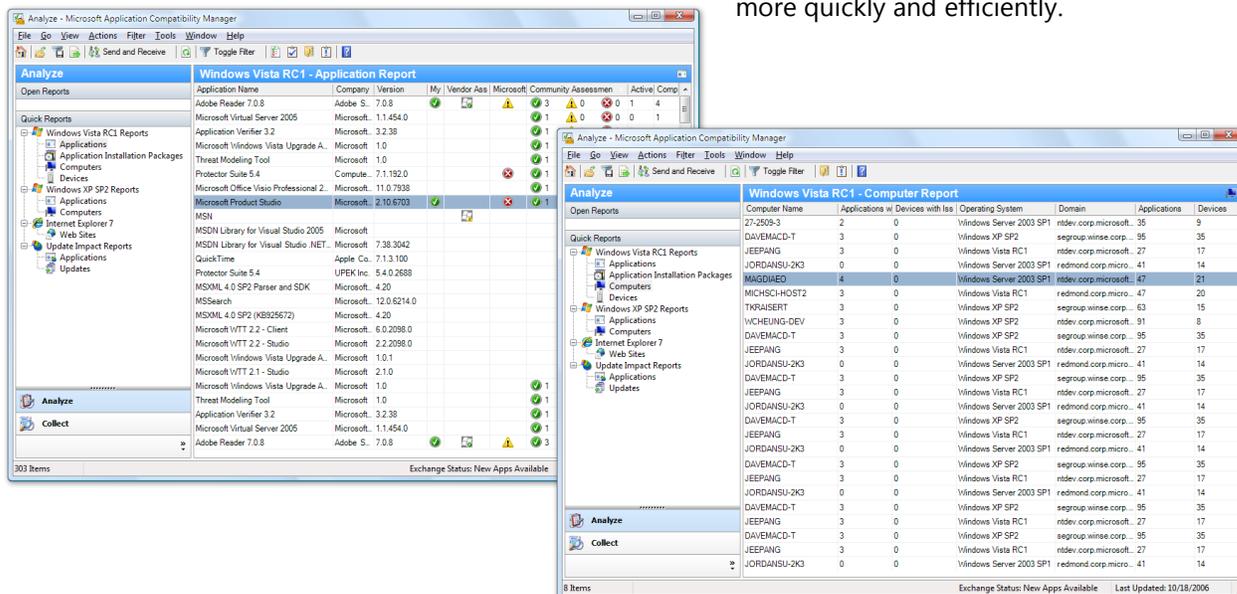
### Windows Vista Program Compatibility Wizard, Assistant, and Properties Tab.



These tools assist users by automatically setting an appropriate “compatibility mode” for applications that were designed for Windows XP. When Windows Vista detects an application that needs to run in a compatibility mode for Windows XP, it prompts you to run in the appropriate compatibility mode in Windows Vista.

## Windows Application Compatibility Toolkit 5

ACT 5 helps you prioritize application migrations and lower the cost of application compatibility testing specifically for Windows Vista. It can help you deploy Windows Vista more quickly and efficiently.



New features in ACT 5 include:

- **Windows Vista-specific evaluators.** A new Inventory Collector Evaluator, User Account Control Evaluator, Internet Explorer Evaluator, Deprecated Component Evaluator, and an Update Compatibility Evaluator that tests for possible compatibility issues during new deployments of service packs and/or hot fixes.
- **Configuration and data collection.** New features allow you to centrally control Evaluator configuration settings, set inventory parameters, do evaluator job scheduling, and gather runtime status information.
- **Data organizing features.** ACT 5 allows you to categorize your inventory, set prioritization, maintain status tracking, and include/exclude applications for review.
- **Issue resolution features.** You can automatically create and deploy mitigations to known application compatibility issues.
- **Data analysis features.** You can perform reporting and analyses, add additional custom issues and solutions to the database, and export reports to files.
- **Compatibility Exchange.** One-click posting capabilities enable customers and ISV partners to share information about application compatibility testing and upload the results of their compatibility testing to share with other IT professionals. You can filter the applications you want to share with the community, and your feedback will be combined with that of other community members to provide comprehensive compatibility ratings (including My Rating, Community Ratings, Microsoft Results, and Vendor Results).

## The importance of an application compatibility community

Giving customers and ISV partners the opportunity to share information about their experiences with application compatibility testing provides an invaluable resource for all participants. Microsoft has tested more than 1,900 applications on Windows Vista, but we cannot test all possible versions of applications that customers will want to use in their Windows Vista environment, so ISV and customer reporting is critical for creating a comprehensive list of applications supported on Windows Vista. Microsoft, ISVs, and customers can share experiences with other participants in the community, reducing the need for individual application compatibility testing.

### Microsoft involvement

Microsoft has enhanced the Application Compatibility Toolkit to allow customers to post results of their own application compatibility testing. Microsoft provides this information to the overall community through the automated web service that feeds ACT 5.

### ISV involvement

We ask ISVs to provide information on Windows Vista compatibility for multiple versions of their applications. ISVs can register their applications online for the Works With Windows Vista and Certified for Windows Vista Logos. This information is available to ACT 5 through the Compatibility Exchange. In addition, Microsoft provides testing results from customers, allowing ISVs to identify and correct potential Windows Vista compatibility issues early.

### Customer involvement

Customers gain the largest benefit from community membership by using available information to reduce the amount of application compatibility testing they need to do. In addition, customers can post the results of their own testing of ISV applications, which helps ISVs gain a better understanding of customer experiences. This cooperative effort will enhance the resolution of compatibility issues for the entire application compatibility community.

## Enterprise guidance to assist with application compatibility

### Known compatibility concerns

Understanding and anticipating application compatibility issues and using the information available to help you address these issues will enable you to plan for the scope of changes required in your application environment. Known application compatibility issues and resolutions in Windows Vista include:

#### Changes that occur between operating system releases

- **Operating system version checks.** Compatibility issues arising from changes to the operating system can be addressed by running applications in other operating compatibility modes within Windows Vista by using the Program Compatibility Wizard, Assistant, and Properties Tab.

#### Changes required for security reasons

- **Windows Resource Protection of system files and protected registry locations.** With newly protected system file and registry locations in Windows Vista, most applications that previously referenced these locations will automatically be redirected to temporary locations during that session. If your application data is trying to persist in protected system areas, you must modify those applications.
- **User Account Control and the ability to customize “standard user” scenarios.** Applications must support new standard user permissions in Windows Vista.
- **Running Internet Explorer in Protected Mode with more secure rights.** To protect the integrity of Windows Vista, Internet Explorer now operates with Standard user rights, typically not allowing access to system files. Internet and intranet applications may require modification to run in a more restrictive security scenario.

#### Operating system innovations

- **64-bit Windows Vista.** 16-bit applications and 32-bit drivers and extensions are not supported in the Windows Vista 64-bit environment. Automatic registry and system file redirection are not available for the 64-bit environment, so new 64-bit applications must adhere to new Windows Vista application standards.

#### New firewall and antivirus APIs

- **New system application programming interfaces (APIs)** expose the layers of the Windows Vista operating system for antivirus software and firewall manipulation. Applications that perform these functions need appropriate modifications using the new system APIs.

## Bridging technologies

Along with specific application compatibility tools and resources, you can use additional Microsoft solutions to “bridge” difficult application compatibility issues and help you with application migration and deployment. These solutions can help when you migrate to Windows Vista but still need to continue running business-critical applications that are not compatible with the new operating system.

### Virtual PC 2007

Virtual PC 2007 provides you with a safety net for operating system migration and a tool for more rapidly deploying Windows Vista. Virtual PC 2007 makes it possible to



simultaneously run multiple operating systems on a single PC. This allows you to migrate your computers to Windows Vista for a more secure and manageable experience, while keeping a previous Windows environment available to run non-compatible applications until developers can modify them. Virtual PC 2007 is freely available to all customers as of early 2007.

### Terminal Services for hosting applications

Hosting legacy applications on Terminal Server lets you deliver Windows-based applications, or the Windows desktop itself, to virtually any computing device on your network. Windows Vista-based computers can connect to these application-hosting environments through Remote Desktop to access legacy applications.

## Subsystem for UNIX-based Applications (SUA) (A feature of Windows Vista Enterprise)

SUA is a Windows component that provides platform services for UNIX-based applications. SUA is the next generation of Microsoft's Portable Operating System Interface (POSIX) subsystem, similar to the Interix subsystem that shipped with Windows Services for UNIX 3.5 and previous POSIX subsystems that shipped with Windows 2000 and Windows NT 4. This subsystem and its accompanying utilities provide customers with an environment that resembles any other UNIX system.

SUA eases integration between Windows and UNIX/Linux environments. IT professionals can use familiar UNIX-based tools and utilities on the Windows platform. SUA also helps with migration of UNIX-based applications to Windows by recompiling UNIX-based applications on Windows.

For customers interoperating with legacy UNIX systems, SUA helps overcome as many barriers as possible in moving workloads to the Windows platform.

Enhanced SUA functionality and new features include:

- 64-bit support (unlike previous POSIX subsystems).
- Support for connectivity to Oracle and Microsoft SQL Server from database applications, through the Oracle Call Interface (OCI) and the Open Database Connectivity (ODBC) standard.
- Support for two UNIX environments: SVR-5 and BSD.
- SUA is optional in Windows Vista Enterprise.
- Additional utilities and a software development kit (SDK) are available as a web download.

## The Microsoft Solution Accelerator for Business Desktop Deployment

The Microsoft Solution Accelerator for Business Desktop Deployment (BDD) delivers end-to-end guidance for efficient planning, building, testing, and deployment of Windows Vista and the 2007 Microsoft Office system, including planning and testing for application compatibility.

The Solution Accelerator for BDD contains guidance, sample templates, and technology files that thoroughly explain each deployment process.

The guidance is structured according to the feature teams and processes shown here.



## Microsoft Desktop Optimization Pack for Software Assurance

Microsoft Desktop Optimization Pack for Software Assurance is a dynamic desktop solution available to Software Assurance customers, which reduces application deployment costs, enables delivery of applications as services and allows for better management and control of enterprise desktop environments. Individual components of the pack can help enterprises with solutions to their application compatibility challenges.

- Microsoft SoftGrid transforms applications into virtualized, network-available services. This results in the dynamic delivery of software that is never installed and never conflicts, reducing costly application compatibility testing. It enables IT to be flexible and responsive to business needs, and reduces the cost of server management.
- Microsoft Asset Inventory Service delivers an intelligent and comprehensive view of your enterprise's desktop software environment. It helps reduce total cost of ownership of your application management lifecycle through advanced software inventory scanning. The service translates inventory data into useful, actionable information for identifying and solving application compatibility problems.
- The Microsoft Desktop Optimization Pack for Software Assurance also contains Microsoft Advanced Group Policy Management and Microsoft Diagnostics and Recovery Toolset.



To learn more about Software Assurance, please turn to [7.04 Desktop Optimization Package for Software Assurance](#)

### Application Compatibility—Key Features

Feature	Brief Description
Automatic system file and registry redirection	Applications that use system and registry resources that are protected in Windows Vista are automatically redirected to temporary locations, allowing applications to continue to execute.
Program Compatibility Assistant	Automatically detects and changes application runtime variables to allow programs to run in Windows XP operating system compatibility mode.
Program Compatibility Properties Tab	Enables a user to set specific application compatibility fixes on the application to solve compatibility issues.
Program Compatibility Wizard	Enables a user to explore and troubleshoot compatibility problems by applying one of many known fixes to get the application working on Windows Vista.

### Application Compatibility Resources for Use with Windows Vista

Resource	Brief Description
Application Compatibility Evaluation Guide	Takes IT professionals through the process of testing applications in their own organization.
Application Compatibility Resource Guide	Identifies all available resources to the IT pro, developer, and partner communities by audience type and assists them in finding the appropriate resources for their purposes.
Application Compatibility Toolkit 5 (ACT 5)	Assists IT professionals and developers in identifying applications in their organization that might need modifications to run compliantly on Windows Vista.
Bridging technologies: Virtual PC 2007 Virtual Server Terminal Services	Bridging technologies provide alternative ways to run non-Windows Vista-compatible applications in a Windows Vista client environment. Each technology offers a different kind of assistance to help you create the most appropriate bridge when migrating to Windows Vista.
Developer guidance and documentation	The Application Compatibility Cookbook provides developers with specific how-to scenarios for migrating applications to run on Windows Vista and guidance on compatibility issues.
IT pro guidance and documentation	Application compatibility information and resources are available to IT pros to help them manage the migration and deployment of Windows Vista through Microsoft TechNet.
Solution Accelerator for Business Desktop Deployment (BDD)	Delivers end-to-end guidance for efficient planning, building, testing, and deployment of Windows Vista and the 2007 Office system, including planning and testing for application compatibility.

## 6.04 Management

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Windows Vista offers many new and improved management and troubleshooting features that help you:

- Reduce the cost of desktop support
- Simplify desktop configuration management
- Enable better centralized management of the desktop
- Decrease the cost of keeping systems updated

### Reducing desktop support costs

Reducing the cost of servicing the desktop was a key focus in the design and development of Windows Vista. The first step in reducing support costs is to reduce the number of support incidents. Windows Vista includes built-in diagnostics that automatically detect and diagnose common support problems and help users resolve the problems on their own. Problems that Windows Vista diagnostics address include failing disks, degraded performance, lack of network connectivity, and failure to shut down properly.

Information technology (IT) departments can add custom content to User Assistance—the version of Help files in Windows Vista—to provide answers to questions about custom applications and internal network resources. User Assistance can also be customized to link users directly to an internal support center.

Remote Assistance, first included with Windows XP, enables support center personnel to resolve problems more quickly by viewing and controlling a user's computer across the network. Windows Vista offers several significant advances that make Remote Assistance even more effective: it is faster, uses less bandwidth, and can function through Network Address Translation (NAT). In Windows Vista, many aspects of Remote Assistance can be configured via Group Policy.

Performance problems are among the most complex and time-consuming issues to troubleshoot. To reduce the time spent on such issues, Windows Vista provides new performance counters and an improved Performance console that offers more detailed information. These tools give support personnel detailed insight into the inner workings of Windows Vista which they can use to isolate complex, persistent problems that might otherwise remain unresolved.

Improvements to the Windows Eventing infrastructure make the Windows Vista desktop easier to manage and monitor, and they provide better information for troubleshooting. Strict standards ensure that events are meaningful, actionable, and well-documented. Windows Vista features a unified event log, so a support professional can view all the operational information about a machine from a single Event Viewer. Many Windows components that stored logging information in text files in previous versions of Windows now create events via the Windows Eventing infrastructure so their logged events are accessible via the Windows Vista Event Viewer. With event forwarding, administrators can centrally manage events from anywhere on the network, making it easier to proactively identify problems and to correlate problems that affect multiple computers.



To learn more about Remote Assistance, please turn to [3.22: Windows Update](#) on page 133.

Finally, the Event Viewer has been completely rewritten to allow users to create custom views that combine events from individual logs, discover events more easily, and perform basic diagnostic tasks. This input makes it much more practical for administrators to use the event log to troubleshoot users' problems.

## Simplifying desktop configuration management

One of the best ways to minimize desktop support costs is to maintain a secure, stable desktop configuration. However, desktop configuration management can itself be a significant challenge. Windows Vista includes several important features to improve the stability of enterprise desktop configurations and reduce the expenses related to maintaining those settings.

One of the most significant Windows Vista innovations is User Account Control (UAC). UAC makes it more practical for IT organizations to create users without administrative privileges by allowing users with standard user accounts to run most applications and perform the most common system configuration tasks. Limiting the use of administrator accounts to true IT administrators helps prevent users from making unauthorized system changes or installing unapproved programs that may contain a virus or spyware.

Windows Resource Protection (WRP) provides additional protection from potentially dangerous system configuration changes:

- It protects system registry settings from accidental changes made by the user and changes made by unauthorized software.
- It protects system files and settings from changes initiated by any process other than the Windows trusted installer.

Managing desktop settings with Windows Vista takes less time because more settings are configurable using Group Policy. Areas in which richer settings are available in Windows Vista include wireless networking, removable storage devices, Internet Explorer, printers, and power management.

Many IT professionals are already familiar with the Microsoft Group Policy Management Console (GPMC), a must-have tool for managing Group Policy objects (GPOs) in Active Directory domain environments. GPMC is integrated into the Windows Vista operating system, so administrators do not have to download and install it each time they need to manage GPOs on a different computer. Windows Vista also supports multiple local GPOs, enabling administrators to specify different policies for different users on a single Windows Vista computer that is not part of an Active Directory domain. This feature improves security and manageability in shared-use environments such as libraries and schools. The updated Network Location Awareness service in Windows Vista is used by Group Policy to more reliably apply policy updates.



To learn more about User Account Control, please turn to [3.08: Security](#) on page 72.

## Increasing automation

Windows Vista greatly increases the IT administrator's ability to automate tasks, reducing the time needed to manage the desktop and decreasing the likelihood of manual errors.

Task Scheduler is much more powerful in Windows Vista than in earlier versions of Windows. Task Scheduler can still be used to launch tasks at specific times or when the computer starts up, and it is entirely backward-compatible with Windows XP. With the new Windows Vista Task Scheduler, IT professionals can also schedule tasks to launch in the following situations:

- **When a specific event occurs, such as insufficient disk space.** Administrators can use Task Scheduler to notify the support center of problems or even automatically resolve common issues.
- **When a user locks or unlocks their session.** Administrators can use Task Scheduler to launch a script or application every time the user locks their workstation.
- **When the computer is idle.** Administrators can use Task Scheduler to run maintenance tasks such as defragmenting the hard disk or backing up the computer when it is not in use.

Additionally, tasks can be run in sequence, enabling administrators to schedule multiple tasks with the confidence that the tasks will not run simultaneously. To improve security and reduce maintenance related to password expirations, you can store credentials for the accounts used to run a task in the Active Directory domain rather than on the local computer, where they are more vulnerable to attack.

Windows Remote Management also makes Windows Vista easier to manage remotely. Windows Remote Management is Microsoft's implementation of the Web Services for Management (WS-Management) standard, an industry-standard web services protocol for protected remote management of hardware and software components. WS-Management—along with the proper software tools—allows administrators to remotely run scripts and perform other management tasks. Communications can be both encrypted and authenticated, limiting security risks. Microsoft management tools such as System Center Configuration Manager (formerly called Systems Management Server, or SMS) use WS-Management to provide safe and secure management of both hardware and software.

Microsoft Management Console (MMC) is a framework for administrative tools that is used by Microsoft Windows 2000, Windows Server 2003, Windows XP, and Windows Vista. Windows Vista includes several improvements to MMC that make administrative tools easier to use. First, Windows Vista allows administrators to run multiple tasks in parallel, keeping administrative tools responsive even after launching a complex or slow management task. Instead of requiring administrators to right-click objects, a separate action pane shows them exactly what they can do with any particular object. MMC makes life easier for developers, too, which means that more non-Microsoft applications are likely to use the MMC framework.

## Reducing update management costs



To learn more about Windows Update, please turn to [3.22: Windows Update](#) on page 133.

It is critical to keep current with software updates, but update management can be costly, time-consuming, and disruptive to IT professionals and end users. Windows Vista addresses these concerns by simplifying the process of deploying updates, providing administrators with the ability to track successful and unsuccessful updates and including enhancements to the Windows Update Agent (WUA).

Windows Vista also includes platform technology that can be used to help prevent system restarts or reduce the impact of restarts when they cannot be avoided. This new technology is used by Microsoft Windows Installer 4.0, so adding or removing applications packaged as MSI files is less likely to require a system restart. Some applications, including key 2007 Microsoft Office system applications, also use this technology to automatically save and restore application state after a restart due to an installation or an update.

Thanks to the new Windows Imaging Format (WIM), updates and patches can be more easily applied to an organization's images as well. Rather than needing to deploy an image, apply the patch, and then recapture the image, IT professionals can simply apply the patch directly to the image.

Windows Server Update Services (WSUS), a new version of Software Update Services (SUS), also helps improve update management. Administrators can use WSUS to more easily review the new updates that are available and assess whether these updates are needed in their environments. For environments that use Automatic Updates, administrators can use WSUS to deploy all updates. With previous versions of Windows, only critical updates can be deployed using the Automatic Updates feature.

The Windows Update Agent (WUA) is now a standalone application that can download updates either directly from Microsoft or from an internal WSUS server. Because the WUA provides a single interface for updates downloaded from Microsoft or from an internal enterprise server, users do not have to learn how to use two separate tools.

### Management—Key Features

Feature	Brief Description
Drivers	Improved driver detection—leveraging Plug and Play (PnP) constructs—supports the growth of .exe-based driver installs and improves multi-function driver support.
Enhanced Event Viewer	Enhanced Event Viewer has discovery, customer view, configuration, and diagnostic capabilities.
Event Viewer: Event forwarding	Allows event forwarding and collection from multiple computers to a central location.
Event Viewer: Reading	Provides framework for reading private logs and event files.
Group Policy–enabled features	More policy settings, covering new Windows Vista features and enhanced policies in key areas of customer need (such as writeable devices).
Group Policy Management Console (GPMC) integration	The GPMC tool is included as part of Windows Vista.
Health and Monitoring Model	Ensures that all events raised are meaningful and actionable, through standard event schemas and prescriptive guidelines.
Instrumentation: Performance counters	Provides and accesses performance counters.

Feature	Brief Description
MMC: Consistent administrative experience	Improves discoverability of actions on the actions pane; updates the Add/Remove dialog box.
MMC: Simplified developer experience	Provides an intuitive managed code framework that reduces and simplifies the task of developing snap-ins.
Multiple local Group Policy objects (LGPOs)	Improves security in shared-use environments, such as schools and libraries.
Network Location Awareness Service	Service that provides system-wide benefits including more reliable and robust application of Group Policy settings.
Performance monitoring	Provides secure and consistent logging, scheduling analysis, and reporting. Also provides a better user experience, with the ability to compare performance data.
Task Definition Wizard	Part of the Task Scheduler user interface. Allows tasks to be set up with just a few clicks.
Task Scheduler: Core jobs scheduling service	Provides jobs triggered on schedule, once or recurring, in specified credentials.
Task Scheduler: Credentials management improvements	Uses Service-for-User (S4U) Kerberos extensions to prevent storage of credentials locally. This improves security and ensures that scheduled tasks are not affected by password expiration policies.
Task Scheduler: Event-based activation	Adds event triggering capability. Provides ability to serially run a series of actions with a common trigger.
Windows Eventing infrastructure	Provides event publication capabilities and APIs. Capabilities include logging, filtering, notifications, processing of events in service, log maintenance and archiving, and remote operations.
Windows Remote Management/Web Services for Management (WS-Management)	Microsoft's implementation of the WS-Management standard, allows remote access to capabilities for the client API via SOAP/Global XML Web Services Architecture (GXA). Uses SOAP-structured requests to directly access providers.
Windows Resource Protection (WRP): System file protection	Offers protection against undesirable changes to key system components.
Windows Update Agent (WUA): Consistent update experience	Allows browsing of updates published on the update server in the same manner in which users can browse updates on the Windows Update website.
WRP: Registry protection	A new management facility in the registry prevents vital areas from being corrupted.
WUA: AutoUpdate everything	Allows all updates (even noncritical ones) to be distributed from the update server through the AutoUpdate mechanism. Machines stay up-to-date with little or no end-user intervention.
WUA: Beta updates	Allows users to browse beta updates through the Windows Update application.
WUA: Network quarantine integration	Supports distribution of updates in a quarantined network.

## 6.05 Advanced Security

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Building on the security advances in Microsoft Windows XP Service Pack 2, Windows Vista includes fundamental architectural changes that provide customers with better protection from evolving threats, including worms and other types of malicious software. Windows Vista was designed and developed using Microsoft's Security Development Lifecycle (SDL), a rigorous process that helps significantly reduce the number and severity of security-related design and coding defects. These improvements minimize the operating system's attack surface area, which in turn improves system and application integrity and helps organizations more securely manage and isolate their networks.

In addition, Windows Vista includes new features and functionality that provide layered defenses against malware threats, intrusions, and data breaches. This approach incorporates prevention to block attacks; isolation to limit damage potential; recovery to get affected users back to a "healthy" state; and identity and access control to allow only legitimate users to access devices, applications, and data.

Windows Vista is also supported by Windows Update, Automatic Updates, Microsoft Updates, and a Software Update Validation program that provides rigorous testing of updates before they're released to customers. Windows Vista is engineered to support future Common Criteria requirements to achieve Evaluation Assurance Level 4 certification and Federal Information Processing Standard 140-2 evaluation.

Information for information technology (IT) pros about the security advances in Windows Vista is organized into three sections below: protecting against threats and vulnerabilities, enabling more secure access to information, and protecting data from unauthorized viewing.

### Protecting against threats and vulnerabilities

IT departments and individual users spend significant time and resources trying to solve problems caused by malware and trying to detect and prevent problems before they occur. Windows Vista includes powerful features that help you prevent, detect, and remove malware before it causes problems, leading to improved computer performance and security and fewer support calls.

### Spyware and potentially unwanted software

Windows Defender (formerly known as Microsoft AntiSpyware) is a tool to help detect, clean, and provide real-time blocking of spyware and other potentially unwanted software. In addition, during an upgrade or migration to Windows Vista, the operating system uses the default signature for Microsoft's Malicious Software Removal Tool to help detect and remove viruses and other types of malicious software. After setup has been completed, users can download and run this tool at any time from [www.microsoft.com/security](http://www.microsoft.com/security), or they can download it on a monthly basis with Automatic Updates. (Note: This functionality is not a substitute for running antivirus software.) For details on Microsoft Forefront Client Security, Microsoft's anti-malware solution for businesses, see [www.microsoft.com/forefront/clientsecurity/default.aspx](http://www.microsoft.com/forefront/clientsecurity/default.aspx).



To learn more about Windows Defender, please turn to [3.09: Windows Defender](#) on page 82.

## Personal firewall

One of the most important ways IT departments can mitigate security risks is by limiting the applications that can access the network. The personal firewall built into Windows Vista is an important part of this strategy. The personal firewall is on by default and now offers bi-directional traffic filtering. With the personal firewall, administrators can allow an application to run locally on computers but prevent it from communicating across the network.

For example, Windows Firewall in Windows Vista allows administrators to block applications such as media applications from contacting or responding to other computers. The applications can be used to play music or videos on a local machine, but they are blocked from accessing content on the Internet. In addition, the Windows Vista firewall settings are configurable by Group Policy objects to simplify manageability and provide enterprise control.

## Windows Service Hardening

The personal firewall works closely with a new platform initiative called Windows Service Hardening, which helps prevent critical Windows services from being used for abnormal activity in the file system, in the registry, or on the network. Windows Firewall supports both inbound and outbound filtering and is used to enforce the Service Hardening network rules. In addition, services can be limited to writing only to specific areas of the file system or the registry based on access control lists (ACLs). This helps prevent a compromised service from changing important configuration settings in the file system or registry or infecting other computers on the network. For example, the Remote Procedure Call (RPC) service can be restricted from replacing system files or modifying the registry.

## Network Access Protection (NAP)

The NAP client in Windows Vista helps to allow an organization to establish requirements for client health status—such as software update state and up-to-date virus scanner signatures—and to check those requirements when the client connects to the network. If a client does not meet the health requirements, it is not allowed on the network.

## Integrated IPSec/firewall management

In Windows Vista, Internet Protocol Security (IPSec) and firewall management are integrated in a single console, known as Windows Firewall with Advanced Security. This console centralizes inbound and outbound traffic filtering along with IPSec server and domain isolation settings in the user interface, enabling increased visibility of security settings.



To learn more about IPSec, please turn to [6.06: Advanced Networking](#) on page 256.

## Enhanced security for web browsing

Security advances in Microsoft Internet Explorer 7 in Windows Vista were designed with two primary security goals in mind: protecting users against malware and safeguarding their personal data.

- **Malware protection.** Internet Explorer 7 has been significantly “hardened” to help prevent attempts to execute malicious software on a user’s machine. For example, a consolidated URL parser minimizes the potential for parsing or buffer overflow attacks. Cross-domain scripting controls limit exploits in which a script from one Internet domain manipulates content in another domain. Internet Explorer 7 also introduces a new security mechanism called ActiveX Opt-In, which helps prevent unintentional exposure of ActiveX controls that were preinstalled on a user’s machine but have not previously been enabled. ActiveX Opt-In greatly reduces the attack surface by prompting users to permit or deny access to an as-yet unused ActiveX control when viewing unfamiliar websites.

Internet Explorer 7 also has a feature called Protected Mode (available only with Windows Vista) that helps protect users from malicious downloads by restricting the ability to write to any local machine zone resources other than temporary Internet files. In Protected Mode, Internet Explorer 7 cannot modify user or system files and settings without user interaction. All communications occur via a broker process that mediates between the Internet Explorer browser and the operating system. The broker process is initiated only when the user clicks Internet Explorer menus and screens. Protected Mode helps prevent scripted actions or automatic processes from downloading data or affecting the system. Internet Explorer Protected Mode also offers tabbed browsing security protection by opening new windows—rather than new tabs—for content contained outside the current security zone.

- **Protection against data theft.** Internet Explorer 7 offers a number of important enhancements to help protect users’ personal information and data:
  - **Security Status Bar:** This feature helps users quickly confirm authentic websites by providing clear and prominent visual cues about a site’s safety and trustworthiness (such as improved visibility of the secure site lock icon and verification of the site certificate).
  - **Phishing Filter:** The Phishing Filter in Internet Explorer 7 helps users browse more securely by advising them about suspicious or known phishing websites.
  - **Address Bar everywhere:** With Internet Explorer 7, all browser windows require an Address Bar. Because hackers have often abused valid pop-up window actions to display windows with misleading graphics and data as a way to convince users to download or install malware, requiring an Address Bar in each window ensures that users know more about the true source of the information they are seeing.
  - **Delete Browsing History:** In the past, users had to separately delete history information, clean the cache, erase automatically completed form history, and clear the Start/Run history. The Delete Browsing History option provides users with one-click cleanup that instantly erases the history of their browser use and any personal data.



To learn more about these security features, please turn to [3.07: Internet Explorer](#) on

## 64-bit protection

The 64-bit editions of Windows Vista tap into security features of the latest 64-bit processors to provide an enhanced layer of hardware protection against some of the most destructive worms and exploits.

### Data Execution Prevention (DEP)

Buffer overflow exploits have proved very harmful to Windows in the past several years. A buffer overflow happens when an area of memory (a buffer) expects to have a maximum amount of data but is given more and doesn't handle it correctly. For example, if your email client is designed to handle attachments with a maximum of 255 characters in their filename and you receive an attachment with a 256-character filename, a buffer overflow can occur. When this happens, adjacent memory space is overwritten and malicious code can end up being executed. The infamous MSBlaster worm was this type of exploit.

The 64-bit editions of Windows Vista work with the 64-bit processor's DEP feature to help protect computers against buffer overflow attacks. (Note that some 32-bit processors also contain built-in hardware support for DEP and that the 32-bit editions of Windows Vista will support DEP on such 32-bit processors.) While DEP is by no means a substitute for a well-designed and well-implemented antivirus and anti-malware deployment, it is an important additional layer of protection that might well have prevented the spread of the MSBlaster worm had it been widely implemented at the time.

### Kernel patch protection

The 64-bit versions of Windows also support kernel patch protection technology, which helps prevent programs from patching the Windows kernel. Kernel patch protection improves the reliability of Windows by helping to disable undocumented and unsupported kernel hooks. Undocumented kernel hooks can cause reliability and performance issues and can add potential security issues to the system as well.

### Driver signing

To give users visibility into the source of drivers and other software running in the operating system kernel, Microsoft introduced the concept of "signed drivers" beginning with Windows 2000. Although it was possible to prevent unsigned drivers from installing, the default configuration only warned users if they were about to install an unsigned driver. IT administrators could also block installation of unsigned drivers via Group Policy, but the large installed base of unsigned drivers made this impractical in most situations. Malicious kernel software typically tries to install silently, with no user consent—and because no kernel load-time check existed before Windows Vista, malicious kernel software was likely to run successfully, assuming these actions were performed by a user with administrative privileges.

With Windows Vista on 64-bit systems, security at the kernel level has been greatly enhanced by requiring that all kernel-mode drivers be digitally signed. Digital signing provides identity as well as integrity for code. A kernel module that is corrupt or has been subject to tampering will not load. Any driver that is not properly signed cannot enter the kernel space and will fail to load.

Although a signed driver is not a guarantee of security, it does help identify and prevent many malicious attacks while allowing Microsoft to help developers improve the overall quality of drivers and reduce the number of driver-related crashes.

Mandatory driver signing also helps improve the reliability of Windows Vista because many system crashes result from vulnerabilities in kernel-mode drivers. Requiring the authors of these drivers to identify themselves makes it easier for Microsoft to determine the cause of system crashes and work with the responsible vendor to resolve the issue.

System administrators also benefit from digitally signed and identified drivers because they get additional visibility into software inventory and install state on client machines. From a compatibility perspective, existing Windows Hardware Quality Labs–certified x64 kernel drivers are considered validly signed in Windows Vista.

### Protecting Against Threats and Vulnerabilities—Key Features

Feature	Brief Description
<b>Spyware</b>	
Windows Defender	Scanning and real-time blocking of spyware and other potentially unwanted software.
<b>Personal Firewall</b>	
Outbound filtering	Filters outbound as well as inbound traffic.
<b>Windows Service Hardening</b>	
Windows Service Hardening	Allows each service to be associated with a write-restricted token that limits the file, registry, and network access allowed to what is legitimately required for the service's operation.
<b>Network Access Protection</b>	
Network Access Protection (NAP) Client Agent	Contains the system health agents used to declare health in areas such as patch state, virus signature, and system configuration, along with a quarantine agent that reports client health status and coordinates between the system health agents and the server-based quarantine enforcement service.
<b>Integrated IPSec/Firewall Management</b>	
Full support for Internet Protocol version 6 (IPv6)	Configures IPv6 via the user interface and Group Policy objects (GPOs).
Windows Firewall with Advanced Security	Centralizes inbound and outbound traffic filtering in the user interface, providing increased visibility to security settings.
<b>Enhanced Security for Web Browsing—Malware Protection</b>	
ActiveX Opt-In	Prompts the user before an ActiveX control is executed for the first time.
Protected Mode	Restricts Internet Explorer to writing to only the Temporary Internet Files directory in the Internet zone.
<b>Enhanced Security for Web Browsing—Protection Against Data Theft</b>	
Phishing Filter	Warns users if they attempt to navigate to a site that is referenced by a TCP/IP address or other type of suspicious URL, such as one with special characters in it. Also performs a check for reported phishing sites against a live service when the user navigates to a page.
Delete Browsing History	Clears all cached data (including history, browser cache, and forms data) with one click.
Security Status Bar	Highlights the Address Bar when a user is on a secure site and lets the user easily check the validity of a site's security certificate.
<b>64-bit Protection</b>	
Data Execution Prevention	Blocks unwanted code from executing when it overruns memory.
Kernel patch protection	Blocks unauthorized programs from extending or replacing parts of the Windows kernel.
Signed kernel-mode drivers	Windows requires developers to sign kernel-mode drivers to provide better

reliability and help identify driver authors

## Enabling more secure access to information

To help IT professionals authenticate users and control access to devices, applications, and data, Windows Vista includes a number of significant advances, including the following.

### User Account Control

User Account Control (UAC) in Windows Vista increases security and improves total cost of ownership (TCO) by enabling Windows to be deployed without administrator privileges. Standard users can now perform more tasks and enjoy higher application compatibility. This helps reduce the impact of malware, the installation of unauthorized software, and unapproved system changes.

In Windows Vista, there are two types of users by default: standard users and administrators. Standard users cannot install most applications, change system settings, or perform other administrative tasks on their own. When a standard user attempts to perform a task that requires administrator rights, the user is either notified that the task is prohibited or that administrative credentials are required to proceed (depending on how UAC is configured). In the latter case, if the user can have an administrator provide valid credentials, privileges are elevated for just long enough to complete the task.

To address the frustration that many standard users have felt in the past, Windows Vista provides them with additional privileges so they can perform common tasks. These privileges have been chosen due to their minimal potential for risk, although administrators can still restrict these privileges if they prefer.

New permissions for standard user accounts include viewing the system clock and calendar, changing the time zone, installing Wired Equivalent Privacy (WEP) to connect to secure wireless networks, creating and configuring a Virtual Private Network (VPN) connection, and installing approved devices and ActiveX controls. Additionally, disk defragmentation is now an automatically scheduled process that users no longer need to initiate.

Many legacy applications that did not run for standard user accounts on Windows XP can run without modification on Windows Vista because of the file and registry virtualization capabilities. Today, many applications break for standard users because they attempt to write to protected areas of the file system and registry that the standard user does not have access to. Windows Vista will improve application compatibility for these users by redirecting writes (and subsequent file or registry operation) to a per-user location within the user's profile.

Windows Vista also offers a new level of protection for administrators, called Administrator Approval Mode. Under normal conditions, administrators run with the same privileges as standard users. When the user attempts to perform a task that requires administrative rights, the user is prompted for consent and can make an informed decision about whether to proceed, in which case privileges are elevated on-the-fly.

### Authentication

Passwords are currently the most popular method of authentication. However, this type of single-factor authentication has many limitations. A short, easy-to-remember password can easily be determined by an attacker. And longer, more complex passwords are difficult to remember and are often written down by users. Windows Vista introduces a

revised architecture for adding alternative authentication methods, such as biometrics or tokens. The Winlogon re-architecture allows independent software vendors (ISVs) and organizations to implement their own authentication methods, such as biometrics or tokens, by writing credential providers. The credential provider model is much simpler than Graphical Identification and Authorization (GINA) replacement, and multiple providers can function side-by-side.

### **Authorization**

To help ensure that only authorized users have access to sensitive data and to maintain control over intellectual property, Windows Vista provides enhanced rights management capabilities. Developers will find support for Extensible Rights Markup Language (XrML) to express rights and conditions associated with digital content.

### **Granular auditing**

The auditing capabilities of Windows Vista make it easier to track what users do. Auditing categories now include multiple subcategories, reducing the number of irrelevant events. An IT pro can subscribe to audit events from a separate machine, allowing the events to be collected in a central location for analysis.

### **Credentials management**

The management of credentials (such as passwords and certificates) and hardware (such as smart cards that hold credentials) is a challenge for many organizations. Windows Vista includes new tools to help support credentials management for roaming users, including the new Digital Identity Management Service (DIMS) and a new certificate enrollment process. Smart cards are easier to deploy with new smart-card management resources such as a self-service personal identification number (PIN) reset tool. Smaller businesses and consumers can now back up and restore the credentials stored in the Stored User Names and Passwords key ring.

### **Cryptography services**

Cryptography is a critical component of Windows authentication and authorization services. Windows Vista delivers Crypto Next Generation (CNG) services, which was requested by many governments and organizations. In its initial release, CNG allows new algorithms to be added to Windows for use in Secure Sockets Layer/Transport Layer Security (SSL/TLS) and IPsec. Windows Vista also includes a new security processor to enable trust decisions for services such as rights management.

## Enabling More Secure Access to Information—Key Features

Feature	Brief Description
<b>User Account Control</b>	
Administrator Approval Mode	Creates a full-privilege “administrator” token and filters out administrative rights and groups to derive a second “standard” token when a user with elevated privileges does an interactive logon. This standard user token is used to start the desktop and other applications by default.
Consent/credential prompt	Launches on the secure desktop to get consent or credentials from the user to launch the application with full, administrative-level privileges.
File and registry virtualization	Redirects per-machine files and registry writes to the user’s profile on failure. Redirects reads to look in the virtualized/ per-user location first and to check the per-machine location second. Intended to allow legacy applications to run without administrative privileges.
Shield UI for elevation	The shield icon is used throughout the user interface (UI) to denote an operation for which the user must supply administrator credentials. Standard users can unlock administrative functions without logging off by entering administrator credentials.
<b>Authentication</b>	
Kerberos and protocol enhancements	Supports new usage scenarios as well as improved performance and supportability, WS-* (web services standards) support, and full support for IPv6.
Winlogon re-architecture	Allows ISVs and organizations to implement their own authentication methods, such as biometrics or tokens, by writing credential providers. The credential provider model is much simpler than Graphical Identification and Authorization (GINA) replacement. Not only are credential providers much easier to write than GINA replacements, but multiple providers can also exist side-by-side.
<b>Authorization</b>	
Authorization Manager	Offers enhanced control over roles, definitions, and role assignments and significantly increases scalability and performance.
XrML	Supports XrML 2.0 and XrML 1.2 which are used to express rights and conditions associated with digital content.
<b>Credentials Management</b>	
Credential Manager enhancements	Backs up and restores a user’s credentials.
Digital Identity Management Service (DIMS)	Provides certificate and credential roaming within an Active Directory forest and end-to-end certificate lifecycle management scenarios.
Smart card management	Supports additional scenarios including domain join.
X.509 enrollment	Provides rewritten enrollment process with rich developer application programming interface (API) classes and a rich user experience.
<b>Cryptography Services</b>	
Crypto Next Generation (CNG)	Within the cryptographic infrastructure, provides APIs and infrastructure to allow new algorithms or algorithm implementations to be easily added to the system. CNG supports SSL/TLS and IPSec, with other scenarios such as Secure/Multipurpose Internet Mail Extension (S/MIME) and the Encrypting File System (EFS) possible in the future.

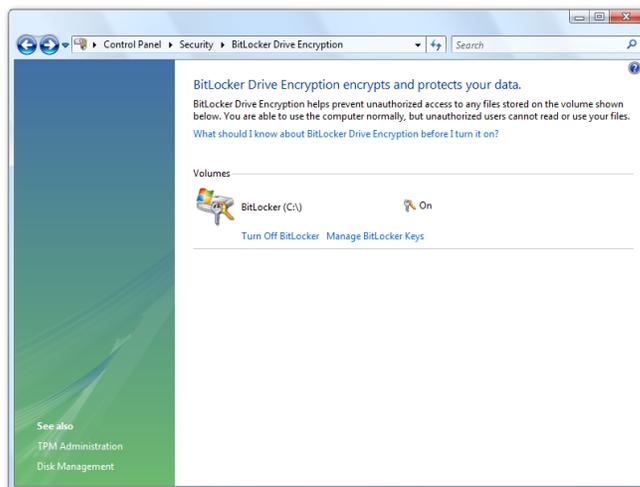
Feature	Brief Description
Smart card infrastructure	Provides a common cryptographic service provider (CSP) for all card types by means of a common card module; supports domain join.

## Protecting data from unauthorized viewing

To help IT managers maintain the integrity of devices and data, Windows Vista includes a number of new capabilities, including the following.

### Windows BitLocker Drive Encryption

BitLocker Drive Encryption is a data protection feature available in Windows Vista Enterprise and Ultimate editions for client computers and in Windows Server "Longhorn." BitLocker is Microsoft's response to one of our top customer requests: address the very real threats of data theft or disclosure from lost, stolen, or inappropriately decommissioned PC hardware with a tightly integrated solution in the Windows operating system.



BitLocker helps prevent a thief who boots another operating system or runs a software hacking tool from breaking Windows Vista file and system protections or performing offline viewing of the files stored on the protected drive.

The feature ideally uses a Trusted Platform Module (TPM 1.2) to protect user data and to help ensure that a PC running Windows Vista has not been tampered with while the system was offline. BitLocker provides both mobile and on-site enterprise information workers with enhanced data protection

should their systems be lost or stolen as well as enables secure data deletion when it comes time to decommission those assets.

BitLocker enhances data protection by bringing together two major sub-functions: drive encryption and the integrity checking of early boot components. Drive encryption protects data by preventing unauthorized users from breaking Windows file and system protection on lost, stolen, or inappropriately decommissioned computers. This protection is achieved by encrypting the entire Windows volume; with BitLocker all user and system files are encrypted, including the swap and hibernation files.

Integrity checking the early boot components helps to ensure that data decryption is performed only if those components appear unmolested and that the encrypted drive is located in the original computer.

### Windows Rights Management Services (RMS) client

RMS helps enterprise customers control and protect critical digital information by providing smart card integration, longer key lengths, and support for business-to-business (B2B) ad hoc information exchange. Windows Vista includes an integrated RMS client.

## The Encrypting File System (EFS)

The EFS is useful for user-level file and folder encryption. For example, if two users are sharing a machine, the EFS can be used to encrypt the data of each user so it is not available to the other user. Windows Vista enhances an administrator's ability to manage EFS on the network by allowing storage of EFS keys on smart cards.

## Control over installation of device drivers

IT administrators can use Group Policy in Windows Vista to block the installation of removable storage devices, such as universal serial bus (USB) flash drives and external hard drives, to help prevent corporate intellectual property or sensitive data from being compromised or stolen.

## Control over usage of removable storage devices

In addition to control over device installation, Group Policy for Removable Storage is a new Windows Vista feature that allows IT administrators to control data transfers to and from removable storage on a per-user basis.

## Protecting Data from Unauthorized Viewing—Key Features



To learn more about this technology, please turn to [6.08: Hardware & Device Experience](#)

on page 273.

Feature	Brief Description
BitLocker Drive Encryption	Full encryption of the system boot volume.
Control over device installation	You can set policies denying the use of removable storage devices as well as other device drivers.
EFS smart cards	You can store EFS keys on a smart card.
RMS client	Provides ability to access and create rights-management protected documents. Requires RMS server.

## 6.06 Advanced Networking

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Connecting users to resources and content in a secure, simple, and manageable way is critical to the productivity of any organization. Windows Vista provides enhancements in many areas of networking to help make client access to resources seamless and secure while keeping configuration efforts to a minimum. Windows Vista provides an enhanced networking experience for both the information technology (IT) administrator, who is responsible for the security, maintenance, and deployment of networked resources, and the end user, who deserves a rich, seamless, and dependable networking experience.

### Next Generation TCP/IP stack

To help IT administrators optimize network efficiency, Windows Vista includes the Next Generation TCP/IP stack, which provides a rich architecture that enables self-tuning for better efficiency over time. The new features of the Next Generation TCP/IP stack include the following:

#### Dual IP layer architecture for IPv6

The Next Generation TCP/IP stack supports the dual IP layer architecture in which the Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6) implementations share common Transport and Framing layers. It also has both IPv4 and IPv6 enabled by default—there is no need to install a separate component to obtain IPv6 support.

#### Automatic configuration of stack settings based on different network environments

The Next Generation TCP/IP stack automatically senses the network environment and adjusts key performance settings, such as the TCP receive window. Improved stack auto-tuning and configuration reduce the need for manual configuration of TCP/IP settings. They enable faster network transfers, more intelligent bandwidth usage, and fewer retransmissions of lost data on the network. This can significantly reduce the time required to transfer a large file or to back up a hard drive across the network.

#### New security and packet filtering

The interfaces in the current TCP/IP stack for TCP/IP security (filtering for local host traffic), the firewall hook, the filter hook, and the storage of packet filter information have been replaced with a new framework known as the Windows Filtering Platform (WFP). WFP provides filtering capability at all layers of the TCP/IP protocol stack. WFP is more secure and more integrated in the stack, and it makes it much easier for independent software vendors (ISVs) to build drivers, services, and applications that must filter, analyze, or modify TCP/IP traffic. For more information about WFP, go to [www.microsoft.com/whdc/device/network/WFP.mspx](http://www.microsoft.com/whdc/device/network/WFP.mspx).

#### Supportability enhancements

The Next Generation TCP/IP stack offers extensive support for runtime diagnostics, including support for TCP Management Information Base II (MIB-II) and better system event logging and tracing.

## End-user experience

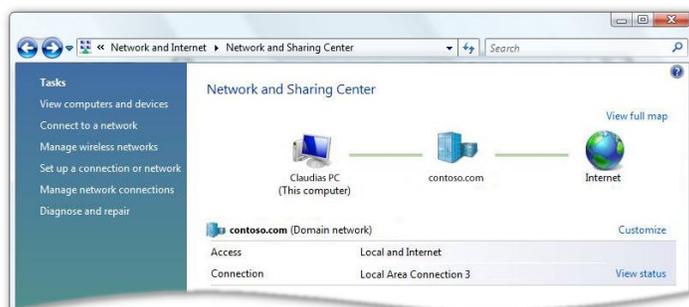
Windows Vista helps end users solve network issues without having to involve the Help Desk. The Network and Sharing Center provides users with information about which network the computer is connected to and whether it is accessing the Internet. The Windows Network Diagnostics tool allows users to identify the top potential issues affecting network connectivity and takes the appropriate steps to attempt to solve the issues.

## Wireless networking

Wireless networks are becoming increasingly common in the network infrastructures of many organizations. Roaming users also frequently find themselves trying to connect to the Internet or their corporate network via a wireless network at a hotel, conference

center, or airport. It is imperative that the organization or IT staff choose security options that protect data without being unduly cumbersome for users or administrators.

Windows Vista includes a native wireless networking architecture called Native Wi-Fi as part of its core networking stack. This architecture provides many benefits, including flexible deployment across many



hardware brands and models, similar user experiences regardless of the hardware, and more reliable third-party wireless network adapter drivers. When you create a wireless network, Windows Vista defaults to the most secure options supported by the wireless adapter.

An issue common to wireless networking is management of configuration options on client computers. Organizations must maintain a consistent configuration across various desktop installations to ensure greater supportability, reduced administrative costs, and increased user productivity. Windows Vista includes improvements to address these issues:

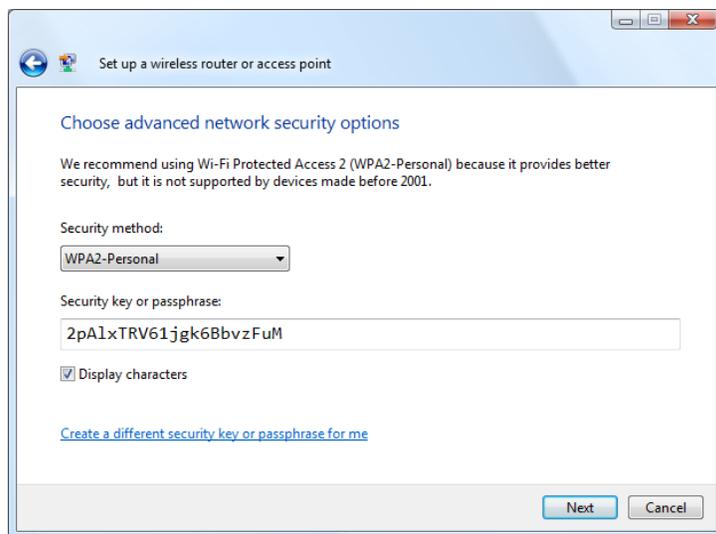
- An enhanced user experience for discovering, creating, and connecting to wireless networks through the Network and Sharing Center user interface
- Wireless Single Sign-On to ensure that the wireless network is available before the user or computer authenticates to an Active Directory domain
- Configuration support for the latest security protocols from the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards body, including 802.11i and Wi-Fi Protected Access 2 (WPA2)
- Mitigation of common attacks against wireless networking
- Increased manageability through Group Policy objects (GPOs) for wireless networking and command-line instructions for configuration and troubleshooting
- Availability of diagnostic tools to aid in troubleshooting and repair of wireless connectivity problems



To learn more about the networking user experience, please turn to [3.12 Networking](#) on page 98.

## An enhanced user experience

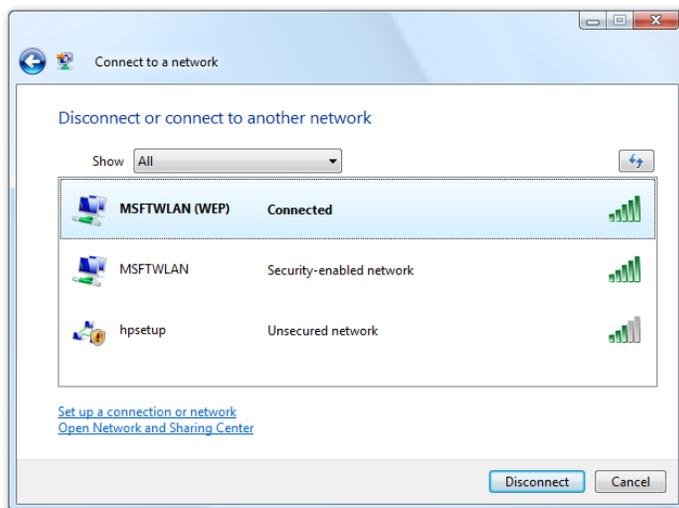
The ability for users to create and use wireless networks has been enhanced with Windows Vista. Users can create ad hoc wireless networks through a wizard-driven



interface. When it presents a list of available networks, Windows Vista clearly marks any wireless networks that are unsecured. In addition, Windows Vista examines the capabilities of the wireless adapter and chooses the highest security available for that adapter when connecting to a wireless network. Windows Vista also uses a more secure-by-default design that chooses default options that enhance security.

## Wireless Single Sign-On

The deployment of wireless networks has promoted the use of Layer 2 network authentication, such as 802.1X, to ensure that only appropriate users or devices are allowed on the protected network and that their data is secure at the radio transmission level. The Single Sign-On feature executes Layer 2 network authentication at the



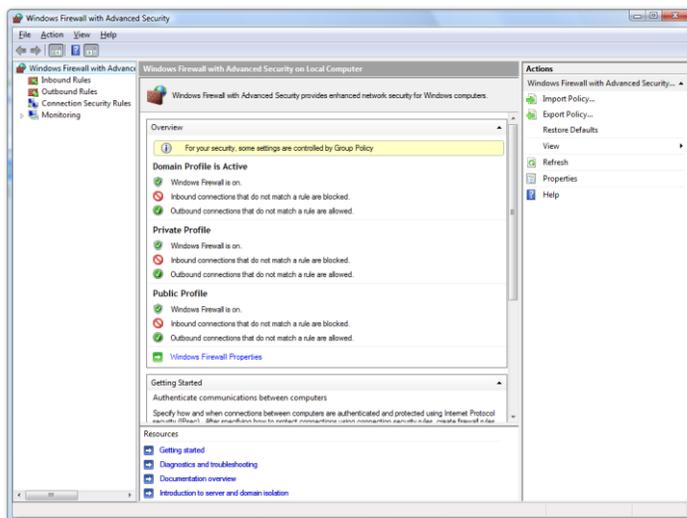
appropriate time given the network security configuration, while at the same time seamlessly integrating with the user's Windows logon experience.

Administrators can use Group Policy or the command-line interface to deploy Single Sign-On profiles to client computers. Once a Single Sign-On profile is configured, 802.1X authentication will precede the Windows logon. This feature enables scenarios such as GPO updates, logon scripts, and wireless client domain joins, which require network connectivity prior to user logon.

## Broad support for wireless security protocols

The native Wi-Fi architecture in Windows Vista has wide support to configure the latest security protocols, including Wi-Fi Protected Access (WPA), Wi-Fi Protected Access 2 (WPA2), Extensible Authentication Protocol (EAP) –Transport Layer Security, Protected Extensible Authentication Protocol (PEAP), and Wired Equivalent Privacy (WEP). This broad support ensures interoperability between Windows Vista and almost any wireless infrastructure. Personal networks at home or in small businesses can also be kept more secure through WPA-PSK and WPA2-PSK authentication by using a pre-shared key (or PSK). Windows Vista examines the capabilities of the wireless network and by default chooses the most secure protocol when creating a new wireless network

Security in Windows Vista is also extensible. Using the EAPHost framework, Windows Vista is able to support custom authentication mechanisms defined by a hardware vendor or by an organization.



connection to an unsecured network.

## Increased manageability

Wireless networks are logically equivalent to their wired network counterparts in Windows Vista and can be managed in much the same way. Windows Vista includes new Group Policy settings that enable administrators to configure policies for wireless client behavior. In addition, Windows Vista includes a command-line interface that enables full management of wireless networks from the command prompt.

Using the Group Policy snap-in for the Microsoft Management Console (MMC), administrators can define how wireless clients connect to and operate on wireless network infrastructures. For example, a company can define a policy that limits all wireless connections to a certain protocol, a certain wireless network, or only secured networks.

With Group Policy, the client can then be prevented from changing these settings.

## Guarding against common wireless attacks

Windows Vista includes many improvements to the behavior of the wireless client to guard against common wireless attacks. The client now actively probes for fewer networks and only for those configured as non-broadcast networks by the user. In addition, the client connects automatically only to networks that the user has explicitly requested or identified as preferred networks, and it provides a warning if the user is about to initiate a

## Wireless command-line interface

Windows Vista includes an enhanced network command-line interface with the Netsh tool that enables automation and scripting and helps with troubleshooting wireless network connections.

Using this command-line interface, administrators can verify, change, or remove the client's wireless network configuration profiles. These profiles can also be exported to or imported from other computers to expedite provisioning of multiple computers.

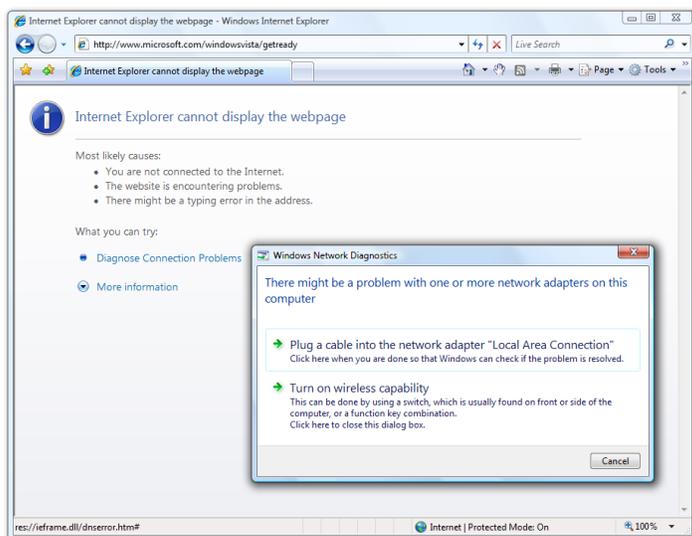
## Wireless diagnostics

Windows Vista includes wireless diagnostics capabilities as part of the extensible Network Diagnostics Framework (NDF). The NDF provides users with advanced help in resolving network-related issues.

When unable to connect to a network resource, the user is presented with clear repair options rather than error messages that can be difficult to understand. If Windows Vista can repair the issue automatically, it will; if not, the user is directed to perform simple steps to correct the problem without having to call for support.

Also, richer information is recorded in the Event Viewer about diagnosed connections. These event records can be used by support staff within organizations to perform further troubleshooting when the wireless diagnostics capabilities cannot resolve the problem or if the steps are beyond what the user's rights allow. The event logs can significantly shorten the time needed to resolve wireless connection problems, resulting in reduced costs for support calls and greater user satisfaction and productivity. These event log entries can also

be automatically collected by network administrators using Microsoft Operations Manager or other types of central management tools and analyzed for trends and wireless infrastructure design changes.



## IPv6

With the number of networked devices increasing dramatically, it is increasingly difficult to scale an IPv4 architecture to meet the growing needs of organizations. Currently, IT administrators must use technologies such as Network Address Translation (NAT)—which adds complexity and can cause application incompatibilities—or combine public and private IP addresses on the same network to support the increased use of networked devices. Additional point solutions or techniques increase the cost of network operations and can create security issues. IPv6 support in Windows Vista enables enterprises to support a larger network address space while eliminating the need for NAT or other workarounds. IPv6 scales well beyond the IPv4 address space and provides additional security with full support for Internet Protocol Security (IPSec). Enterprises can deploy IPv6 within their infrastructure without having to completely upgrade their network with IPv6 transition tunneling mechanisms to support the tunneling of IPv6 traffic across an IPv4-only infrastructure.

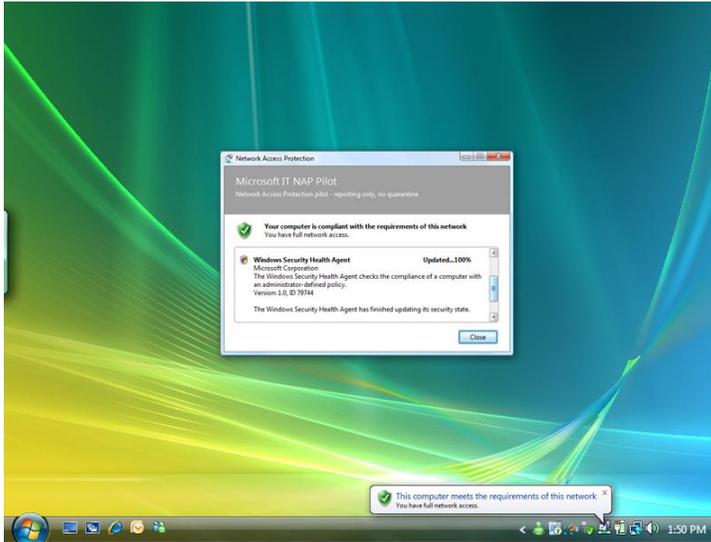
For end users, IPv6 in Windows Vista supports Teredo, which allows global addressing and end-to-end communication for IPv6-capable applications between Teredo client computers (which are behind most of the NATs in common use today). By using Teredo, application developers do not have to build their own NAT traversal solution. As long as the application is IPv6-capable, it can take advantage of Teredo, the NAT traversal solution built into Windows Vista.

## Server Message Block 2.0 (SMB)

SMB, also known as the Common Internet File System (CIFS), is the file sharing protocol used by default on Windows-based computers. SMB in Windows Vista supports SMB 2.0, a new version of SMB that has been redesigned for today's networking environments and the needs of the next generation of file servers. SMB 2.0 has enhancements that reduce the number of packets for SMB commands and allow for larger buffer sizes and more open files for scalability. Computers running Windows Vista support both SMB 1.0 (for previous versions of Windows) and SMB 2.0 (for Windows Vista and Windows Server "Longhorn").

## Network Access Protection (NAP)

Windows Vista includes the NAP agent, which can provide information about a client's health state and configuration to network access servers or peers. Clients that lack current security updates or virus signatures or otherwise fail to meet corporate-mandated health requirements are restricted from the network until they can be reconfigured or updated for compliance. A NAP infrastructure included with Windows Server "Longhorn"



determines whether to grant the client access to a private network or restricted network based on its compliance with established health policy. In the restricted network, the client might be granted access to remediation services to get the patches, antivirus signatures, and so on needed to comply with the health requirements policy. NAP can also be used to protect your network from unhealthy remote access clients as well as unhealthy local area network (LAN) clients using 802.1X authenticated wired or wireless connections.

## IPSec

With the explosive growth and adoption of highly connected networks, organizations are faced with a potentially paradoxical situation: trying to provide greater accessibility while maintaining security. Employees, business partners, and customers alike are demanding greater flexibility and mobility when connecting to networked resources. Even though more ubiquitous connectivity can yield numerous business benefits—such as productivity gains and operational cost savings—it also has the potential to introduce new risks to the organization's networked infrastructure. These risks can include costly virus attacks, rogue users and devices, and unauthorized access to sensitive information.

Organizations face many challenges in their efforts to meet the demands of this new communications paradigm. Therefore, they seek to:

- Reduce the risk of malicious software (malware) threats (such as viruses, worms, and spyware) and limit the impact of outbreaks and denial of service (DoS) attacks
- Protect the confidentiality and integrity of sensitive information and intellectual property
- Prevent unauthorized access (either internal or external) to trusted assets
- Lower operational costs and administrative overhead
- Achieve and maintain compliance with legislative and industry regulations

The implementation of IPSec within Windows Vista was designed to enable IT administrators to:

- Easily create security policies based on user or computer credentials as part of network access authorization
- Leverage Group Policy to centrally distribute these policies in a flexible manner based on business requirements
- Create Windows Firewall policies based on IPSec

Windows Vista allows IT administrators to effectively manage access to critical information assets in several scenarios:

- **Server isolation:** Administrators can restrict connectivity to a server or groups of servers by computer, port, IP, user, or subnet. For example, an administrator can restrict access to the Finance Department's SQL Server to only the Finance web server, while also restricting access to the Finance web server to only users in the Finance user group.
- **Domain isolation:** Administrators can restrict connectivity to a domain of computers, by allowing all outbound connectivity while restricting inbound connectivity to other domain-joined computers. Domain isolation is a Sarbanes-Oxley control solution to protect intellectual property. It also limits the impact of worms and viruses by restricting connectivity from computers not joined to the corporate Active Directory domain.
- **Network Access Protection:** Administrators can restrict connectivity to the corporate network from computers that are healthy as determined by NAP. IPSec integration with NAP provides real-time enforcement of health policy, which cannot be achieved by 802.1x or Dynamic Host Configuration Protocol (DHCP) enforcement. If the status of the computer changes to unhealthy, IPSec immediately blocks that computer's ability to initiate communications with other domain member computers.
- **Windows Firewall with user and computer authorization:** Administrators can define richer firewall policies that restrict certain applications from bypassing the firewall (network scanners) as well as restrict connectivity by computer, user, IP, port, or subnet. All of these policies can be defined and managed from one central user interface.

## Network Awareness

The Network Awareness platform in Windows Vista provides the ability to report changes in network connectivity to applications in order to provide a more seamless experience to the end user. As the user connects to different networks, the change is communicated to applications that take advantage of Network Awareness, which can take appropriate action. For example, firewall settings can be configured to allow the use of IT management tools when a user switches from the home office to a corporate network, and Group Policy will detect the reconnection to the corporate network and automatically begin processing policy changes instead of waiting for the next detection cycle.

## Policy-based Quality of Service

Policy-based Quality of Service (QoS) in the Windows Vista and Windows Server "Longhorn" operating systems alleviates network congestion by enabling central management of host bandwidth. For example, when the traffic for an enterprise resource planning (ERP) application for branch offices is given a high priority over the wide area network (WAN) link, a branch office sales manager accessing and entering ERP data can benefit from a consistently fast response time, even when the WAN link is loaded with other traffic.

Historically, network traffic had not been easy to prioritize and manage. Mission-critical and latency-sensitive traffic has had to compete for bandwidth with lower-priority and latency-tolerant traffic, such as bulk data transfers. At the same time, users and computers with specific network performance requirements have required differentiated service levels. So the challenge of providing predictable network performance levels often first appeared over WAN connections or with latency-sensitive applications such as Voice over IP (VoIP) and video. However, the goal of providing predictable network service levels applies to any network environment and to more than VoIP applications—it includes any custom line-of-business application.

With policy-based QoS, an IT department can define flexible QoS policies to prioritize and/or throttle outbound network traffic without requiring modifications to applications. These QoS policies apply to outbound traffic based on any or all of the following triggers: sending application; deployment through Group Policy (such as a set of users or computers); source/destination IP address; source/destination port; and protocol.

### Advanced Networking—Key Features

Feature	Brief Description
Connectivity interface	A single, easy-to-use interface for viewing and connecting to all available wireless networks, corporate remote access connections, and dial-up connections. Helpful wizards make it easy to set up these connections for the first time.
Group Policy configuration for wireless networks	Easier configuration and deployment of wireless network settings across the enterprise from a central location.
IPv6	Supports larger enterprise networks by providing larger address spaces.
Network Access Protection (NAP)	Windows Vista computers can be checked for administrator-defined system health before being allowed on a corporate network.
Network and Sharing Center	A central, easy-to-use place for quickly viewing network status and important network settings.
Network Awareness	A platform that applications can use to determine which network a user is currently connected to in order to provide a custom experience for each network.
Network Diagnostics Framework	Provides root-cause analysis of common networking issues and provides guidance to the end user to automatically make repairs.
Policy-based Quality of Service (QoS)	Prioritizes and limits the amount of bandwidth a user or application can use.
SMB 2.0	Windows Vista computers can better utilize bandwidth and scale for file and printer sharing operations.
Windows Firewall with Advanced Security	Integrates firewall capabilities with authentication and/or the encryption capabilities of IPSec to provide more secure network connections to resources.

## 6.07 Reliability

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At Microsoft, *reliability* means that our technologies and services are dependable. To help further describe reliability, we have identified the following five attributes as central indicators of reliable computing experiences. They are based directly on the feedback we heard from thousands of customers when we asked for their definition of reliability.

These attributes are:

- **Predictable:** Consistent, available service
- **Maintainable:** Easy to configure and manage
- **Resilient:** Works despite changes in conditions
- **Recoverable:** Easily restored without adverse impact
- **Proven:** Ready to operate in a variety of environments

Reliability enhancements in Windows Vista help users work with greater confidence and productivity while reducing support costs for organizations. Users are less often disrupted by crashes, hangs, and restarts, and they can recover more quickly when problems do occur. The information technology (IT) department needs to address fewer support issues, and new tools and improved instrumentation allow support professionals to diagnose problems more quickly and accurately.

Improvements to reliability in Windows Vista can be summarized as follows:

- **Fewer user disruptions.** Windows Vista includes new technology that prevents many common causes of hangs, crashes, and other disruptions.
- **Easier recovery when disruptions occur.** Windows Vista provides fast, easy solutions for occasional, unpreventable failures. Windows Vista automatically diagnoses and recovers an unbootable system to a usable state with the help of the Startup Repair tool. Built-in diagnostics in Windows Vista can detect many common error conditions and either repair problems automatically or guide the user through a recovery process.
- **Continual improvements in reliability.** Windows Vista is reliable out-of-the-box, and enhanced instrumentation provides better insight when disruptions do occur and enables continual improvements in reliability.

The sections that follow discuss the technologies behind these improvements in more detail.

## Fewer user disruptions

Windows Vista is engineered to reduce the frequency and impact of user disruptions. It fixes many common causes of crashes and hangs and includes enhanced instrumentation that provides greater insight into what causes unresponsive conditions.

## Focus on fundamentals

Windows Vista was engineered with reliability in mind. Hangs and crashes have been tracked since the earliest Windows Vista beta release, and reliability problems have been treated as bugs that need to be repaired. New tools have also been employed during development to ensure that all code meets reliability standards.

## Reduced disruption from system restarts

The most frequent cause of system restarts is installation of applications and software updates. With previous versions of Windows, when an installer needs to replace a file in use by a running process, a restart is required to complete the installation. New technology in Windows Vista helps reduce the need for restarts after installing applications and when a restart cannot be avoided, the Restart Manager can make it less disruptive.

First, certain application updates can install the new version of a file on the disk even if the old one is in use, through the use of side-by-side compliant dynamic link libraries (DLLs). The next time the user restarts the application, the updated version of the file replaces the previous version.

Second, Windows Vista also includes platform technology that can be used to prevent restarts or reduce the impact of restarts when they cannot be avoided. This new technology is used by Microsoft Windows Installer (MSI) 4.0, so adding or removing applications packaged as MSIs is less likely to require a system restart. Some applications, including key 2007 Microsoft Office system applications, also leverage this technology to automatically save and restore an application's state after a restart due to an installation or an update.

When a system restart cannot be avoided, Restart Manager can also reduce disruption by returning applications that implement Smart Relaunch to the state they were in before the restart. Some key 2007 Microsoft Office system applications support Smart Relaunch by automatically saving user data and state when prompted by Restart Manager.

## Improved driver reliability

Drivers perform more reliably in Windows Vista than in previous versions of Windows. Support for canceling synchronous input/output (I/O) operations in Windows Vista enables drivers to recover gracefully if they become blocked when attempting to perform I/O.

Windows Vista also has new application programming interfaces (APIs) to enable applications to cancel pending I/O requests when a resource takes too long to become available. To help Microsoft and its partners identify and fix drivers that do not complete I/O in a timely fashion and that have not yet implemented the cancellation APIs, new instrumentation called Kernel Hang Reporting collects information to support

triage  
and diagnosis.

## System File and Registry protection

Any code that runs in kernel mode, including many types of drivers, can potentially corrupt kernel data in ways that surface later. Diagnosing and fixing these bugs can be difficult and time-consuming. Corruption of the registry tends to have a disproportionate impact on overall reliability because this corruption can persist across system restarts.

Windows Vista prevents poorly written drivers from corrupting the registry. This protection enables the memory management component to achieve protection the vast majority of the time, with low overhead.

Windows Vista also protects system settings from corruption or inadvertent changes that can cause the system to run incorrectly or not run at all. Windows Resource Protection (WRP) protects critical system settings, files, and folders from changes by any source except a trusted installer. This prevents users from changing critical system settings that can render systems inoperable. It also prevents software installers from inadvertently overwriting a system file that has been updated by Microsoft with an older version that came on the distribution media.

## Easier recovery when disruptions occur

Built-in diagnostics and failure recovery mechanisms in Windows Vista minimize user impact when problems occur, reducing support costs and improving productivity for end users and support professionals.

## Repairing unbootable systems

Startup problems are among the most difficult to troubleshoot because an administrator cannot start the operating system and use built-in troubleshooting tools. Often, administrators choose to reinstall the operating system rather than attempt to solve the problem—even though the solution might be as simple as replacing a single file. Windows Vista includes a Startup Repair tool that provides automated diagnosis and recovery of unbootable systems. It can address 80 percent of the known causes for unbootable systems. When a system startup failure is detected, the system automatically activates the Startup Repair tool, which runs diagnostics and attempts to recover the system to a usable state. In many cases, Startup Repair can diagnose and automatically resolve the problem with no input required from the user. The Startup Repair tool can be preinstalled by OEMs or corporations. If it is not preinstalled, it can be run from the installation DVD.

## Built-in diagnostics

Windows Vista contains built-in diagnostics—collections of instrumentation, troubleshooting, and resolution logic—to resolve external problems that affect the way Windows behaves. The framework that supports these diagnostics, called the Windows Diagnostic Infrastructure (WDI), is a new feature in Windows Vista. A number of diagnostic scenarios are implemented using WDI, addressing some of the most common and costly problems facing PC users.



To learn more about Backup and Restore Repair, please turn to [3.10: Windows Backup and Restore](#) on page 87.

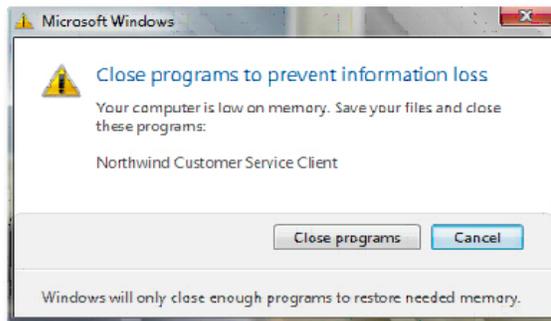
Built-in diagnostic scenarios in Windows Vista include the following:

Problem Type	Diagnostics Performed
Client performance degradation	Performance diagnostics, including slow shell responsiveness and visuals, and slow startup/logon/shut-down
Hardware failures	Disk failure and defective physical memory diagnostics
Networking problems	Network diagnostics for wireless and wired networks
Power transition problems (e.g., hibernate failures)	Power transition diagnostics for consistent, predictable power transitions
Program Compatibility Assistant	Identifies application installation failures that may be attributable to incompatibility with Windows Vista and offers the user solutions
Resource exhaustion	Resource exhaustion detection and resolution

All of these built-in diagnostics scenarios take advantage of the new WDI framework in Windows Vista, and all of them are designed to improve reliability and reduce support costs. Network Diagnostics, Performance Diagnostics, and Power Transition Diagnostics are discussed in detail elsewhere in this product guide. The other diagnostic resources are described below:

- **Disk Diagnostics.** Even in closely managed enterprise environments, mobile users often go weeks or months without a backup. Data loss caused by unexpected disk failure can be disastrous, and a user might spend weeks recreating work, if it's even possible to do so. The built-in Disk Diagnostics in Windows Vista detects impending disk failures and guides users through data backup, disk replacement, and data restoration procedures. When Windows Vista detects a potential disk failure, it logs an event to the event log and guides the user through the backup and recovery process to minimize the likelihood of data loss.
- **Memory Diagnostics.** Defective computer memory is difficult to diagnose. It can mimic software or operating system problems, leading to hours of wasted troubleshooting effort. Memory Diagnostics in Windows Vista works with Microsoft Online Crash Analysis to detect crashes that might be caused by failing memory, providing guided support and prompting the user to schedule a memory test the next time the computer is restarted.
- **Resource Exhaustion Prevention.** Occasionally when a user is running a large number of applications, the machine will simply run out of system resources, leading to hangs, crashes, and data loss. Resource Exhaustion Prevention warns users when critical resources are low—before a hang or crash occurs. It also identifies which applications a user should close in order to reclaim the resource and helps the user close them. And when Windows Vista issues a resource exhaustion warning, it logs events in the event log that include detailed data useful for subsequent analysis.

For enterprise environments, built-in diagnostics are manageable through Group Policy. Administrators can choose to disable any diagnostic scenario or keep the diagnostic component in place and disable the resolution component for any diagnostic scenario.



All built-in diagnostic scenarios raise events to the event log. These events provide a record of what problems the built-in diagnostics have automatically repaired and also provide information to IT professionals to help solve problems that can't be resolved automatically.

## Recovering from service crashes

In Windows XP, if a service crashes, the user usually has to restart the system to recover full functionality. This is due to three problems. First, most services do not restart automatically after a crash, and most users cannot manually start a service that does not have an associated icon or familiar user interface. Second, even if users know to restart the crashing service, they might not know which other services also stopped when the crashing service's SvcHost process was terminated. Finally, dependencies might exist between services outside of the SvcHost process that are not exposed through the Service Control Manager, making it hard for the user to know the order in which to restart services.

In Windows Vista, most in-box services have a recovery policy that allows the user to continue working after the service has crashed and then been automatically restarted. The key exceptions are critical services that must be present for the operating system to remain operational. The implicit and explicit dependencies between services are understood, and all appropriate services are restarted in the correct order when one of them crashes.

## Continual improvement in reliability

Windows Vista offers improved reliability from the moment it is deployed, and its enhanced error reporting capabilities provide the foundation for further reliability improvements over time. For example, Windows Vista provides more detailed information on certain types of reliability issues to the Microsoft product feedback system—information that Microsoft and its partners can use to continually improve products. And when users submit anonymous error reporting information to Microsoft, they will receive a fix for their problem more often than in the past.

## Reliability instrumentation

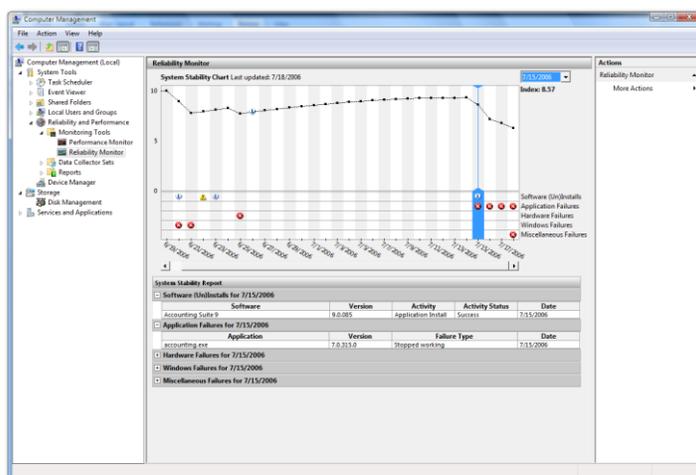
Many key operating system components in Windows Vista log user disruptions and their causes when known. This information can be combined with other configuration and usage information on the system so that developers, IT professionals, and automated tools can assess reliability and determine the necessary corrective action when problems occur.

Specific improvements in instrumentation in Windows Vista include hang reporting, deadlock detection, and memory leak detection.

- **Hang reporting.** With earlier versions of Windows, application hangs are difficult for developers to troubleshoot because error reporting provides limited or no information about hangs. In Windows Vista, users can choose to share data with Microsoft through the Microsoft product feedback system. Once received, Microsoft analyzes hang reports to determine the root causes of the most frequent hangs. This data is made available to developers in an actionable format.
- **Deadlock detection.** Deadlocks are circular wait conditions. When an application hangs, Windows Vista determines whether the hang is caused by a deadlock. Windows Vista includes this information as part of the Windows error reporting data to ensure that all hangs caused by deadlocks are accurately and automatically diagnosed.
- **Memory Leak Detection.** With Memory Leak Detection, Windows Vista can identify and report software memory leaks so software vendors can address these issues.

## Reliability Analysis Component

The Reliability Analysis Component (RAC) is a tool that helps IT professionals better manage the stability of machines in their organization. RAC aggregates, analyzes, and correlates problems at the operating system and application levels. It calculates a stability index that indicates overall system stability over time. RAC also keeps track of any important changes to the system that are likely to affect stability, such as Windows updates, application installations, and driver installations.



Users can view RAC data via the Reliability Monitor, which displays data collected from RAC in a stability chart and correlates the computer's stability index with important events that are likely to affect stability, such as driver failures and software installation. The Reliability Monitor may be found in the Reliability and Performance node of Computer Management.

As Windows Vista is adopted by users and organizations, the RAC data will be available to health monitoring applications such as System Center Operations Manager. In turn, this detailed information enables IT professionals to be more proactive in preventing failures and providing guidance on areas for improvement.

## Windows Error Reporting

Windows Error Reporting (WER) is a feature of Windows Vista that is designed to help Microsoft learn about problems end users encounter using Windows and provide Microsoft with diagnostic information that may help solve the problems, so that fixes, workarounds, or other solutions can be delivered back to end users as quickly and easily as possible.

When an end user encounters a problem using Windows Vista, large or small, WER creates a small report of the issue. This basic report only contains enough information to identify the issue; by default, it is data such as the application name, the application version, and the position in the code where the problem originated. The user may choose to check for a solution, then WER sends these parameters to Microsoft to see if the problem has already been diagnosed and solved. If a solution exists, it is presented to the user immediately. In cases where more information is needed to solve the problem, the user may be asked to send more information.

## Windows Customer Experience Improvement Program

A few days after beginning to use Windows Vista, users are prompted to join the Customer Experience Improvement Program (CEIP). CEIP is an opt-in program designed to gather data to improve the quality of Microsoft products, including Windows Vista. Unlike Windows Error Reporting, which reports on disruptions such as crashes and hangs, CEIP collects more general information related to configuration, performance and reliability, and usage.

Participation in the program is strictly voluntary and the end results are product improvements for Microsoft customers. We do not collect any information that is used to identify customers and we respect each user's right to opt-out of the program at any time.

### Reliability—Key Features

Feature	Brief Description
Deadlock detection, Memory Leak Detection	Identify and report software memory leaks and deadlocks so software vendors can address them.
Disk Diagnostics	Detects potential disk failures and guides the user through backup and data recovery to minimize downtime and data loss.
Hang reporting	Finds hangs and provides fixes to customers.
Memory Diagnostics	Detects and confirms physical memory corruption caused by bad memory modules and provides the user with information needed for repair.
Registry kernel memory protection	Protects the registry's kernel memory from modification by drivers or other kernel-mode code. Any such modifications are detected and rendered automatically diagnosable.
Reliability Analysis Component (RAC) client and Reliability Monitor	Collects, correlates, and makes available information about system reliability and stability.
Resource Exhaustion Prevention	Prevents hangs, crashes, and data loss due to resource exhaustion
Restart Manager	Windows Vista infrastructure that reduces the need for system restarts or reduces the disruption from restarts when they cannot be avoided.
Startup Repair tool	Provides users with a guided, diagnostics-based recovery for no-boot situations caused by registry corruption, missing or damaged system files, hardware failure, buggy drivers, or damaged driver files. It is used in conjunction with a Windows PE (Preinstallation Environment) recovery environment present on the system or provided on a CD. If present on the system, it is invoked automatically after an unsuccessful startup.
Synchronous cancellation of I/O requests	Enables programs to cancel pending I/O requests when a resource takes too long to become available.
Windows Diagnostic Infrastructure (WDI)	Infrastructure for detecting potential failure conditions, collecting data, diagnosing causes, and launching resolutions.

## 6.08 Hardware and Device Experience

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The new Driver Store infrastructure in Windows Vista helps organizations move to a more managed and secure desktop environment by providing information technology (IT) administrators with flexible control over hardware and devices. The end-user experience is streamlined because Windows Vista automatically searches multiple paths—the local Driver Store, a network share, Windows Update—to choose the best ranking driver and then automatically installs the device driver software. New features allow IT administrators to control which devices are allowed to install and can even specify which users are allowed to read or write to removable storage devices such as CDRs and flash drives. These new features in Windows Vista can help IT administrators meet their organization's security, management, and end-user needs.

### Focus on flexibility for managed environments

Windows Vista makes managed desktops easier to deploy and more accepted by users. Standard users can now have the ability to install trusted and approved devices as they need them. For example, traveling portable computer users can install approved printers or other devices without needing administrative rights. Whether organizations want to reduce Help Desk calls for unsupported devices or improve security and compliance by blocking device usage, Windows Vista provides the right tools for a managed but flexible desktop environment.

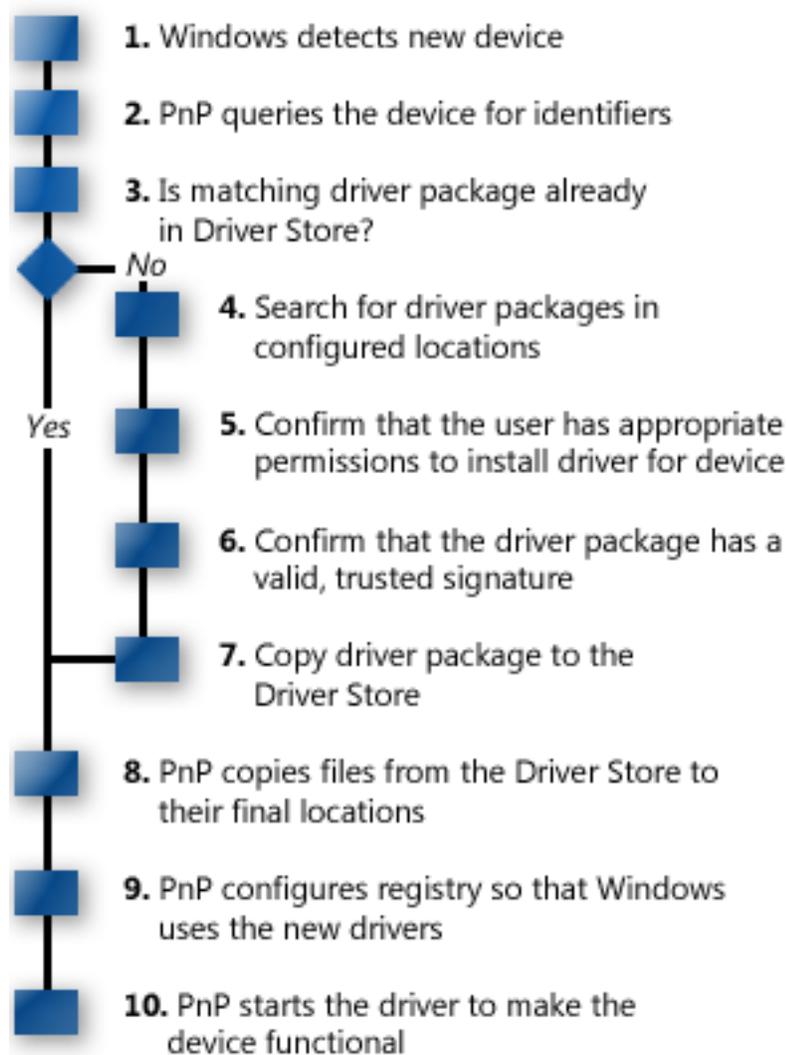
### Seamless, automated end-user experience

While locating and installing device driver software can be difficult if not confusing for end users, IT professionals can alleviate this with the new Driver Store infrastructure in Windows Vista. Drivers for supported hardware can be injected into the Driver Store of offline or online images or they can be staged on a network share where Windows Vista clients can be set to automatically search its contents. Users just need to plug their devices in first and Windows Vista will automatically find matching device driver software with minimal prompts. If a user attempts to install a prohibited device, IT administrators can provide customized feedback informing the user of corporate policy. These new features in Windows Vista provide users with a device installation process that reduces confusion and helps prevent Help Desk support calls.

## Simplified driver management and deployment

New features for deploying and managing device driver software will save IT administrators' time. Drivers can be pushed to offline images using Package Manager or to online images using a new command-line utility called PnPUtil.exe in conjunction with software distribution applications. Drivers can also be pulled by Windows Vista client machines from the local Driver Store, a predetermined network share, or Windows Update. With new Sysprep and Unattend.XML support, IT administrators can also add drivers alongside operating system images via a directory or file share. To help streamline the management of approved hardware and devices, device driver software can be self-signed by IT departments or third parties.

For total flexibility, IT pros can modify the installation process at each step of the way. The following chart outlines the device installation process.



## Flexible device control

While the device installation process is seamless and automated for end users, not all organizations want users to have the ease of installing just any device or to be allowed to transfer massive amounts of data to removable storage. New Group Policy features in Windows Vista can be set to control device installation and data transfer privileges at the user level or up to the group level.

## Device installation control

Group Policy for device installation is a new feature in Windows Vista that allows IT administrators to specify which devices are allowed to install by a specific device ID, by a device class, or by a specific device manufacturer. Controls in the Group Policy Object Editor can also be set to prevent either all devices or only certain devices from installing and operating.



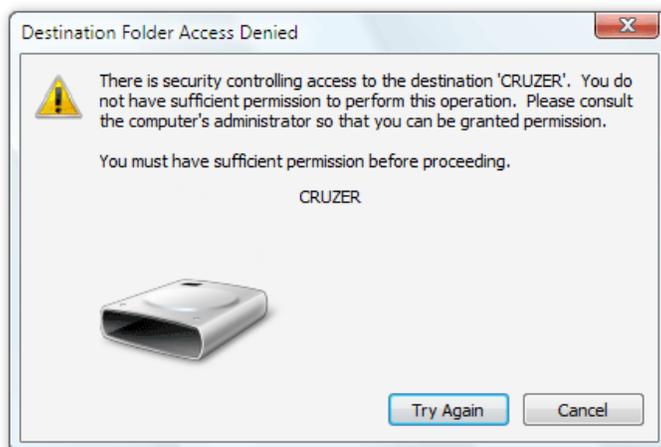
Controls in the Group Policy Object Editor can also be set to prevent either all devices or only certain devices from installing and operating.

If users attempt to install a prohibited device, IT administrators can provide customized feedback to the user in the following dialogue box:



## Data transfer control

With today's wealth of digital information and proliferation of removable storage mediums, the security and compliance goals of organizations are compromised by the ease of data theft. Group Policy for Removable Storage is a new Windows Vista feature that allows IT administrators to control data transfers to and from removable storage.



Specific users can be permitted to only read from removable storage devices such as CDRs, flash drivers, and external hard drives while being denied the ability to write to them.

Even if organizations deny users device installation privileges and read/write privileges, IT administrators can still enable an important new feature called Windows ReadyBoost which uses universal serial bus (USB) flash drives to extend system memory and improve performance. And though some Windows BitLocker Drive Encryption configurations use USB flash drives for encryption key storage and retrieval, device installation restrictions will not interfere.



To learn more about Microsoft's Hardware Certification Program, please turn to [7.05: Hardware and Software Certification Programs](#) on page 298.

## Certification program

Microsoft continues to advance its hardware certification program to ensure that organizations can purchase products that have met performance standards, provide compatibility assurance, and have been tested to Microsoft standards.

### Hardware and Device Experience—Key Features

Feature	Brief Description
Driver package integrity	IT departments or third parties can digitally sign drivers for deployment in their enterprise.
Driver Store	A trusted and dynamic repository of drivers on each Windows Vista client machine. Once drivers are staged into the Driver Store, Windows Vista installs them as needed regardless of the user's privileges.
Driver Store policies	Policies IT administrators can configure that govern which driver packages can be placed into the Driver Store by non-admin users such as roaming mobile PC users installing a printer.
Group Policy for device installation	Policies IT administrators can configure to allow only approved devices to be installed on a per-machine basis.
Group Policy for removable storage	Policies IT administrators can configure to specify which users have read privileges and which users have write privileges to removable storage devices.

## 6.09 .NET Framework 3.0



Microsoft .NET Framework 3.0 enables developers to build next-generation managed-code applications for Windows Vista. It is a superset of Microsoft .NET Framework 2.0, adding the ability for developers to create powerful, flexible, secure, visually compelling

applications. Because .NET Framework 3.0 is an evolution of .NET Framework 2.0, it remains consistent and familiar to the millions of developers programming in managed code today.

New features in .NET Framework 3.0 dramatically simplify software development and open the door to building new types of applications:



- **Windows Presentation Foundation (WPF)** provides developers and designers with a unified programming model for building rich Windows smart-client user experiences that incorporate user interface (UI), media, and documents.
- **Windows CardSpace** simplifies and improves the safety of sharing personal identity information online and provides developers with a simple, consistent way of authenticating users.
- **Windows Communication Foundation (WCF)** provides a unified programming model and runtime for building powerful service-oriented applications that can interoperate with other platforms and technologies.
- **Windows Workflow Foundation (WF)** is a programming model, engine, and tools to build workflow-enabled applications that model business processes.

## Windows Presentation Foundation (WPF)

WPF enables developers and designers to build Windows Vista-based smart-client user experiences that incorporate UI, media (two- and three-dimensional vector graphics, animation, speech, audio, video, and so on), and documents.

WPF overcomes traditional barriers associated with developer-designer collaboration with the introduction of the Extensible Application Markup Language (XAML). XAML enables designers to concentrate on creating visually stunning user experiences while developers simultaneously implement the application's business logic.

Using ClickOnce deployment technology, developers can deploy WPF-based applications either as installed clients or hosted in the browser.

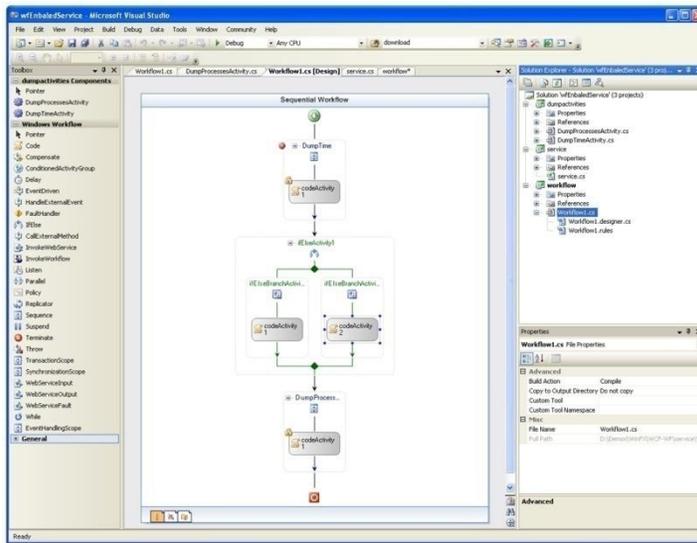
WPF-based applications let customers visualize information in ways never before possible utilizing the power of PCs running Windows Vista.





## Windows Workflow Foundation (WF)

Windows WF offers a programming model, engine, and tools for rapidly building workflow-enabled applications on Windows Vista. It includes support for both system- and human-based workflow across a wide range of scenarios, including line-of-business applications, user interface page flow, document-centric workflow, composite workflow for service-oriented applications, business rule-driven workflow, and workflow for systems management. WF provides developers with a graphical design capability that



enables the creation of workflow-enabled software using a combination of imperative code and declarative rules. And because WF builds workflow capabilities directly into the core developer framework, it enables enterprises and independent software vendors (ISVs) to more easily build software that models and adapts to their ever-changing business processes.

In addition to the new feature areas introduced in the .NET Framework 3.0 application programming interfaces (APIs), developers can leverage and extend the value of their existing skills in the .NET Framework when

building applications. .NET Framework 3.0 includes the .NET Framework 2.0 APIs—from Microsoft ASP.NET for web application development, to Windows Forms for forms-based client applications, to Microsoft ADO.NET for data access. The .NET Framework 3.0 integrates seamlessly with Microsoft Visual Studio 2005, giving developers access to an intelligent code editor, debugging capabilities, deployment tools, and more.

As a core part of Windows Vista, .NET Framework 3.0 simplifies the development of next-generation applications on the Windows platform. It enables developers to take advantage of new technologies to increase their productivity, improve application security, deployment, and manageability, and leverage existing skills in the .NET Framework. The result is software that is more connected, easier to use, and more responsive to changing business needs.

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## 7.01 Windows Vista vs. Windows XP

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Many Windows Vista features are available only in Windows Vista, while some are available as a Windows XP download.

### Key Windows Vista features not available on Windows XP machines

Here is a partial list of Windows Vista features *not* available on Windows XP machines.

#### In the area of user experience:

- Windows Vista Basic and Windows Vista Aero user experiences\*
- Windows Sidebar
- Windows Device Driver Model (WDDM)
- New thumbnail previews within the shell
- Unified home and domain login experience
- Reading Pane integration into the Windows Explorers (with the 2007 Microsoft Office system at launch, third parties to follow)
- Programs Explorer
- Redesigned Control Panel
- Windows Photo Gallery
- Shell support for RAW codecs
- Search integration in Windows Explorers
- MPEG-2 decoders\*
- Parental Controls
- Improved sharing (folder and per-item)
- Improved performance (Windows SuperFetch, Automatic Disk Defragmentation, Windows ReadyBoost support)

\*Note: The Aero user interface (UI) and MPEG-2 codecs are not included in Windows Vista Basic and Windows Vista Starter.

**In the area of mobile improvements:**

- Improved power management and faster shutdown
- Smoother state transitions
- New Windows Mobility Center
- Windows Vista Sync Center
- Tablet PC improvements, including support for pen flicks
- Significant improvements to corporate roaming, including cached mode, Delta Sync, and increased limits on max folders
- Support for auxiliary displays (Windows SideShow)
- Support for hybrid hard drives
- Networking user experience improvements
- Windows Meeting Space
- Remote Desktop access using HTTP (Hypertext Transfer Protocol)

**For home users and small business customers:**

- Improvements to Media Center, including HDTV recording
- Windows Movie Maker HD
- Gaming Center and new games
- Windows Mail and Calendar
- Fax and Scan Center
- Improvements to Backup and Restore
- Improvements to the PC-to-PC transfer feature

**For information technology (IT) administrators:**

- Improved deployment technologies streamline processes and enable further automation
  - System Image Manager is a tool that leverages the modular architecture of Windows Vista and its XML-based unattend format to enable better servicing and language independence
  - New Image Based Setup provides faster and more reliable installations
  - Windows Imaging Format (WIM) technology and an improved hardware abstraction layer provide hardware independence
- Administration tools
  - Improved Group Policies, including centralized control of power management settings
  - Improved diagnostic tools
  - Improved eventing and Event Viewer

## Windows XP “down-level” features

Some features that ship with Windows Vista are available as downloads for Windows XP. Some of these features have limitations when they run on Windows XP. For example, because the Aero user interface is not available on Windows XP, neither Windows Media Player nor Microsoft Internet Explorer 7 can run the Aero user interface on Windows XP.

The following additional comments apply to specific features:



### Internet Explorer 7

When running on Windows XP, Parental Controls and Protected Mode are not available in Internet Explorer 7.



### Windows Media Player 11

When running on Windows XP, the following Windows Media Player 11 features and capabilities are *not* available:

- Playing content (including Digital Rights Management, or DRM) on your PC from another device
- Viewing content from the Windows Vista Media Library on other PCs or digital devices (such as TiVo)
- Playback of premium high-definition (HD) video content
- Shell integration with Windows Media Player
- Content Indexer change notification to sync My Music and the Windows Media Player library
- DVD full-screen playback enhancements
- DRM Transcode
- High-quality video streaming over home networks
- Media foundation for playback

### Windows Defender

Windows Defender is available on Windows XP, and the functionality is the same, with the following two exceptions:

- Scan time is faster on Windows Vista due to the use of an index of files that have been changed that is kept by Windows Vista.
- Known malware is caught earlier in the process of opening a file.

### Deployment tools

ImageX and Windows Deployment Service are tools that assist with deployments of both Windows Vista and down-level (Windows XP and Windows 2000) operating systems. However, the System Image Manager, the XML-based unattend formats, and the improved hardware abstraction layer do not work with Windows XP or Windows 2000.

### Windows Presentation Foundation (WPF)

WPF is part of the .NET Framework 3.0, which is a feature of Windows Vista. The .NET Framework 3.0 and all of its components, including the new common language runtime, are available down-level to Windows XP. From the point of view of functionality (APIs or application programming interfaces) exposed to developers, there is little or no difference. It is worth noting, however, that when WPF is running on Windows XP, there are some limitations:

- There is no access to the Aero API and user interface (UI).
- There is no API access to metadata on images.
- The underlying Windows Vista driver model (WDDM), which provides greater robustness and virtualization of the graphics resources, is not available.

### Windows Communication Foundation

#### Queues: per-application dead letter queues and poison message handling.

These features require Microsoft Message Queuing (MSMQ) 4 on Windows Vista and do not work on down-level operating systems. In Windows Vista, the addition of poison message handling means that users do not have to manually unblock queues, as they do when unreadable messages are sent to the queue in earlier Windows versions. The addition of per-application dead letter queues means that users are not restricted to using a single dead letter queue per MSMQ queue and stale messages are routed to separate queues per application.

#### Common Log File System (CLFS) integration.

The Windows Vista logging mechanism supports CLFS integration. CLFS is available on Windows Vista and Windows Server 2003 Release 2 (R2), but not on Windows XP.

#### WS-Management support.

The Windows Communication Foundation (WCF) Windows Management Instrumentation (WMI) provider supports command-and-control operations that are exposed as Web Services for Management (WS-Management) services on Windows Server "Longhorn" and Windows Server 2003 R2. (This is not a client feature and it is not available on Windows XP Client.)

## 7.02 Windows Vista + 2007 Office System

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### People are key

To thrive in today's changing markets, businesses such as yours are constantly challenged to maximize their competitive advantage.

You may already know that you need to focus on fundamentals such as:

- Better understanding and serving customers
- Delivering breakthrough products and services
- Building tighter relationships with key partners
- Streamlining operations and driving cost savings

But you might wonder, "How can I drive gains across all these areas at once?" It turns out that all of these drivers of business excellence have the same change agent. Your *people*.

At Microsoft, we believe that when properly equipped with the right tools, your people can go further and do more. And of the many options available to business, *software* has demonstrated a unique capacity to amplify the positive impact of your people.

### People-Ready software

As the world of digital business information grows exponentially, we look to advances in software to not just manage the influx of this information, but also to accelerate the effectiveness and impact of your people. This belief has always been—and will always be—at the very core of the Microsoft Windows operating system and the Microsoft Office system. From the earliest days of developing a graphical user interface (GUI) for computers, to bringing together separate productivity applications into a unified suite, to connecting and extending those applications with powerful tools and servers, our focus has been on providing software that is all about people.

Throughout their history, Windows, the Microsoft Office system, and Microsoft Exchange Server have focused on empowering people to drive business success. This focus on individual productivity continues to be a major area of investment in the next releases of Windows, the Microsoft Office system, and Exchange Server. We've listened to your feedback, invested heavily in research, and made major improvements in new, intuitive user interfaces designed to increase the productivity of all users—from the most skilled to the novice.

Windows Vista operating system brings a streamlined user experience called Windows Aero that provides enhanced graphics and visualization capabilities. Pervasive search capabilities make it easy to find your information. Mobile workers can quickly access relevant information using Windows SideShow displays without needing to open their portable computers.

Replacing an overwhelming catalog of commands, the new 2007 Microsoft Office system user interface reflects the results people want to achieve. You won't have to spend your time searching through toolbars and menus—the software now visually reflects the way you want to work. We've also added new analysis capabilities to the Microsoft Office system so your people can work with data more easily and make better decisions. Enhanced authoring tools make it easier than ever to create high-impact documents and presentations with less effort.

The built-in capabilities of Exchange Server 2007 are further indicative of our commitment to creating software that helps your people do their best. Exchange Server has new mobility and unified messaging capabilities to help you connect with the information and resources you need, while on the go, without compromising security.

## Address a new world of work

While this focus on individual productivity continues to form the core of our mission, we've also heard loud and clear from customers that the business environment is changing. With those changes comes the demand for new solutions to help groups of people—from small teams to business divisions to entire organizations—work more productively and effectively with information.

Customers tell us this pressure for new levels of team and organizational productivity is coming from a combination of global trends:

- **One world of business.** Most enterprises today either operate globally or face global competition. As traditional barriers to the flow of goods, capital, and labor dissolve, collaboration of all sorts is becoming more prevalent—and more necessary. For example, teams increasingly work across all manner of organizational and geographic boundaries. Outsourcing of call centers, accounting, and many other common business processes is on the rise, as is telecommuting. An estimated 26.1 million employees in the U.S. work from home—and people are also working in a wider variety of places away from the office.
- **The transparent organization.** Government regulation, combined with increasing vigilance by shareholders, customers, and empowered consumer groups, is compelling businesses to operate at unprecedented levels of visibility while maintaining control over proprietary information. "Flattening" of organizations can help simplify the flow of information, but also renders intellectual property more susceptible to misuse.
- **Always on, always connected.** Pervasive wireless networks and increasingly powerful mobile devices make information access easy, but prioritization is becoming more and more difficult as workers try to balance competing demands for their time. Finding the right information and expertise to make efficient decisions continues to be a real challenge.

Additionally, customers tell us about evolving security threats, privacy issues, and the effort to manage software updates and patches.

## The next wave of innovation

With the next releases of Windows, the Microsoft Office system, and Exchange Server, we've fully embraced the challenges—and the incredible promise—of these trends. We will deliver significant new capabilities to help your organization increase each person's individual impact, as well as:

- Simplify how people work together.
- Help protect and manage content.
- Find information and improve business insight.
- Reduce security threats and deployment costs.

Let's look at each area in turn.

### Simplify how people work together

In *one world of business*—where teams are challenged to work not only across time, geographical, and organizational boundaries, but also increasingly with customers and partners—the next releases of Windows, the Microsoft Office system, and Exchange Server are designed to simplify how people work together.

Windows Vista includes capabilities designed for mobile workers or people in distributed workforces to:

- Get more out of meetings by sharing applications and jointly editing files among small groups using Windows Collaboration (a new peer-to-peer application) or by projecting presentations wirelessly using Network Projection.
- Access network information on the road with simplified connectivity through the Network and Sharing Center and with easier offline access to commonly used network files. Intelligent background synchronization automatically reflects changes the next time you connect to the network.
- Set up smooth and simple device synchronization with your Windows Mobile-based device, making it easier to transfer files, music, and pictures. Computer-to-computer sync enables you to replicate key documents between your portable computer and desktop.
- Control key mobile system settings from a single location using Windows Mobility Center, and make portable computers more effective with improved power management and wireless support.

Today when we talk about communication and collaboration with the Microsoft Office system and Exchange Server, people most often think of managing email in Microsoft Office Outlook. With the next release of Exchange Server and the Microsoft Office system, we've expanded that experience to a new set of capabilities that help your people:

- Communicate in and out of the office—helping to realize true “anywhere access” to your information with a wide variety of devices and using powerful mobile email and instant messaging capabilities.
- Use a single Outlook Inbox to manage all types of communication, including email, voicemail, phone calls, and faxes with Exchange Unified Messaging.

- Work together on documents using group workspaces, whether online or offline, and use advanced information-sharing tools to help you efficiently collaborate with others.
- Find people and resources to enable productive meetings, even over the Web and with participants spread around the world.
- Use new collaboration technologies such as Really Simple Syndication (RSS), blogs, wikis, and an automated alert system to keep team members up to date.

With the 2007 releases of the Microsoft Office system and Exchange Server, your people will have the tools they need to work together. And they'll be able to do so from within the familiar Microsoft Office system programs they already know and use.

## Help protect and manage content

When we look at the trend toward *transparent organizations*, we see customers struggling to simplify their everyday business processes and to better control their ever-increasing volume of content. New compliance requirements mean organizations must monitor both how they do work and how the information that work generates—whether contained in documents, email messages, or content on websites—is used, managed, and secured.

Up to 80 percent of a company's digitized information may reside on computer hard disks<sup>1</sup>. With workforces becoming increasingly mobile, your sensitive data is at risk when a portable computer is lost or stolen. More than 600,000 portable computers are stolen in the United States each year.

Using Windows BitLocker Drive Encryption, Windows Vista can help protect user and system data from being compromised when a computer is lost or stolen. Additional capabilities enable you to restrict the use of universal serial bus (USB) keys and removable storage devices—helping to prevent your company's valuable intellectual property from walking out the door.

The Microsoft Office system builds directly on the great "content creation" experience in core desktop programs such as Microsoft Office Word and Microsoft Office PowerPoint. This means the Microsoft Office system can enable your people to go from using these programs for simply authoring documents, worksheets, or presentations to using them for sharing, applying workflow to, approving, or managing these types of content. Security, retention, and compliance policies can be applied to content—all within the familiar Microsoft Office system.

We've also expanded the electronic form capabilities of the Microsoft Office system—both on the desktop and on the Web. The Microsoft Office system can help you to automate internal and external business processes and to better integrate the familiar user experience of Microsoft Office programs with data from your key business systems.

With the integrated policy engine built into Exchange Server 2007, the same kinds of policies can be applied to email and other types of communication using familiar Microsoft Office programs or easy-to-use administrative tools. The confidentiality and integrity of this information is enhanced within your organizational boundaries. Your sensitive communications with customers and partners can also be encrypted without additional client or server software.

<sup>1</sup> "The Knowledge Worker Investment Paradox," Gartner, by Regina Casonato and Kathy Harris, July 7, 2002.

## Find information and improve business insight

In an *always on, always connected* world, where information and people are accessible around the clock, organizations are dealing with the catch-22 of generating more and more information that is, on the one hand, increasingly valuable and, on the other hand, increasingly hard to locate and use in a meaningful, timely way. According to IDC Research<sup>2</sup>, companies may spend up to \$18,000 per knowledge worker each year in lost productivity when users can't find the documents they need to do their work. Windows Vista, the 2007 Microsoft Office system, and Exchange Server 2007 can help your company stay ahead with pervasive search capabilities.

Windows Vista can help employees find anything on their computers and on the Internet quickly and easily. New Live Icons give people the ability to clearly preview their documents and go directly to the items they need. Search Folders provide a quick, convenient way to find and organize documents based on their contents, no matter where they are stored on your computer.

The Microsoft Office system and Exchange Server also help people find information more quickly. People can search for information from the desktop, from Web clients (such as Microsoft Office Outlook Web Access), and from mobile devices. New capabilities also include a greatly improved enterprise search engine for finding information across your company. We've invested in innovative new tools for rapidly searching email and for searching through handwriting, graphics, and even audio recordings stored within electronic notebooks.

We've also worked hard to extend insight across the organization with business intelligence tools intended for everyone. These include personalized "report centers," executive dashboards, business scorecards, personalized portal sites, and server-based Microsoft Office Excel spreadsheets. We've also made it easier to expose data from key corporate systems into the Microsoft Office environment, using our new Business Data Catalogue and XML file formats. With Exchange Server 2007 you can use web services to integrate access to email, calendar, contacts, and other Inbox data with your business and service-oriented applications.

## Reduce security threats and deployment costs

We've made Windows Vista, the Microsoft Office system, and Exchange Server more secure by design and by default when you deploy them by reducing the threat surface area, offering one place for people to manage their privacy and security settings, and simplifying security prompts and warnings. The next releases also reflect changes in how we build software to make it more manageable, reliable, and cost-effective.

Windows Vista features User Account Control capabilities to better manage operations that require different levels of security privilege. Microsoft Internet Explorer 7 Protected Mode helps shield your system from web-based malicious software by limiting its access to only temporary files. Anti-phishing capabilities help protect users and their data, while Network Access Protection restricts the access of clients that lack current security updates or virus signatures.

Exchange Server and the Microsoft Office system together help deliver comprehensive protection from outside threats. Exchange Server includes built-in antivirus and anti-spam capabilities that act on email going to and from the Internet—working in concert with

<sup>2</sup> "The High Cost of Not Finding Information," IDC Research, Study #29127, by Chris Sherman and Susan Feldman, April 2003.

improved junk email filtering in Office Outlook 2007. Enhanced protection against phishing and fraudulent email messages helps keep you from accidentally disclosing personal information. Exchange Server also smoothly integrates with Microsoft Exchange Hosted Services for a flexible and attractively priced email filtering service that helps keep harm from reaching your network in the first place.

Security updates in Windows Vista and Microsoft Office system programs are significantly easier to deploy because they use language-independent binaries that require only a single update, regardless of how many languages your organization might use.

With new imaging technology in Windows Vista, companies can deploy a single operating system image to different types of computer hardware and to people with different language requirements, which produces a dramatic reduction in information technology (IT) costs. Software updating improvements mean fewer system restarts, and virtualization capabilities help ensure that older but still critical applications continue to run.

With the Microsoft Office system, we are reducing the complexity associated with software updates and deployment by providing a consistent experience for customization with the new Microsoft Office Customization Tool and Microsoft Office Migration Planning Manager. Exchange Server 2007 and Office Outlook 2007 help to eliminate the need for manual setup of user accounts, reducing Help Desk support calls and deployment costs. Improvements in software reliability and quality come through proactive support, improved program responsiveness, and better recovery when programs stop responding.

Exchange Server 2007 makes it cost-effective to keep your company's communications on the server where they can be accessed remotely with increased security. A new, more scalable architecture; the ability to use inexpensive, high-capacity storage systems; efficient new backup and restore technology; and new compliance capabilities give your IT department the confidence to increase Inbox sizes so your people can take full advantage of the desktop, Web, mobile, and phone-based access offered by Exchange Server 2007.

## Conclusion

At Microsoft, we believe that people, when properly equipped with the right tools, can surmount any challenge. Their value is measured not simply in productivity, but in organizational impact and results. And of the many options available to business, software has demonstrated a unique capacity to amplify the positive impact of people, helping them overcome diverse challenges in a new world of work.

So we create software that is:

- Familiar and easy to use so it requires less training and is easier to deploy, adapt, and manage.
- Widely used by businesses and supported by the largest community of partners, developers, and support professionals in the world.
- Easy to connect and integrate with the other software, technology, devices, or services that businesses and their partners use or may adopt in the future.
- Innovative and continues to evolve with steady and significant capabilities as business needs change.

When your people use Windows Vista, the 2007 Microsoft Office system, and Exchange Server 2007, they're not simply helping themselves, they're helping your whole organization compete and win.

## 7.03 Windows Vista + 2007 Office System Feature Integration



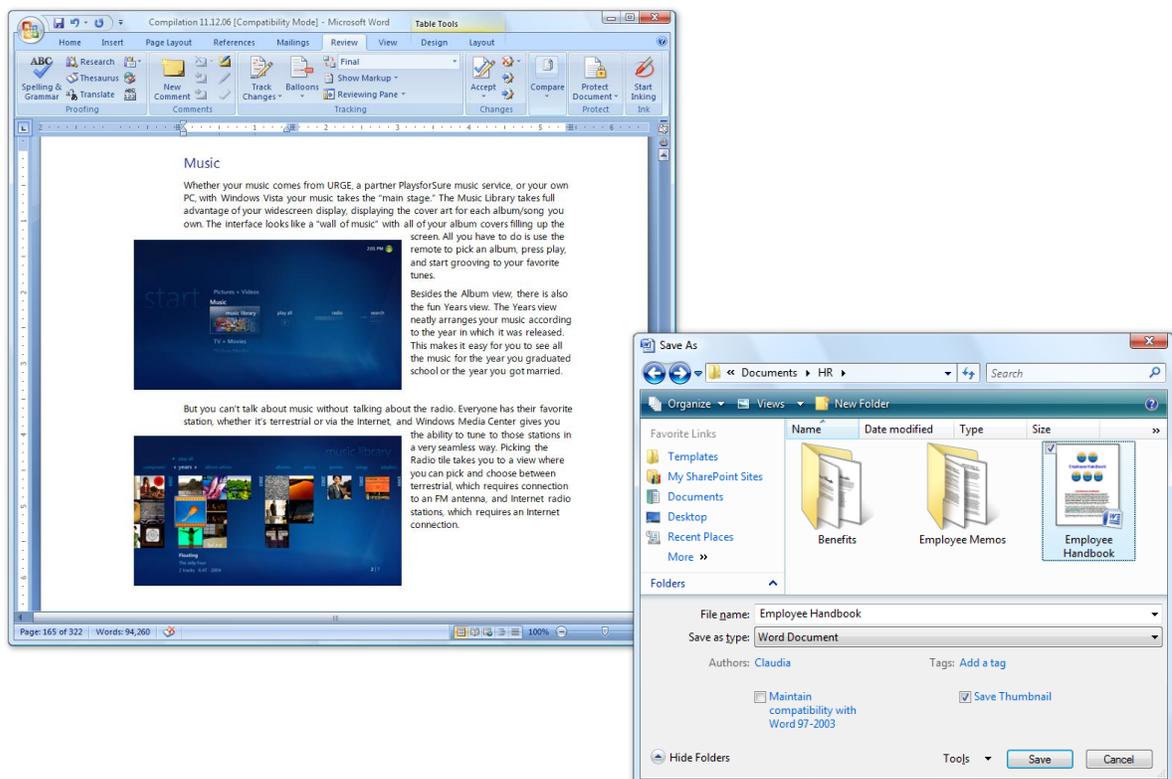
The following new capabilities are specific to Windows Vista and are not available when the 2007 Office system is running on Windows XP.

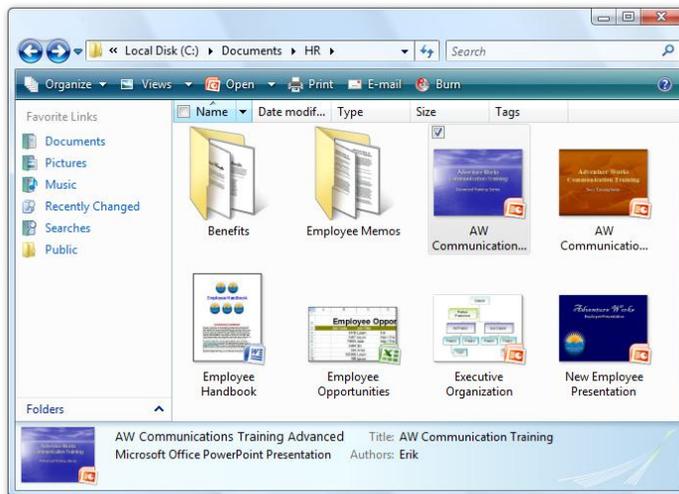
### Search

The new search functionality in Windows Vista is fully supported by Office system metadata for both the Office binary and Open XML formats. Windows Vista search can search deeply into 2007 Office system data, providing full-text search for documents, Microsoft Office Outlook email, and Office Outlook email attachments.

### Improved File Open/Insert/Save dialog boxes

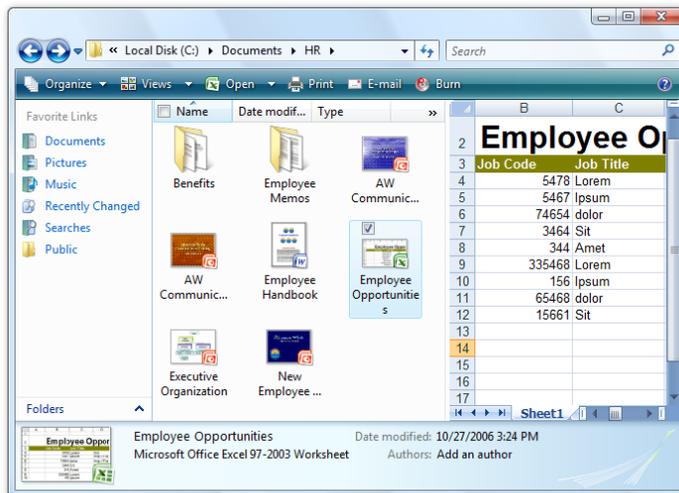
When using Windows Vista, Office system users interact with the Windows Vista common File dialog box when opening, inserting, and saving files in 2007 Office system applications. Instead of using proprietary Open/Insert/Save dialog boxes, the 2007 Office system prominently exposes the new Search and Organize functionality in Windows Vista and makes it available to Office users. Searching for documents from a File Open dialog box in the 2007 Office system is the same as searching for a file in Windows Vista.





## Thumbnails

Microsoft Office Word, Office Excel, and Office PowerPoint in the 2007 Office system make it easier to save Live Icons in the Windows Vista user interface.



## Explorer Preview Support

2007 Office system documents such as Microsoft Office PowerPoint files and Microsoft Office Excel spreadsheets are fully readable in the Windows Vista Explorers. With the Explorer Preview, you can scroll through an entire document without even opening it in the application that was used to create it.

## RSS feeds

Microsoft Internet Explorer 7 in Windows Vista and Microsoft Office Outlook in the 2007 Office system enable users to subscribe to Really Simple Syndication (RSS) feeds. Office Outlook automatically subscribes to feeds that a user has added to Internet Explorer 7.

## Windows SideShow (auxiliary display) for portable computers

The Windows team is working with hardware vendors to support small lid displays on portable computers running Windows Vista. Users who have the latest version of Office Outlook installed on a Windows Vista portable computer with an auxiliary lid display can check the time and location of appointments stored in their calendars by glancing at the display on the computer lid without having to open and start the computer.

## Freeze Dry/Restart Manager

Windows Vista includes a new feature called Restart Manager that reduces user frustration with system updates and restarts. To complement this functionality, certain 2007 Office system applications (Office Excel, Office Outlook, Office Word, and Office PowerPoint) showcase a new Freeze Dry feature that can “remember” program settings such as window size, window position, and even cursor position. The next time you install a software update that requires restarting your Windows Vista computer, Restart Manager signals Microsoft Office to “freeze dry.” When your computer restarts, all of your programs automatically return to the state they were in before the interruption occurred.

## Single index

Windows Vista and the 2007 Office system provide instant desktop search capabilities based on their own underlying index and query provider. In reality, they are the same technology. Because the 2007 Office system is deployed on Windows Vista, Office executes fast searches using the Windows Vista index. The net benefit is that you no longer have multiple indexes competing for CPU cycles.

## International domain name support

From all 2007 Office system applications, you can navigate to and open webpage URLs that contain extended characters such as ä, å, and many others.

## IPv6 support

Internet Protocol version 6 (IPv6) is a new IP standard that was created with the primary goal of expanding the number of available IP addresses. The 2007 Office system supports IPv6 with support at the system level in Windows Vista.

## Reducing hangs

Both the 2007 Office system and Windows Vista make it easier to cancel any operation that could cause your system to “hang.” Office uses Windows file input/output (I/O) anti-hang application programming interfaces (APIs) where appropriate. The goal is to enhance application responsiveness when you run the 2007 Office system and Windows Vista.

## 7.04 Desktop Optimization Package for Software Assurance

### Microsoft® Desktop Optimization Pack for Software Assurance

Enterprise information technology (IT) infrastructures are increasingly complex to manage. The Microsoft Desktop Optimization Pack for Software Assurance addresses the need to increase manageability and reduce complexity. It is a dynamic desktop solution, available to Software Assurance customers, that employs innovative technologies to increase desktop manageability, reduce the total cost of ownership (TCO), and improve overall infrastructure satisfaction.

### PC manageability challenges

Managing desktops across an enterprise is often time-consuming, complex, and costly. IT organizations face difficult PC manageability tasks on a daily basis. How many of these issues plague your organization?

- IT staff spends too much time and too many resources deploying, upgrading, supporting, and terminating applications
- Managing corporate images is tedious and labor-intensive
- End users lose productivity when you deploy new applications, upgrades, and patches
- Group Policy changes have an unexpected adverse affect on desktops
- End users require administrative rights on their desktops to run select applications, thereby putting systems at risk
- Maintaining an inventory of software assets is protracted and complicated
- PC crashes impact user productivity and cause the loss of valuable data

The Microsoft Desktop Optimization Pack for Software Assurance can transform the way you manage these challenges. It can enable you to better control the desktop, accelerate and simplify desktop deployments and management, and enable IT to provide highly responsive service.

### Extending the benefits of Software Assurance

#### Take control of the desktop

Ease change management and roll-backs, enhance Group Policy management, reduce downtime, and provide end users with on-demand access to applications for which they are assigned.

- Lock down desktop permissions and Group Policy objects (GPOs) while the virtual applications still execute with centralized control of application permissions.

- Applications are delivered on demand to clients, improving the time it takes to recover users from desktop failures.
- Centralized, policy-based management—including deployment, patching, updating, and application termination—is intelligently managed for all types of users via policies and administered through a single console.
- Real-time application usage tracking makes it easy to determine how applications are or are not being used so customers can better manage license compliance.
- Software inventory management enables IT to better manage and control the software environment and reduce TCO.
- Operating system (OS) images are consolidated and stabilized because applications are decoupled from the OS and delivered on demand.

### **Accelerate desktop deployment, management, and responsiveness**

Accelerate and simplify desktop deployments and migrations with application virtualization and streaming—reducing end-user downtime, decreasing IT management costs, and increasing IT agility.

- Virtualization enables applications to run as network services—without ever being installed—on demand. Applications run reliably without conflicts, increasing user uptime and accelerating deployments and OS migrations.
- Application compatibility conflicts and regression testing are eliminated by isolating all key components of the application from the desktop.
- IT Help Desk call volume is dramatically reduced by eliminating application conflicts. Users have a more reliable desktop experience.
- Troubleshooting tools pinpoint problems, and recover and repair PCs. Post-crash analysis provides intelligence that helps prevent future PC failures.
- Applications are universally available to users in multiple client environments including desktops, portable computers, and terminal servers, with a centrally managed infrastructure.
- Application management lifecycle is simplified and accelerated; IT responsiveness and end-user uptime are significantly improved.

### **Transform software into centrally managed services**

Build the foundation for a dynamic infrastructure.

- Dynamic enterprise is created through a virtual IT environment where applications can be delivered and managed as on-demand virtual services.
- End users can get their applications from any licensed Windows desktop, like a webpage.
- IT administrators can easily assign new computers since they can offer a generic image to all users.
- IT administrators can easily replace hardware because applications and users are not bound to specific computers.

- Facilitates business continuity planning by allowing users to go to any computer on the network and instantly get to their own applications.\*

## Technologies included in the Microsoft Desktop Optimization Pack for Software Assurance

### Microsoft SoftGrid

Deploy software applications that are never installed and never require regression testing, yet follow users anywhere, on demand. Turn Windows applications into centrally managed virtual services that are delivered to any desktop or portable computer client worldwide. Integrate and manage within Microsoft Systems Management Server (SMS).

### Microsoft Asset Inventory Service

Reduce application management lifecycle TCO through advanced software inventory scanning and by translating inventory data for more than 430,000 titles into useful, administrator-friendly information available on demand. Delivered as an easily administered, hosted service.

### Microsoft Advanced Group Policy Management

Help IT take control of the desktop through effective change management, versioning, and roll-backs via GPOs and a robust role-based administration and delegation model.

### Microsoft Diagnostics and Recovery Toolset

Quickly repair unbootable or locked-out systems, restore lost data, remove malware from infected systems while the system is safely offline using existing antivirus software, and diagnose system and network issues.

Rely on Microsoft Desktop Optimization Pack for Software Assurance to control your desktops, accelerate software deployment and management, and improve IT responsiveness and end-user uptime. The Microsoft Desktop Optimization Pack can help you reduce the TCO of your entire enterprise-wide application management lifecycle and create the foundation for an agile, services-oriented infrastructure that supports long-term organization growth.

Learn more about the Microsoft Desktop Optimization Pack for Software Assurance at <http://www.windowsvista.com/optimizeddesktop>.

\*Using Microsoft Desktop Optimization Pack for Software Assurance does not change licensing requirements for applications delivered and managed through this solution. Refer to your application license terms.

## 7.05 Hardware and Software Certification Programs

With millions of choices in PCs, software, and devices, it can be hard for customers to find the right product with the assurance of quality and ease-of-use. With Windows Vista, Microsoft has advanced its hardware and software certification program to help customers identify products that work with Windows Vista. The Windows Vista Logo Program gives customers the confidence that when they buy a PC, device, or application it has been tested to meet Microsoft standards of compatibility, reliability, and security. To simplify the purchase decision, there are now two tiers of the logo: basic and premium. The basic logo indicates a product has baseline functionality while the premium logo indicates a product will deliver the richest PC experience available. Premium products are designed to directly integrate with Windows Vista features and will deliver better performance, easier use, and higher fidelity graphics, sound, and video.

### Windows Vista family of logos

Logo Tier	On Computers	On Software and Devices	On Games
<p><b>Premium logo for premium experiences</b></p> <p>In addition to passing Microsoft standards of compatibility, reliability, and security, products with these logos take advantage of Windows Vista features and provide the richest PC experience possible.</p>			
<p><b>Basic logo for basic experiences</b></p> <p>Products with these logos have been tested to pass Microsoft standards of compatibility, reliability, and security and will work with all PCs running Windows Vista.</p>			

## Windows Vista logos on PCs

With a comprehensive selection of PCs—desktops, mobiles, ultraportable, ultra mobile—and an often complicated array of technical options, customers need a better way to identify PCs that can meet their needs. For consumers that want baseline functionality and reliability, systems with the basic logo will provide an excellent, cost-efficient PC experience. For consumers that want to make the most out of enjoying photos, music, videos, and games, systems with the premium logo will provide the richest PC experience possible.

No matter what system customers choose, if it bears the basic or premium logo, they can be assured that their PC has been tested to Microsoft standards of reliability, stability, and security.

### “Premium” logo level

PC systems carrying the premium logo are designed to enable today’s digital life. Microsoft has worked with its partners to develop new standards in graphics, wireless networking, audio, printing, and color management so Windows Vista can take full advantage of today’s hardware advancements while operating in a more stable, reliable, and secure environment. Windows Vista premium systems are ready for high-fidelity experiences with games, photos, videos, and music and take full advantage of the new user experience in Windows Vista called Windows Aero.

The premium logo also signifies a long-term commitment by Microsoft and its hardware partners to maintain the quality of device driver software long after a product ships. PC systems carrying the premium logo must maintain a “Green” Driver Quality Rating of stability for the life of the product, which is monitored by Microsoft. Drivers that cause system crashes and fail to meet the Driver Quality Rating standard are required to update device driver software within 90 days in order to maintain the logo certification.

### “Basic” logo level

Systems that carry the basic logo indicate that the product has met the minimum hardware requirements to work well with Windows Vista. A PC with this basic logo is tested to Microsoft standards and will be more reliable, stable, and secure.

## Logos on computers after market availability of Windows Vista

Logos on PCs	What the Logo Means
	<ul style="list-style-type: none"> <li>▪ Desktops and mobile PCs will run the Windows Aero user experience and accompanying features such as Flip 3D and themed slide shows</li> <li>▪ Integrated displays and audio experiences have been tested to high-fidelity standards</li> <li>▪ Network connectivity is compatible and supports high bandwidth standards whether wired or wireless</li> <li>▪ Devices connect to the PC faster and more reliably</li> <li>▪ Hardware and device driver software is more reliable, stable, and easily updated</li> <li>▪ Sufficient hardware to run multimedia applications such as Windows Media Center, Windows Movie Maker HD (high definition), and Meeting Space</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Desktops and mobile PCs meet the minimum hardware requirements for a reliable and secure PC experience running Windows Vista</li> <li>▪ Essential graphics, storage, and audio hardware provide a robust base for basic PC activities</li> </ul>

## Logos on computers prior to market availability of Windows Vista

Logos on PCs	What the Logo Means
	<p>Many PCs will carry the Windows Vista Premium Ready logo which signifies the PC meets hardware performance specifications required to run Windows Vista Home Premium Windows, Windows Vista Business, or Windows Vista Ultimate editions and delivers the best Windows Vista experience.</p>
	<p>A PC carrying the Windows Vista Capable logo means that it will run the core experiences of Windows Vista, including innovations in organizing and finding information, security, and reliability.</p>

## Windows Vista logos on hardware and devices

Microsoft has worked with industry partners to develop new standards and device categories so Windows Vista can take full advantage of dramatic advances in hardware and devices to enhance the types of computer activities people have become accustomed to. In some cases, Microsoft expects that these enhancements will encourage end users to do even more with their PCs than those users thought possible. Windows Vista is ready to help prepare end users for the future with integrated support for high-end graphics, HD audio, HD video, and easy wireless setup. More than 20 categories of devices qualify for either the Works with Windows Vista or the Certified for Windows Vista logo:

- Audio
- Camcorders
- Cameras
- CD & DVD Readers/Burners
- Cell Phones
- Digital Picture Frames
- Displays and Monitors
- Flash Memory
- Gaming Devices
- Graphics Cards
- Hard Drives
- Headsets
- Keyboards
- Mice
- Portable Audio Devices
- Printers
- Remote Controls
- Routers
- Scanners
- Smart Card Readers
- TV Tuners
- USB Transfer Cables
- Webcams
- Wireless Routers

Pair any Certified for Windows Vista or Works with Windows Vista device with any edition of Windows Vista and it just works. But for a fully integrated, rich PC experience across multiple devices, combine Certified for Windows Vista devices with Windows Vista Home Premium, Windows Vista Business, or Windows Vista Ultimate editions. Certified for Windows Vista products allow the operating system to integrate seamlessly with hardware so activities such as burning DVD movies, boosting performance, or setting up a wireless network are easier than ever before. Certified for Windows Vista devices work better together too. For example, monitors and printers must pass color standards in the new Windows Color System so the photo on your screen looks like the photo you print.

Logos on Hardware and Devices	What the Logo Means
	<ul style="list-style-type: none"> <li>• Devices are tested to deliver a superior experience with a PC running Windows Vista</li> <li>• Devices take full advantage of specific Windows Vista features</li> <li>• Devices work better together</li> <li>• Wireless devices, such as routers, are easy to set up</li> <li>• Easy device installation; just attach the device first</li> </ul>
	<ul style="list-style-type: none"> <li>• Devices are tested to Microsoft standards of compatibility, reliability, and security</li> <li>• These products meet baseline standards of functionality on all PCs running Windows Vista</li> </ul>

## Windows Vista logos on software

Microsoft has been working with software partners industry-wide to improve the overall quality of software running on Windows. All software that carries the Certified for Windows Vista logo is required to pass third-party testing to verify that the software runs more reliably with fewer crashes and hangs, integrates with Windows Vista security features, and delivers a more reliable and predictable installation experience.

The Certified for Windows Vista logo also indicates a long-term commitment between Microsoft and its software partners to address product issues and improve software quality on an ongoing basis. If problems occur, customers have the choice to submit feedback and software partners are required to address the biggest problems in order to maintain Certified for Windows Vista logo status.

Software that bears the Works with Windows Vista logo does not go through independent testing, but partners are required to test for compatibility and functionality and must commit to providing customer support for products running on Windows Vista.

Logos on Software	What the Logo Means
 <p>The logo features the Windows logo (four colored panes: red, green, blue, yellow) inside a blue circle, with the text "CERTIFIED FOR Windows Vista™" below it.</p>	<ul style="list-style-type: none"> <li>• Increased reliability by minimizing the number of crashes, hangs, and system restarts experienced by users</li> <li>• Improved overall security of applications and compatibility on different computer architectures and configurations</li> <li>• Improved application reliability as the operating system is serviced or upgraded</li> <li>• Easy installation on Windows Vista without degrading the performance of the operating system and other applications</li> <li>• Rigorous testing by a third-party authority ensures compliance with the Certified for Windows Vista technical requirements</li> </ul>
 <p>The logo features the Windows logo (four white panes) on a dark grey background, with the text "Works with Windows Vista™" to its right.</p>	<ul style="list-style-type: none"> <li>• Applications have been tested by the software vendor to ensure compatibility and full functionality when running on Windows Vista</li> <li>• Software vendors have agreed to support customers using this software with Windows Vista</li> </ul>

## Games for Windows logos on software

Microsoft is also working with the industry's leading game publishers to ensure that new games take advantage of everything Windows Vista has to offer.

Games that carry the new Games for Windows logo on their packaging take full advantage of the new Windows Vista gaming features. These include support for the Games Explorer, game ratings that support the Parental Controls feature, the ability to be launched from within Windows Media Center, support for the Xbox 360 controller (if the title supports gamepad control), and more. Titles that carry the Games for Windows logo also support easier installation, getting you into your game faster. Popular games are already available with this support, including "Flight Simulator X" and "Age of Empires III: The Warchiefs" from Microsoft Games Studios, "Lego Star Wars II: The Original Trilogy" from LucasArts, "Company of Heroes" from THQ, and many more.

Logos on PC Games	What the Logo Means
	<ul style="list-style-type: none"> <li>• Games are simpler to install with an "easy install" option</li> <li>• Games appear in the Games Explorer, include ratings, and fully support the Parental Controls functionality in Windows Vista</li> <li>• Games can be launched from within Windows Media Center</li> <li>• Games support the Xbox 360 controller for Windows (if the games supports gamepad control)</li> <li>• Games meet Microsoft requirements for stability, compatibility, and reliability</li> </ul>

## 7.06 Recommended System Requirements

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### Recommended system requirements for Windows Vista Ultimate, Home Premium, Enterprise, and Business:

- 1 GHz 32-bit (x86) or 64-bit (x64) processor<sup>1</sup>
- 1 GB of system memory
- 40 GB hard drive with at least 15 GB of available space
- Support for DirectX 9 graphics with:
  - WDDM Driver
  - 128 MB of graphics memory (minimum)<sup>2</sup>
  - Pixel Shader 2.0 in hardware
  - 32 bits per pixel
- DVD-ROM drive<sup>3</sup>
- Audio output
- Internet access (fees may apply)

### Recommended system requirements for Windows Vista Home Basic:

- 1 GHz 32-bit (x86) or 64-bit (x64) processor<sup>1</sup>
- 512 MB of system memory
- 20 GB hard drive with at least 15 GB of available space
- Support for DirectX 9 graphics and 32 MB of graphics memory
- DVD-ROM drive<sup>3</sup>
- Audio output
- Internet access (fees may apply)

### Recommended system requirements for Windows Vista Starter<sup>4</sup> and minimum system requirements for all Windows Vista editions:

- 800 Mhz processor
- 512 MB of system memory
- 20 GB hard drive with at least 15 GB of available space
- Support for Super VGA graphics
- CD-ROM drive

### Additional requirements to use certain features:

- TV tuner card required for TV functionality (compatible remote control optional)
- Windows Tablet and Touch Technology requires a Tablet PC or a touch screen
- Windows BitLocker Drive Encryption requires a USB flash drive and a system with a TPM 1.2 chip

Windows Vista Upgrade Advisor can help you determine which features and edition of Windows Vista will run on your computer; visit [www.windowsvista.com/upgradeadvisor](http://www.windowsvista.com/upgradeadvisor). For complete Windows Vista requirements, visit [www.windowsvista.com/systemrequirements](http://www.windowsvista.com/systemrequirements).

<sup>1</sup> Processor speed is specified as the nominal operational processor frequency for the device. Some processors have power management which allows the processor to run at lower rate to save power.

<sup>2</sup> If the GPU uses shared memory, then no additional graphics memory is required beyond the 1 GB system memory requirement; if the GPU uses dedicated memory, then 128 MB is required.

<sup>3</sup> A DVD-ROM may be external (not integral, not built into the system).

<sup>4</sup> No support for 64-bit (x64).

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