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Windows 7 Reviewer's Guide

A First Look at Windows 7

DRAFT

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Introduction

Computers are an integral part of the everyday lives of billions of people. PCs come in more sizes and shapes, can do more things, and are used for more purposes than anyone could have imagined just five years ago. Over the years, the Windows® operating system has become much more than simply the backbone of the PC; it's the connective tissue that enables people to communicate with others, manage a busy schedule, succeed at school or work, or just have fun.

As the role of the PC has continued to evolve at a rapid pace, your expectations for what an operating system should deliver have grown. First and foremost, you care more than ever about the basics. You want your PC to deliver on the “fundamentals”—to be ready, responsive, safe, reliable, and work well with the applications and devices you depend on. You want everyday tasks to be faster and easier—including new choices in how you interact with your PC, greater control over your desktop, and the ability to quickly find what you need, regardless of where it resides.

You also want all of your digital devices—including PCs, multifunction printers, cell phones, cameras, and MP3 players—to connect and work together, so that you can easily find, access, and share information across the components of your digital world. You want to get more out of your devices, easily connect them to your PC, and take full advantage of the features you paid for. As you add more PCs to your home, you want to be able to add them to your home network and easily share media and files across your PCs. And with access to more digital media than ever, you want to be able to enjoy that media when and where you want, regardless of how or where it's stored.

Finally, you want a simpler, more integrated online experience. You want to easily get online, stay connected on-the-go, and remain productive anywhere, with access to work resources from home or other locations. You want your PCs and

the Web to work together, making it easier to access online services that help keep your life in sync and stay connected to the communities, people, and information you care about. And when browsing the Web, you want the experience to be faster and easier while delivering greater levels of safety, choice, and control.

The role of the PC in the enterprise is evolving as well, presenting new challenges for IT professionals who must enable end users to get more done, find information faster, and work from any location. The growth of mobile computing and the need to provide more flexibility to end-users also present new challenges to IT professionals, who must maintain control over an increasingly complex computing environment. At the same time, IT professionals must continue to enhance security and compliance, all while keeping costs in check. IT professionals must find new ways to streamline all aspects of PC management—including desktop and application deployment, ongoing administration, and support.

This guide provides a first look at how Windows 7 helps meet the needs of both end users and IT professionals. It's written as a companion to the pre-Beta preview version of Windows 7 that Microsoft is distributing at the Professional Developer's Conference (PDC) in October 2008. Some features described in this guide will be demonstrated at the PDC, but will not be available in the pre-Beta build Microsoft is distributing at this event. Throughout the guide, we have noted which features are not enabled in the pre-Beta build.

Also, not all features that will be delivered in the final version of Windows 7 are covered in this guide; however, it provides a great first look at how Windows 7 will make the things you today faster and easier and make new things possible. We encourage you to reference this guide as you experiment with the pre-Beta preview version of Windows 7, and to try the Beta version of the product when it becomes available.

Designing Windows 7

Windows software is part of the everyday experience of billions of people. They experience it in significant ways, such as using a Web cam to visit with a loved-one on the other side of the world. And they experience it in small ways, such as simply launching a favorite program or game. In each case, their satisfaction depends on those experiences just working—in a way that's intuitive and inspiring. In designing Windows 7, we focused on delivering greater customer satisfaction in both big and small ways.

In Windows Vista® and Windows Server® 2008, the most recent releases of the Windows platform, Microsoft introduced a number of substantial investments in platform technology. Among those were a new graphics subsystem, a new driver model, a new componentization model, and significant enhancements to the kernel to improve security. In Windows 7, we're making fewer major architectural changes, instead building on the platform improvements we made in Windows Vista to deliver innovative end-to-end experiences to consumers and businesses. Our goal is to ensure the investments that our partners and customers have made in Windows Vista are fully respected and that they continue to deliver great value as customers move to Windows 7.

Windows 7 delivers new end-to-end experiences with attention to the critical details that drive customer satisfaction. To accomplish this, we made some changes in how we designed and built Windows 7. The planning process documented the end-to-end experiences to be delivered in this release, not just the technology we

planned to build. Teams are accountable for complete, end-to-end scenarios, with a focus on how customers will experience the technology.

Great customer experiences require seamless operation across hardware, software, and devices. When Windows Vista was initially released, not all of Microsoft's partners had adapted their products to run well on the Windows Vista platform. This diminished many customers' first experience with Windows Vista. In Windows 7, Microsoft worked closely our partners from the earliest planning phase, during which we solicited early feedback on design concepts. Before writing code, Microsoft talked to OEMs. Before defining APIs, Microsoft talked to developers. And before adding support for new devices, Microsoft worked with device manufacturers to understand what scenarios would be enabled by next-generation hardware.

Market Trends

In designing Windows 7, Microsoft examined how the industry has changed and where it's headed. In doing so, a few key themes emerged:

- **Hardware advances.** Although Tablet PCs with touch screens were introduced more than five years ago, new devices have revitalized the role of touch in the user experience. Other technology becoming commonplace includes solid state disk drives, faster wireless networking, enhanced Bluetooth connectivity, multi-core CPUs, 64-bit processors, and powerful new graphics accelerators.
- **Expanded diversity and complexity of devices.** The type and range of devices available continues to expand: Nearly 1,500 new Plug and Play identifications are reported daily and more than 4 million Plug and Play devices are expected by 2010. Devices such as MP3 players and mobile phones can store more information and are becoming increasingly complex.
- **Growth of mobile computing and new form factors.** In the United States, laptops are now more prevalent than desktops. New form factors are arriving at a rapid pace, including NetBooks, ultra mobile PCs, and Tablet PCs. Furthermore, with the increasing popularity of laptops, PCs are becoming less shared and more personal, with customers often citing "the computer fits my personality" as a factor in purchase decisions.
- **More connectivity options.** People want to easily get online and stay online through whatever type of connectivity is available. And with the lines between personal and work activities continuing to blur, people want access to all of the information they care about whether at work, at home, or on the road—all through a single, integrated user experience. Enabling a mobile, always-connected workforce is critical to a business's ability to compete, with IT professionals challenged to do so in a way that minimizes costs and helps maintain security.
- **Multiple PCs per household.** More than 50 percent of U.S. households today have more than one PC. However, setting up a home network is difficult for the average consumer. Managing, finding, and selectively sharing information across multiple PCs can be even more challenging.
- **Ever-increasing role of media.** Consumers have access to more types of digital media, including music, video, TV, photos, and an ever-increasing amount of rich content on the Web. They want that media to be easier to discover, use, and share—accessible through more devices without added complexity, regardless of whether they are listening to music on wireless headphones or watching a movie on a big-screen TV.
- **Rapidly evolving Web.** Browsing the Web remains the single most popular activity on the PC, with people spending more time on the Web and doing more things on it. They want a Web browsing experience that supports all that the Web has to offer, with everyday tasks and content at their fingertips. And they want to know that they're protected from hackers, malware, viruses, and other forms of Internet-based threats.

Engineering Focus Areas

Based on these trends, Microsoft focused its design efforts for Windows 7 around a few key themes—areas where we saw the greatest opportunity to deliver value to end users and IT professionals:

- **Specialized for Laptops.** Microsoft focused on how Windows 7 could enhance the user experience on laptops, making them more responsive, energy-efficient, secure, and easier to use.
- **Designed for Services.** Web-based services are an increasingly important component of the user's computing experience, so significant emphasis was placed on integrating services into the overall Windows experience.
- **Personalized Computing For Everyone.** Microsoft designed Windows 7 to provide a personalized computing experience for everyone—one that gives people greater control over their desktops and enables them to more quickly get things done, putting access to everyday tasks and content right at their fingertips.
- **Optimized For Entertainment.** In Windows 7, Microsoft worked to help consumers experience digital media in new ways, enabling them to take advantage of the increasing range of connectivity options to share their media with other computers and devices.
- **Engineered For Ease of Ownership.** Security and quantifiable cost savings are key reasons for businesses to adopt a new operating system, with application and device compatibility being the top barriers to adoption. So Microsoft worked to make sure that Windows 7 included enhancements to make it easier to manage and keep secure, and that it ran well with the same applications and devices as Windows Vista.

Continued Delivery of New Value

Another goal for Windows 7 is to begin to establish a regular release cycle, so that customers and partners can benefit from predictable updates to the core operating system. However, many client experiences today are delivered through the Web, and you expect innovations to these experiences more frequently than is possible

with a core Windows operating system release. To this end, Microsoft has established vehicles to deliver new and enhanced customer experiences on an ongoing basis, with Windows Live™ as a delivery vehicle for consumers and the Microsoft® Desktop Optimization Pack (MDOP) as a delivery vehicle for IT professionals.



Windows 7 for End Users

As a Windows user, you depend on your PC more than ever before.

You want everything you do on your PC—from navigating the Windows desktop to finding and organizing files to using the Web—to be faster and easier. You want the devices you depend on to work well with your PC, and you'd like it if Windows could make it easier to get the technology in your home to work well together. And because you spend a lot of time on the Web, you'd like that experience to be faster and safer—and you'd like it to be consistent with your offline experience, so that you don't have to learn two ways to do the same thing.

Meet Windows 7. We think you're going to like what you see.

Works the Way You Want

Windows 7 delivers the fundamental performance, reliability, and security features that you expect. Your system starts up, shuts down, and resumes from standby faster, and your portable PC's battery lasts longer. Browsing the Web is faster too. Windows 7 is more secure, and it's easier to help protect your privacy and data. Keeping your PC running smoothly—and finding out what to do when there's a problem—is much simpler and faster. And Windows 7 is designed to be compatible with the same hardware, applications, and device drivers as Windows Vista.

Everyday Tasks are Faster and Easier

A key focus for Windows 7 has been to streamline and simplify the tasks you do most often. An enhanced Start menu and Windows Taskbar put commonly-used resources within easy reach, minimizing clutter and maximizing usable space on the desktop. The Windows Aero® desktop feels more organized and clean, with a streamlined user interface that puts you in control and helps you get where you want to go faster. Managing large numbers of windows is much easier, with intuitive touch gestures to view multiple documents at once and remove unneeded windows.

Windows 7 also provides a better way to manage devices, bringing together many of the common tasks, manuals and services for your cameras, mobile phones, and other peripherals. With Windows 7 and Windows Live, it's easy to view, organize, and find all your documents, pictures, movies, and music, regardless of which PC they're stored on—and share them with your friends, family, and colleagues.

New Things Possible

As processing power, storage, and network bandwidth continue to increase, Microsoft is working to translate those developments into exciting new capabilities for customers. In Windows 7, Microsoft is building on its investments in next-generation user interfaces, moving beyond the mouse and keyboard and enabling people to interact with their PCs through multi-touch gestures, handwriting, or voice.

Windows 7 also takes advantage of the power of home networks to let you access all of your music, pictures, and videos from the different PCs in your home, even when what you want is on another computer. An enhanced Windows Media Center offers one-stop access to your favorite TV shows, whether they're on-the-air or on the Internet. And Windows 7 offers more options than ever for you to customize and personalize your PC with styles that match your personality.

Windows 7 for End Users:

Works the Way You Want

As a PC user, you care about the basics. You need your PC to be reliable, responsive, and safe. It's annoying to wait for your computer to start or to be interrupted by pop-up notifications that don't seem relevant. You want the data on your PC to remain protected from prying eyes—including all the threats you hear about on the Web. You want your laptop's battery to last longer, and you need the applications and devices you depend on to work well with your PC. In other words, you want everything to "just work"—and to work how you want.

Windows 7 builds on the substantial investments that Microsoft made in Windows Vista to deliver an operating system that boots quickly, is fast and reliable, is more secure, gets the most out of today's powerful hardware, and connects with the broad world of devices you use today.

Get Going Quickly

Whether you buy a new computer or upgrade an existing one to Windows 7, you'll want to get through the setup process as quickly as possible and start using your Windows 7 PC. With Windows 7, you'll notice the difference as soon as you take your new PC out of the box. You'll be able to start using your PC, set up a home network, and begin sharing files with other computers in your home more quickly than with previous versions of Windows. Windows 7 is designed to improve your first experience and get you going quickly.

First Experience With a New Windows 7 PC

A new PC running Windows 7 is designed to get you up and running fast. If you have a wireless network and your computer has a wireless adapter, you'll be able to quickly connect to your wireless network. You can also create or join a HomeGroup (discussed later) to start sharing files and printers with everyone in your home. Tasks that aren't vital to getting you set up and connected to a network have been removed from the setup process.

When you're done, the desktop feels organized and clean. You can personalize your experience and change things like glass color, desktop background, screen saver, and sounds. You'll also be guided through creating an account, accepting the licensing agreement, choosing your language and region, and turning on Windows Update.

You may notice that Microsoft removed the Welcome Center, a component of Windows Vista. Rather than automatically launching an application at the end of the setup process (and delaying your access to the desktop), Windows 7 includes a new Getting Started experience that points you in the right direction by highlighting common tasks on a new PC. You'll see Getting Started



Streamlined setup

on the Start menu, where you'll have easy access to several different tasks using the new Jump List. You can explore new features, start transferring files from your old PC, add new user accounts, and more. Getting Started is there when you need it, stays out of your way when you're doing other things, and eventually disappears when it's no longer used.

Upgrading a PC to Windows 7

In the past, when upgrading from one version of Windows to a newer version, there may have been times when you weren't sure if the process was still progressing normally. Or the installation may have stopped due to a system configuration issue, and then stopped again due to a different issue after you had addressed the first one. The upgrade experience for Windows 7 addresses these issues, keeping you more informed about progress and providing you with all upgrade-related information up-front.

Windows 7 lets you know that the upgrade process is progressing as intended. All too often, people cancel an upgrade thinking that it has stalled, when in fact everything is functioning properly in the background. To remedy this, Windows 7 provides regular progress updates throughout the upgrade process, with those progress updates replacing the "Your upgrade may take several hours to complete" text at the bottom of the screen in Windows Vista.

Windows 7 provides all upgrade-related information—such as PC configuration, memory and disk space required, and application and device compatibility—in a single, easy to scan report, thus reducing the likelihood of repeated upgrade failures.

Windows 7 also includes several enhancements to the upgrade experience for 64-bit systems, one of which is the ability to upgrade from a 64-bit version of Windows Vista to a 64-bit version of Windows 7. A "load driver" feature is also provided so that, if an upgrade is blocked due to incompatible or missing drivers that are required for the system to boot, you can load a new or updated driver from the Compatibility Report and continue with the upgrade.

Windows Easy Transfer

Introduced in Windows Vista, Windows Easy Transfer makes it simple for you to move files, folders, program settings, and system settings from your old PC to your new one. However, in the past, you may have had difficulty finding or deciding on which files to transfer—or started the process and walked away, only to come back later to find that it had stalled after just a few minutes.

If you're adding a second computer to your home, the new file explorer in Windows Easy Transfer for Windows 7 lets you see files on other computers and pick the ones you want to copy to your new PC. If you're not sure what you want to transfer, the new selective restore feature in Windows Easy Transfer lets you save all the files and settings on your old PC to removable media and then pick and choose which files and settings you want on your new PC. Everything else remains safely stored in your Windows Easy Transfer archive, in case you want to access it later.

Because no one wants to monitor a lengthy file transfer process in case an error occurs, Windows 7 enables you to leave the transfer unattended. If Windows Easy Transfer encounters a file or setting that it can't transfer, the migration will continue to completion and you can view a report of any items that failed to transfer, with the option to try again for files that didn't transfer. You can even save the report on your new PC, so you can refer to it later.

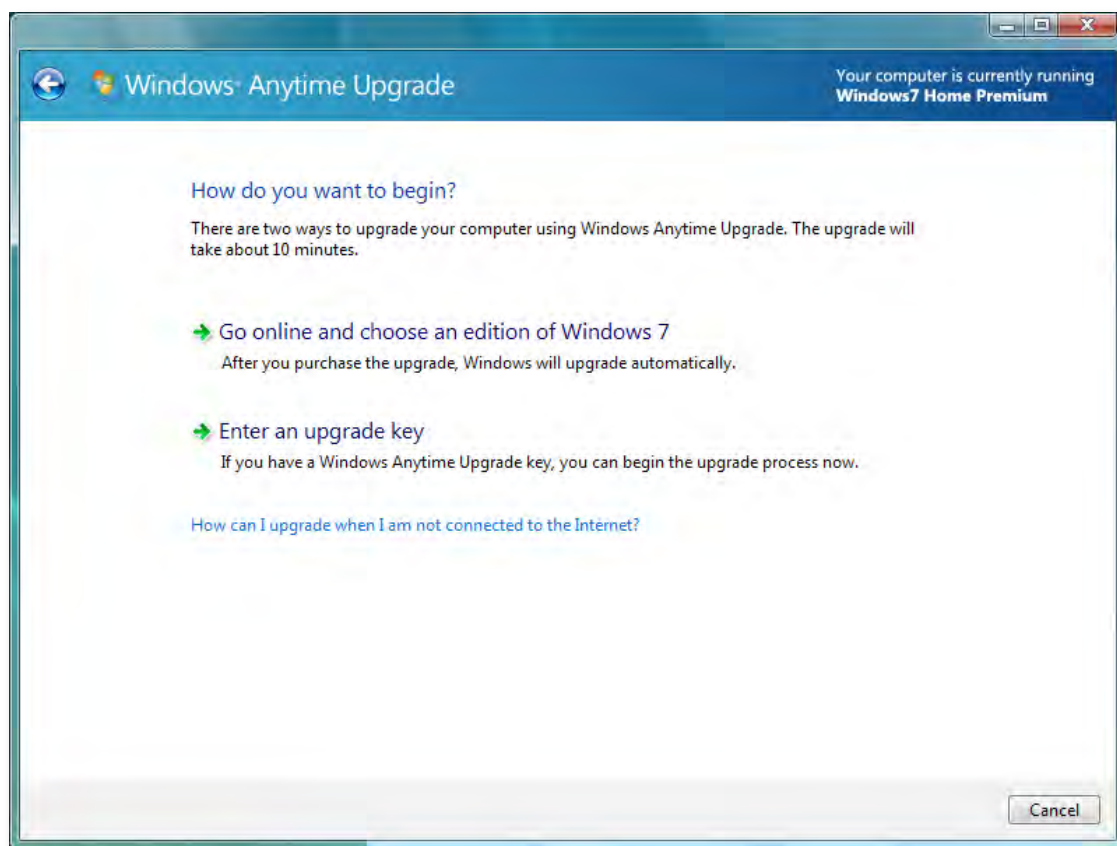
Although Windows Easy Transfer does not move installed applications, it does make the process of reinstalling those applications on your new PC easier. It does this by inventorying installed programs on your old computer and presenting that information in a post-migration report. Applications are categorized as discontinued Windows components, programs from known hardware manufacturers, programs from independent software vendors, and programs without a defined publisher. The report also includes links provided by independent software vendors to product information, software updates, and support.

Finally, although the same version of Windows Easy Transfer needs to be running on all PCs, Windows Easy Transfer takes care of this for you. Its new peer update feature automatically copies the latest version of Windows Easy Transfer to other PCs after they're connected, so you won't need to install any new software on your old PC before you can start transferring data.

Windows Anytime Upgrade

With Windows Vista, upgrading from one edition to another required physical disks and the process could take up to an hour. In Windows 7, Windows Anytime Upgrade enables you to quickly and easily upgrade from one edition to another in about 10 minutes—without requiring physical media. All the software required to upgrade already resides on your PC, and can be

“unlocked” by purchasing a software key from Microsoft or a retailer. You won’t have to download any software, and your existing customizations—including the exact look and feel of your desktop—will be retained. If you upgrade online, you won’t even need to type in an upgrade key.



Upgrading to other editions of Windows 7 is fast and easy

Delivers on the Basics

All the great new innovations in Windows 7 won't matter if the operating system doesn't deliver on the basics. That's why fundamentals are a key focus for Windows 7. Performance is improved, with your PC starting up, shutting down, and resuming from Standby faster. Your Windows 7 PC is more reliable, works well with your existing applications and hardware, and helps guard your security in new ways.

Faster and More Responsive

Nobody likes to wait. You want an operating system that is ready when you are, and that responds quickly to what you tell it to do. So Windows 7 is designed to be ready and responsive. It starts, shuts down, and resumes from Standby faster than earlier versions of Windows, and enables you to better take advantage of external USB flash memory drives to improve performance. Web browsing is faster, too, as are common activities such as searching.

Performance improvements in Windows 7 start under-the-hood. Windows 7 is designed to reduce background activity and adds support for trigger-starting of system services, starting them only when they're needed instead of ahead-of-time—for example, the Windows Bluetooth service is only started when a Bluetooth device is connected to the computer. Windows 7 also includes improvements to the kernel that enable applications and services to scale efficiently on small to large systems.

Many of the individual features within Windows 7 also deliver improved performance. For example, rendering of graphics in a number of DirectX® components is smoother and quicker, and the window querying capabilities of accessibility automation APIs are significantly faster than before.

Because insufficient RAM can affect performance, major efforts were made to reduce memory consumption in Windows 7. For example, the size of the Desktop Window Manager (DWM) and graphics stack were reduced to deliver a responsive user interface across a broader range of system configurations. Capabilities were also added to allow device manufacturers to improve the performance of their video drivers.

Microsoft also implemented new engineering practices to ensure that Windows 7 delivers solid performance. Virtual teams focus on performance for key usage scenarios, with each team consisting of feature developers, testers, and UI designers. New tests implemented throughout the development process help ensure early detection and resolution of any performance-related issues.

A few key areas where you'll notice improved performance in Windows 7 include the following:

- **Startup and Shutdown.** Windows 7 is ready when you are. PCs running Windows 7 start faster, and startup times are more consistent. Windows 7 also shuts down faster than Windows Vista.
- **Resume from Standby.** When resuming from Standby, Windows 7 will be ready to use in seconds. And you won't have to reconnect to a wireless network—it will be reconnected for you after you logon. You'll spend even less time waiting for your computer to be ready if you use the Sleep mode.
- **Internet Explorer® 8.** Internet Explorer 8 starts faster, instantly creates new tabs, and loads Web pages more quickly, so your entire Web browsing experience will feel more immediate and satisfying. The JavaScript engine in Internet Explorer 8 is much faster as well, improving the responsiveness of the many sites that are based on JavaScript or AJAX. You'll also see improvements to the Address Bar, Search, Tabs, and Favorites Bar—all designed to reduce the time it takes for you to get where you want to go on the Web.
- **Search and Indexing.** When looking for information, you want answers, not delays. Windows 7 includes all performance improvements from Windows Search 4.0, so search and indexing are much faster. Sorting and grouping of search results are significantly faster as well.
- **ReadyBoost™.** PCs that are low on memory must constantly swap data to disk, which decreases performance and leaves you frustrated. ReadyBoost (introduced in Windows Vista) improves system responsiveness. It does this by using flash memory devices to cache frequently-used data, which the computer can read more quickly from flash memory than from a traditional hard drive. ReadyBoost in Windows 7 adds support for concurrently using multiple flash devices (such as USB keys, Secure Digital cards, and internal flash devices) and for caches larger than 4 GB. ReadyBoost supports exFAT, FAT32, and NTFS file systems.

Reliability

Windows 7 is the most reliable version of Windows yet. You'll experience fewer interruptions, and can recover more quickly from problems when they do occur because Windows 7 will help you fix them. As with performance, reliability improvements start under-the-hood. Some of the low-level enhancements in Windows 7 that improve reliability include:

- **A Fault Tolerant Heap**, which is designed to resolve common memory mismanagement issues without requiring change to the offending application. As many as 15% of crashes today are due to heap corruptions. A new feature in Windows 7, Fault Tolerant Heap mitigates the most common causes of heap corruption, significantly reducing the number of crashes you will experience.
- **Process Reflection**, which reduces the disruption caused by diagnostics. Using Process Reflection, Windows 7 can capture the memory content of a failed process on your PC while at the same time recovering that failed process through a "cloning" capability. In this way, your application

can recover and continue running—and you'll remain productive—while Windows 7 diagnoses and analyzes the failure condition.

Windows 7 also monitors its own reliability more deeply, providing you with access to that information through an improved Reliability Monitor UI. The data collected is more granular and, as with performance data, you can choose to send to Microsoft by participating in the Customer Experience Improvement Program. Where relevant, specific reliability data that Microsoft collects (such as diagnostic data for poorly-behaving applications) is sent to Microsoft partners to help them improve the quality of their products.

Finally, Windows 7 makes printing more reliable and trouble-free. Driver sandboxing prevents poorly-written device drivers from negatively affecting other device drivers or Windows as a whole. And the print diagnostic packages in Windows 7 make common printing problems (such as removing a stuck print job) easier to diagnose and repair than ever.

Improved Battery Life

Windows 7 extends battery life for your mobile PC, helping you be productive longer while still getting great performance. Power-saving enhancements include increasing the idle time for the processor, automatically dimming the display, and more power-efficient playback for DVDs. With Windows 7, you're also kept better-informed about battery status.

Get Idle and Stay Idle Longer. Windows 7 reduces background activities and supports the trigger-starting of system services, so your computer's processor can be in an idle state more often—and an idle processor increases battery life.

Adaptive Display Brightness. The display on a typical mobile PC consumes more battery power than any other part of the computer. Windows 7 automatically reduces display brightness after a period of inactivity, much like cell phones do today. And Windows 7 intelligently adapts to your activity. For example, if the screen dims after 30 seconds and you immediately move the mouse to brighten the display, Windows 7 will wait 60 seconds before dimming the display again.

Power-saving DVD Playback. Your PC will use less power than previous versions of Windows when playing a standard-definition DVD. Windows 7 requires less processing power and is more efficient when it spins the disc, so you're more likely to get through a full movie with a single battery charge.

Wake on Wireless LAN. Having your computer go into Sleep state when idle is a good way to conserve power, and Wake on LAN provides a way to "wake up" a sleeping computer over the network when you need to access it remotely. However, in Windows Vista, waking up a sleeping computer could only be done over a wired network connection. Wake on Wireless LAN in Windows 7 provides the same capabilities over a wireless network connection.

For example, if you have a PC in your kitchen that's wirelessly connected to your home network and want to view a photo on that system from your laptop in the bedroom, the computer in the kitchen can be in sleep state and wake-up to allow you to see the photo. Similarly, in an enterprise environment, IT administrators can wake up wirelessly connected computers to apply software



Adaptive display brightness saves battery power

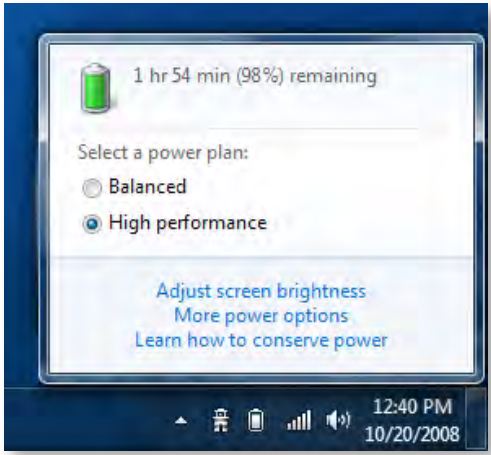


updates or perform other maintenance. In this way, IT administrators can minimize power costs for wirelessly connected systems.

Smart Network Power. Today, your mobile PC sends energy to parts of your computer when they're not being used—such as sending power to the network adapter when you don't have an Ethernet cable plugged-in. Windows 7 automatically turns off power to the network adapter when the cable is disconnected and restores power when the cable is connected. IT professionals can take advantage of this feature to further corporate "Green IT" initiatives.

Battery Life Notification. Windows 7 provides more prominent, timely, and accurate battery life notifications, helping you remain aware of power consumption and remaining battery life.

Power Config. A new utility in Windows 7, Power Config detects problems across devices, policies, firmware, system settings, applications, and other common areas where settings can reduce power efficiency, delivering that information to you in an easy to understand report.



Improved battery status and notifications

Application Compatibility

Microsoft continues to work closely with its ecosystem partners, beta testers, and early adopters to improve the overall compatibility experience for customers. Given the significant progress the software ecosystem has made in Windows Vista compatibility—and the continuous feedback and telemetry data that Microsoft expects to receive from beta customers—the Windows 7 engineering team believes that Windows 7 is on the path to deliver a high degree of application compatibility. Applications that already work well on Windows Vista or Windows Server 2008 will continue to work well on Windows 7.

Windows 7 is designed to address application compatibility in several ways, beginning with tools, processes, and education to help feature teams design compatible features. The Windows 7 engineering team continually validates application compatibility. Microsoft has built a comprehensive list of the most widely used consumer and enterprise applications, against which Windows 7 is being tested throughout

the development cycle. Microsoft is also investing in tools such as the Windows Upgrade Advisor and Application Compatibility Toolkit (ACT) to help customers assess application compatibility.

For untested or in-house developed applications, Windows 7 provides a number of in-box compatibility aids. For example, if an application fails to install because of a hard-coded version check, the Program Compatibility Troubleshooter can automatically fix the problem (with the user's consent) and rerun the installer. Windows 7 also includes an expanded application shim infrastructure and a Problem Steps Recorder that people can use to capture application compatibility issues for evaluation by technical experts.

Finally, Microsoft is monitoring application compatibility issues across the Windows ecosystem—and investing in partner outreach efforts so that software developers have the resources required to ensure application compatibility.

Device Compatibility

No one wants to upgrade their operating system only to find that a device that previously worked well no longer does. That's why Microsoft is working to ensure that devices that work with Windows Vista will work just as well with Windows 7.

As with applications, Microsoft has greatly expanded the list of devices and peripherals are being tracked for compatibility with Windows 7. Thousands of devices have been identified through data collected via the

Customer Experience Improvement Program and outreach efforts to device and PC manufacturers, and those devices are being actively tested for compatibility with Windows 7. When updated device drivers are required, Microsoft is working to ensure that you can get them directly from Windows Update or through links to driver downloads on device manufacturer Web sites.

Improved Security

Viruses, spyware, root kits, and phishing scams pose a constant risk today. Windows 7 builds upon the proven security lineage of Windows Vista, retaining the multiple layers of defense that have made it the most secure version of the Windows client to date. As with Windows Vista, Windows 7 was designed and developed using Microsoft's Security Development Lifecycle (SDL), a rigorous process that has proven to significantly reduce the number and severity of security-related design and coding defects.

The defense-in-depth security enhancements of Windows Vista form the foundation for Windows 7 security. Fundamental security features such as Kernel Patch Protection, Service Hardening, Data Execution Prevention, Address Space Layout Randomization, and Mandatory Integrity Levels continue to provide enhanced protection against malware and other forms of security threats. Windows 7 builds on this foundation to make your PC easier to use while delivering security enhancements to better protect your security and privacy.

User Account Control

The User Account Control (UAC) feature introduced in Windows Vista has been very successful at reducing the incidence of malware infection, with Windows Vista users experiencing 60 percent fewer malware infections than users of Windows XP SP2. However, some users have expressed frustration with the number of UAC consent prompts. In Windows 7, fewer operating system applications and tasks require elevation, and you can adjust consent prompt behavior if you have administrative privileges. So you'll see fewer prompts while still benefiting from reduced exposure to malware.

Windows Defender

Windows Defender, introduced in Windows Vista, helps protect you from spyware and other forms of malicious software. In Windows 7, Windows Defender is improved in several ways, beginning with the user experience. It's integrated with Action Center (discussed later) to provide a consistent means of alerting you when action is required, and features an improved user experience when scanning for spyware or manually checking for updates. Scrollbars were removed in the configuration settings screen, and the Software Explorer feature was removed because it's not integral to spyware detection and removal. In addition, real-time protection in Windows 7 is improved to provide continuous monitoring while reducing the impact on overall system performance.

Windows Filtering Platform

The Windows Filtering Platform (WFP) in Windows 7 improves security and gives you more choices with respect to security software. If you want to use a third-party firewall, its vendor can build on the core capabilities of Windows Firewall to add custom features. Third-party products also can selectively turn parts of the Windows Firewall on or off, enabling you to choose which software firewall you want to use and have it coexist with Windows Firewall.

Parental Controls

Windows 7 Parental Controls offer parents greater peace of mind and confidence in their ability to manage what their kids can do on the computer. Parents can specify which computer games their children can play and which applications they can use, and can set specific times when children can use the computer to ensure that they aren't playing games when they should be doing their homework. Windows Live Family Safety (discussed later in this guide) works alongside Parental Controls to help keep kids safe on the Web by filtering inappropriate Web sites and providing parents with a report on their kids' activities on the PC.

Protects Your Data

Whether your hard drive contains a collection of irreplaceable family photos or financial data critical to your corporation, the data you store on your computer is valuable to you. Protecting that information from loss, theft, or accidental erasure in an event of a hardware failure (or user error) is vital, and Windows 7 contains several enhancements to help protect your data, in case something goes wrong.

BitLocker To Go™

Each year, hundreds of thousands of computers without appropriate safeguards are lost, stolen, or decommissioned. However, you can also lose your data without losing your PC, with the widespread use of USB flash drives and other personal storage devices providing yet another way for your data to fall into the wrong hands. BitLocker To Go provides enhanced protection against data theft and exposure by extending BitLocker™ drive encryption support to removable storage devices, such as flash memory drives and portable hard drives, thereby helping you safeguard sensitive data on all of your USB removable storage devices.

Integrated Fingerprint Readers and Logon

Fingerprint scanners are becoming more and more common in standard laptop configurations, and Windows 7 ensures that they work well. It's easy to set up and begin to use a fingerprint reader, and logging on to Windows using a fingerprint is more reliable across different hardware providers. Fingerprint reader configurations are easy to modify, so you can control how you log on to Windows 7 and manage the fingerprint data stored on the computer.

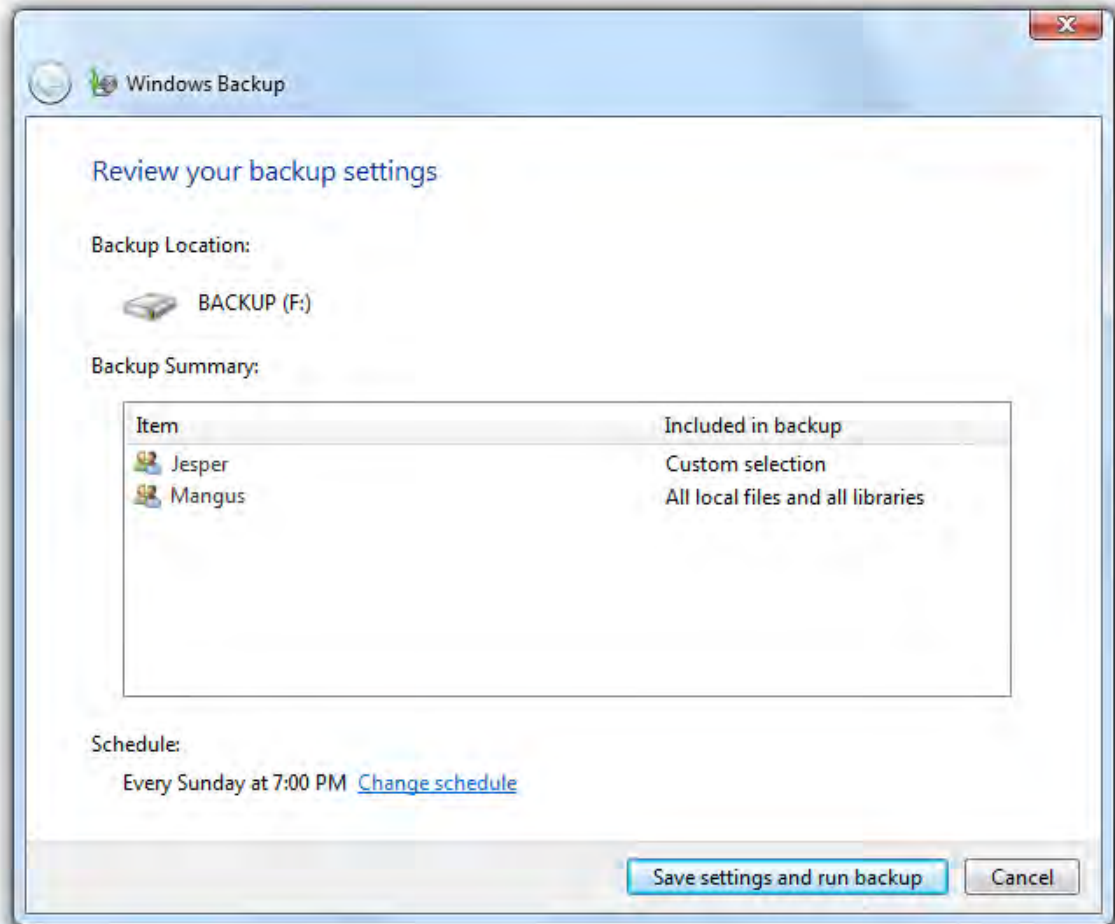
Backup and Restore

Even the most reliable computer can be subject to a hardware failure, and even the most careful person can make a mistake and delete a file that he or she intended to keep. When these things happen, it's important to have a recent backup of important data. However, many people fail to backup their computers on a regular basis. With Windows 7, it's easy to configure regular backups so that you're always prepared should something go wrong.

Windows 7 helps you configure backup settings in three quick clicks, capturing all your personal files and, if you choose, your system files. You can easily schedule regular backups, so you won't have to remember to do it

manually. You can back up everything or just specific files, and you can choose from a number of advanced backup options, such as backing up files to a network location and performing ad-hoc system backups to DVD.

Windows 7 also improves the restore experience, enabling you to restore individual files, selected folders, or all your personal files. You can even reimage or restore your entire PC from a recent backup in the event of a hard drive failure or the presence of malicious software.

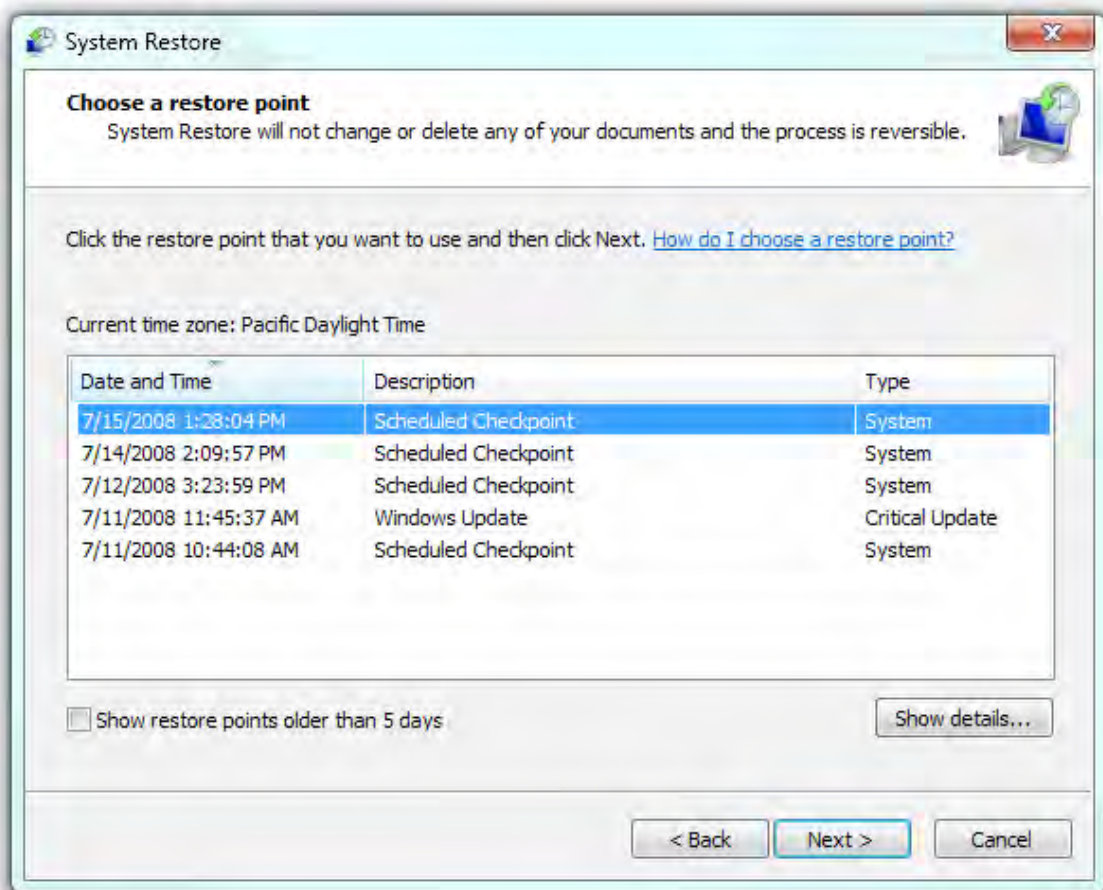


It's easy to configure regular backups

System Restore

If your PC isn't working properly, you may want to return to a previous configuration—back to a time when your machine was running well. However, you still want to retain all of the new data and changes to existing files that you've made since you left that "good" state. Introduced in Windows Vista, System Restore provides just that—a non-destructive way to return your PC to the way it was at a previous point in time, without deleting any of your personal files.

In Windows 7, System Restore is more reliable, predictable, and effective. You'll see a list of programs that will be removed or added, providing you with more information on which restore point to choose. System restore points are also available in your backups, giving you a larger list of restore points to choose from—and likely over a longer period of time.



You can restore your computer to its previous state, before a particular program was installed

Solving Problems

Although Windows 7 is designed to deliver a trouble-free computing experience, it also makes it easier to solve problems if and when they do arise. You'll have one place to go when Windows 7 needs your attention, with "troubleshooters" provided to help solve many common problems. With Windows 7, you'll find yourself relying less on the help desk or an IT professional, and able to recover more quickly when problems do occur.

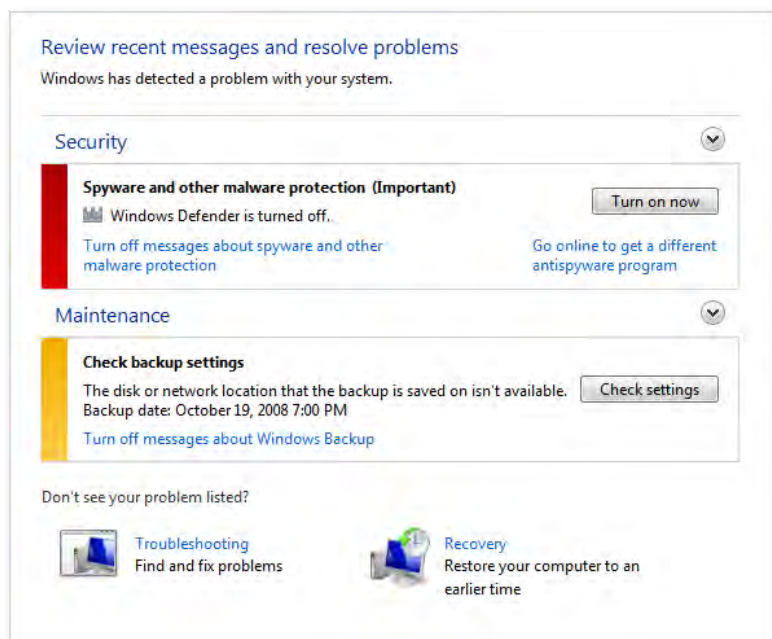
Action Center

In previous versions, Windows was often able to tell you when something needed attention on your computer. Unfortunately, it often did so by interrupting you with pop-ups or other messages. These were helpful if the problem was important and you needed to respond immediately. However, they were less helpful if the problem was not urgent and you didn't want to deal with it at the time.

Windows 7 helps you solve more problems, and it helps you solve them on your own schedule. The Action Center is a new, integrated Control Panel experience that gives you a central place to go for tasks and notifications associated with keeping your computer running smoothly. It makes it easier for you to fix problems yourself by providing a new streamlined experience for addressing notifications and managing computer issues, including configuring User Account Control.

You'll see fewer notifications on your desktop because the Action Center consolidates alerts from ten existing Windows features, including Security Center; Problem, Reports, and Solutions; Windows Defender; Windows Update; Diagnostics; Network Access Protection; Backup and Restore; Recovery; and User Account Control. When Windows 7 needs your attention, you'll see a new icon in the notification area and can find out more by clicking the icon. When you do, you'll see a menu that offers options for directly addressing an issue, or you can go to the Action Center for more details. If you don't have time to address the issue immediately, the information you need will be waiting for you the next time you visit the Action Center.

(Note: In the PDC build, Action Center is called Solution Center. This will be rebranded as Action Center in future builds.)



Notifications are consolidated in the Action Center

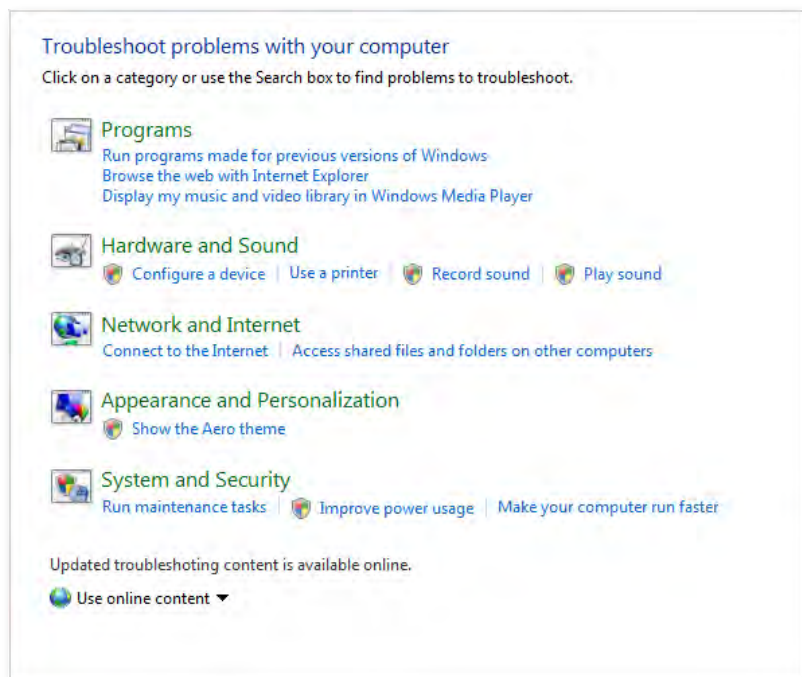
Windows Troubleshooting

No one likes waiting on the phone for help, no matter how friendly and knowledgeable the support representative may be. Wouldn't it be nice if your computer could recognize and solve many common problems, so that you could stay productive rather than calling in for help?

Windows Troubleshooting—new in Windows 7—diagnoses and resolves common operating system and hardware issues, providing built-in troubleshooters for several different types of problems. For example, the printing troubleshooter makes it easier to resolve problems with local printers, such as removing a job that's stuck in the print queue, as well as problems related to networked printers at the office. Similarly, the power-efficiency troubleshooter lets you run a simple test to determine the percentage degradation in storage capacity for your portable PC's battery, so that you can be proactive in replacing a battery that's near the end of its useful life.

Some troubleshooters that come with Windows 7 automatically run in the background, on a scheduled basis. If they discover a problem, they'll let you know in the Action Center. Examples of such scheduled maintenance tasks include cleaning up temporary files, detecting hard disk errors, removing broken shortcuts, and ensuring the system time is correct.

Windows 7 includes built-in troubleshooters for many categories, including performance, programs, devices, networking, printing, display, sound, and power efficiency. The Action Center will notify you of new and updated troubleshooters when they're made available online, as provided by Microsoft or your computer vendor.



Built-in troubleshooters help solve problems

Startup Repair

Startup problems are among the most difficult to troubleshoot because you can't start the operating system and use its built-in troubleshooting tools. Often, users or support professionals will choose to reinstall the operating system rather than attempt to solve the problem, even though the solution may be as simple as replacing a single file. Windows Vista provided an automated Startup Repair tool to diagnose and recover unbootable systems. However, extra steps were required to deploy it to a separate partition.

Windows 7 automatically installs the Startup Repair tool onto the operating system partition, so you'll always have access to it. After an unsuccessful boot, Windows 7 will automatically load Startup Repair, which will scan your PC for issues (such as corrupt registry and system files or an invalid Boot Configuration Database), automatically repair them when possible, and then reboot as normal.

More information on this feature can be found in the Windows 7 for IT Professionals section of this document.

Windows 7 for End Users: Everyday Tasks Are Faster and Easier

In Windows 7, Microsoft set out to streamline and simplify the things you do every day. You may like the convenience of saving files directly on the desktop, but could do without the cluttered look. You need to work with multiple applications, but want a more intuitive way to switch between them—without having to constantly rearrange windows as you work. And as you bring more devices and PCs into your home, you'd like it to be easier to get them to work together—and work together well.

As you use Windows 7, you'll find you can get more done without really thinking about it. The user interface is nimbler and more responsive, with navigation that gets you where you want to go faster than ever before.

Windows 7 brings the technology in your home together in new ways, making it easy to find and access what you need, no matter where it's stored or when you need it. You can easily share content across the PCs and devices in your home. You can stream music stored on the computer in your den to your laptop in the kitchen—or to your home stereo. You can connect your PC to the Internet using your cell phone or use your cell phone as a remote control for a video playing on your PC. Today, it's a challenge to get all the technology in your home to play together, let alone to work together the way you want. With Windows 7, it's simple.

Windows 7 also simplifies your life online. It helps you stay connected on-the-go and remain productive anywhere. Connection options are easier to discover and use, requiring less work and no specialized knowledge. With Windows 7, you'll have anywhere, anytime access

to the Internet, work resources, home resources, and local network resources—all cleanly integrated into the desktop experience.

With Windows 7 and Windows Live, sharing your photos, family videos, or an announcement of your business's grand opening is an easier and safer experience. Windows Live offers a single access point for your communications, contacts, and photos—you can bring together your e-mail accounts in a single inbox, manage and edit your photos in one place, and easily consolidate your contacts across your devices. When you're browsing the Web, Internet Explorer 8 in Windows 7 will make the experience faster and easier, enabling you to "reach beyond the page" you're currently browsing while helping to protect your safety and privacy in new ways.

Easier, More Intuitive Navigation

While you want to get things done more quickly, you value the familiarity of Windows. You don't have time to re-learn how to do the things you're comfortable doing today. So we made sure that improvements in Windows 7 build off the familiar Windows look-and-feel—and that any changes deliver real benefits. The UI enhancements in Windows 7—ranging from new ways to arrange and work with windows to enhancements to the Windows Taskbar, Start menu, and Windows Explorer—are designed to be intuitive and familiar, and to help you get more done with measurably fewer clicks.

Windows Taskbar

The taskbar is one of the most familiar components of Windows—sitting right at the bottom of your desktop—but in some ways you need to reacquaint yourself with it each time you use your PC. Today, files and applications that you open appear on the taskbar, allowing you to switch between open files and applications. But Windows decides where on the taskbar to place each item and their locations change with each Windows session. The icons are small and don't provide much information. And when you want to launch a new program or open a file, you have to use some other means, such as the Start menu or Windows Explorer. Over the course of a day, all these extra steps can slow you down. In Windows 7, the taskbar is changing, putting what you want to do at your fingertips.

To help you keep track of the files and programs you're using, the new taskbar in Windows 7 represents each

open window as a graphic thumbnail. If you hover your mouse over the thumbnail, the window expands to a full-screen preview. You can even close a window directly from the thumbnail. Icons are bigger, too, making it easier to select them with a mouse or with the new touch features in Windows 7.

You can work faster by placing each program exactly where you want it on the taskbar, so you always know where to click to get to the applications you use most often. You can also quickly access frequently used applications by pinning them to the taskbar. In addition, applications can use the new taskbar to provide more information in more intuitive ways. For example, you can see progress bars on a taskbar icon, so that you can stay aware of progress without keeping the window visible.

(Note: This feature is not available in the PDC build.)



Full-screen preview from the taskbar

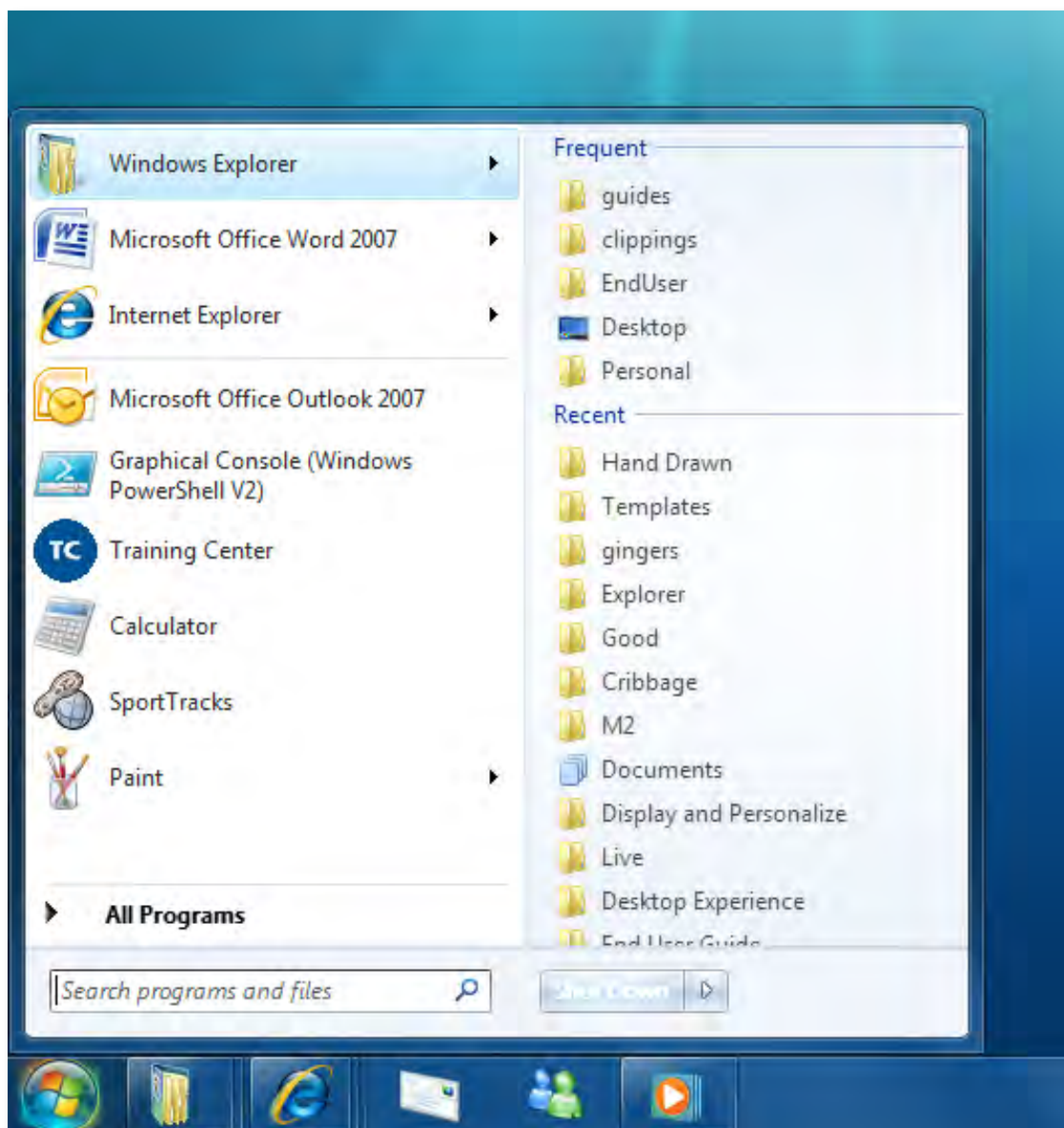
Jump Lists

If you're like most people, you probably find it hard to find the files you use most often. Many people keep frequently-used documents on the Windows desktop, which can make it cluttered over time—and thus still difficult to find that one file you need.

Jump Lists—you'll find them on the Start menu and Windows Taskbar—help eliminate that clutter, leaving you with a cleaner desktop and taking you where you want to go faster. Jump Lists are automatically populated based on how often and recently you do things, so you'll spend less time looking for your favorite song, or that document you worked on yesterday.

There's a Jump List for each program on your Start menu and taskbar, making it easy for you to find the documents you've used recently or use regularly. Some applications—such as Windows Media Player—can pre-populate their Jump Lists with common tasks. For example, on the Jump List for Windows Media Player, you'll see options to Play All Music or resume your last playlist. On the Jump List for Internet Explorer, you'll see frequently and recently viewed Web sites. With some programs, you'll even have quick access to tasks that, in the past, were only available from within the program, such as composing a new e-mail message.

(Note: This feature is not available in the PDC build.)



Jump Lists provide quick access to common tasks

Aero Desktop Enhancements

One of the benefits of Windows is the ability to work with large numbers of documents and programs at the same time. However, as you open more and more windows, you may find yourself spending more and more time managing them. Have you ever had to wade through a dozen open documents to view a file or gadget on your desktop? Do you ever find yourself struggling to “line-up” two windows so that you can compare their contents? With Aero Desktop Enhancements in Windows 7, working with multiple windows on your desktop is easier than ever.

Windows 7 lets you “peek” behind open windows to get a quick look at your desktop, so you can easily view any gadgets or files. Just hover your mouse over the far-right side of the Windows Taskbar, and all of your open windows will become transparent so you can see your desktop. You can also peek at a specific window and see

exactly where it is by hovering over its thumbnail in the Windows Taskbar.

And there’s more. Aero Snaps—an enhancement to the Aero Desktop—let you “snap” open windows to screen borders, so you’ll no longer have to click on tiny objects in the corner of a window to make it do what you want. Maximize a window by dragging its border to top of the screen, and return the window to its original size by dragging it away from the top of the screen. Drag the bottom border of a window to expand it vertically. It’s easy to copy files or compare the contents of two windows by dragging the windows to opposite sides of the screen. As your cursor touches the edge, the window will resize to fill that half of the screen.

(Note: The “peek” feature is not available in the PDC build.)



Peeking through windows to see the desktop

Windows Explorer

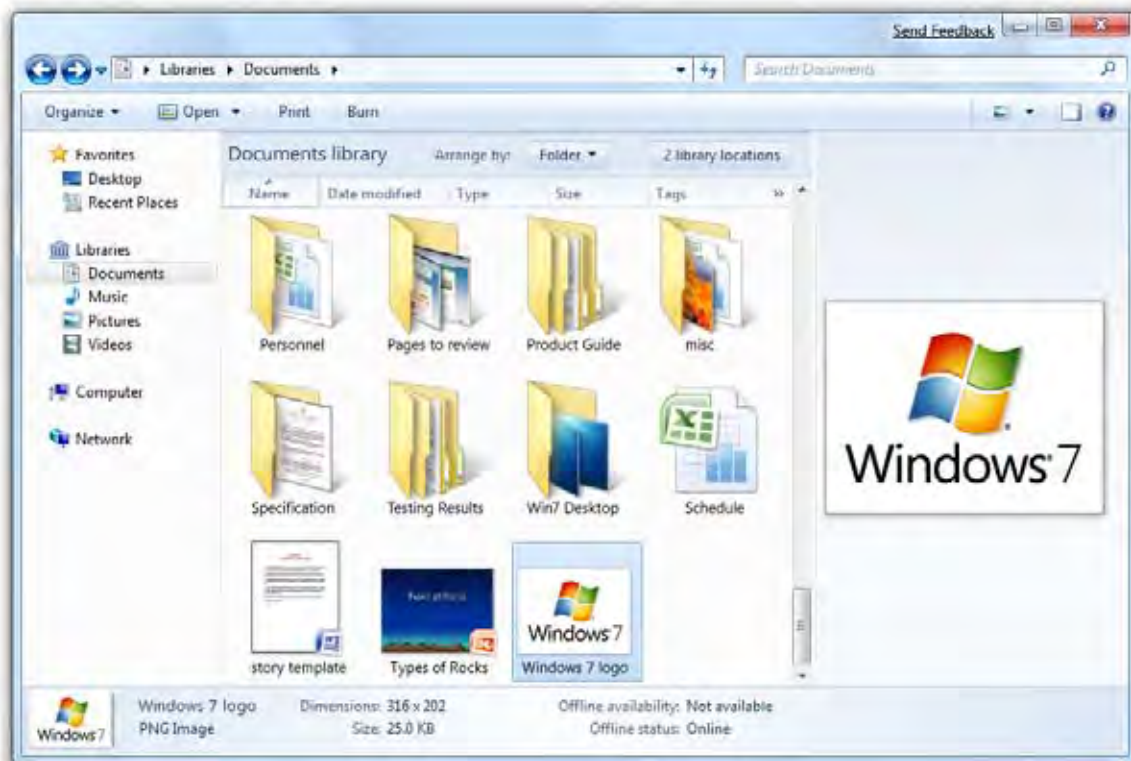
Windows Explorer in Windows 7 makes it easier to manage all your files, providing a central place where you can view and organize the files on your PC and on other PCs connected to your home network. It gives you new ways to view your files and folders—for example, you can arrange documents or photos based on author, subject, date created, file type, storage location, or other tags or properties. Views can be personalized, so you can view and organize your files in whichever way makes the most sense for you, even when those files span multiple locations (see Libraries, discussed next.)

Navigation is also simpler, faster, and more intuitive. Windows Explorer has an improved layout that reduces clutter and makes better use of space. A new navigation pane helps you find and organize your files no matter where they live, and streamlines common tasks such as moving or copying files. An improved copy engine is more reliable, displays fewer prompts, and shows the name of the file being copied. Navigation also is

more closely aligned with storage—for example, always showing a USB key upon insert or a list of other computer storage locations in your home. You'll appreciate the quick access to your favorite locations, and how new buttons make it easy to toggle and customize views of your files or perform other common tasks, such as creating a new folder.

It's also much easier to find the right file when you can take a quick peek at its contents. Rich file previews in Windows 7 enable you to do just that, helping you to feel confident that you've got the right file before you open it. When you click a file name in Windows Explorer, the preview pane shows you what's in that file, enhancing your ability to search and browse. A new button lets you easily show or hide the preview pane.

(Note: The Explorer New Folder button is not available in the PDC build.)



More ways to arrange how you view files

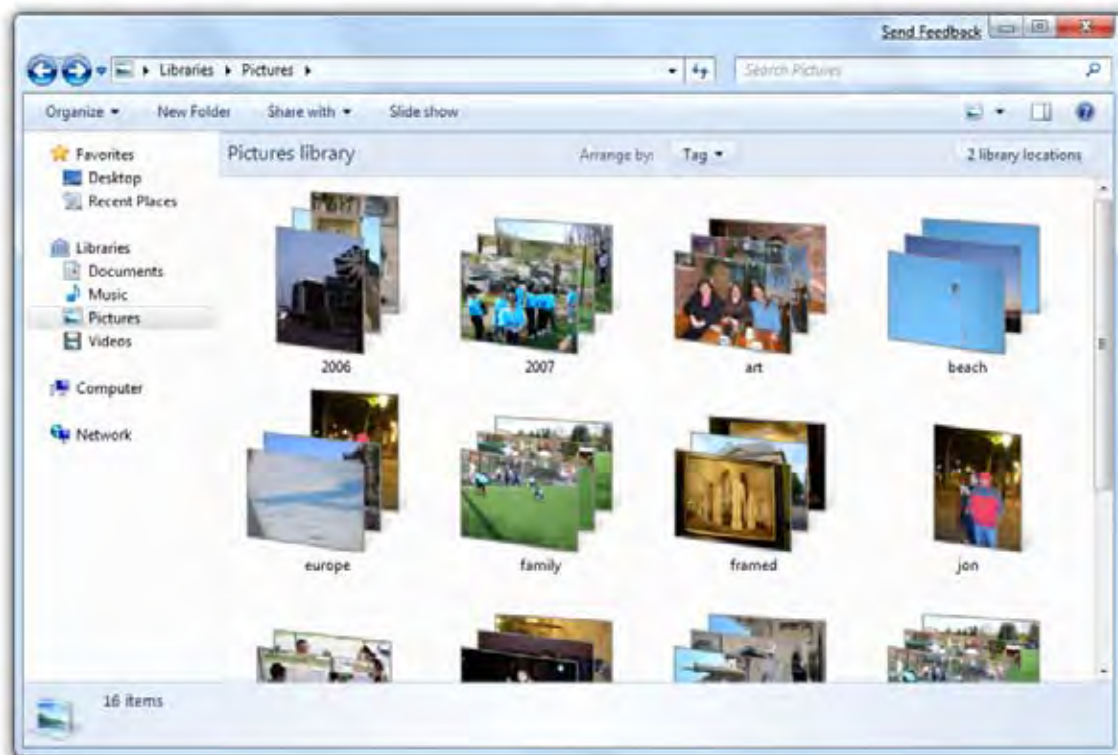
Libraries

If you have photos scattered across folders on your work PC, your family PC, and your laptop, it can be challenging to find the exact file you need for your parents' 50th anniversary party. With Windows 7, you can have a Library that spans all the locations where you store photos (or other types of content). You can search, organize, and edit the files in your "photo library" in the same way as you would a single folder. So, with Windows 7 Libraries, you don't have to remember exactly where you stored a particular photo or search multiple places to find what you need. Also, since it's easy to get to all your photos, all the time, Libraries help you avoid keeping multiple copies of the same photo around.

Libraries make it easier to view, organize, manage, and find files that are stored in more than once place. They provide a consolidated view of your files, even when they're stored in different folders, on different disk drives, or on other PCs in your home network. You can reference all those locations in a Library and then browse and search across them as one. You can view

the files in your Libraries in different ways, without the hassle of organizing the files into folders—for example, documents by type, pictures by date taken, or music by genre. When Libraries are shared within a HomeGroup (discussed later), others who can access the shared Library benefit as well because they will be able to view the content according to their preferences.

Libraries are automatically indexed for faster viewing and searching. Windows 7 automatically creates Libraries for items such as Documents, Music, Pictures, and Videos; you can also easily personalize these libraries and create your own. For example, a real estate agent who doesn't want pictures of homes to be mixed with personal pictures can create a new library called "Real Estate Photos." And if you're at work, you can even add content residing on network servers to your Libraries.



Libraries show all content in a particular collection, no matter where the files are stored

Scenic Ribbon

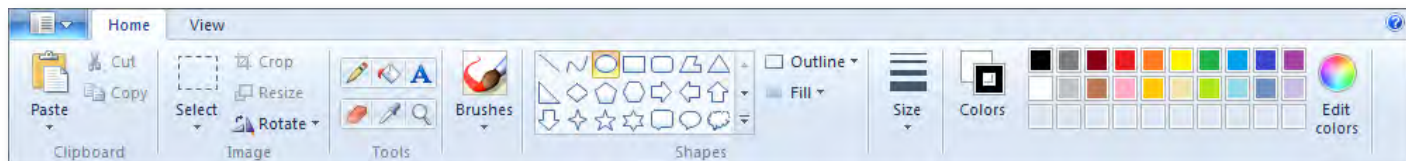
The Scenic Ribbon in Windows 7 exposes frequently used features for more intuitive access, increasing your productivity by reducing the need to hunt through menus. It's similar to the ribbon in Microsoft Office 2007, with a user interface that consists of an application menu, a quick-access toolbar, a ribbon control of contextual tabs, mini-toolbars (or chunks), and style galleries.

Microsoft has incorporated the Scenic Ribbon into some applets in Windows to make them easier and more fun to use.

- **Paint.** Paint glisters with the addition of the Scenic Ribbon. The natural media paint brushes are new, and it's easier to pick colors and shapes. Controls in Paint are touch-ready, so you can even use your finger to paint and choose colors or shapes.

- **WordPad.** Word Pad also takes advantage of the Scenic Ribbon. Other improvements to WordPad include highlighting, line breaks, additional text colors, bullets, indents, print preview enhancements, picture insertion, and zoom.

The Scenic Ribbon is now a part of the Windows platform available to third-party software developers, who can take advantage of it to put more functionality at your fingertips, making you more productive and reducing your learning curve.

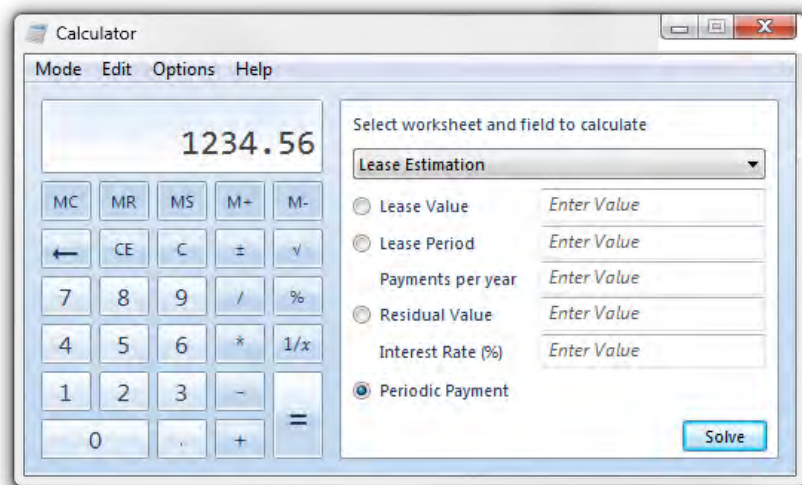


The Scenic Ribbon in Paint

Other Tools Made Easier

Other programs in Windows 7 have been updated to provide greater functionality and make them easier to use. These include the following:

- Calculator.** Calculator has a new look and some brand-new features. You'll find calculation history, unit conversion, calculation templates, date calculations, and controls that are optimized for touch so you can easily "tap out" a calculation on your screen.



New look and features for calculator

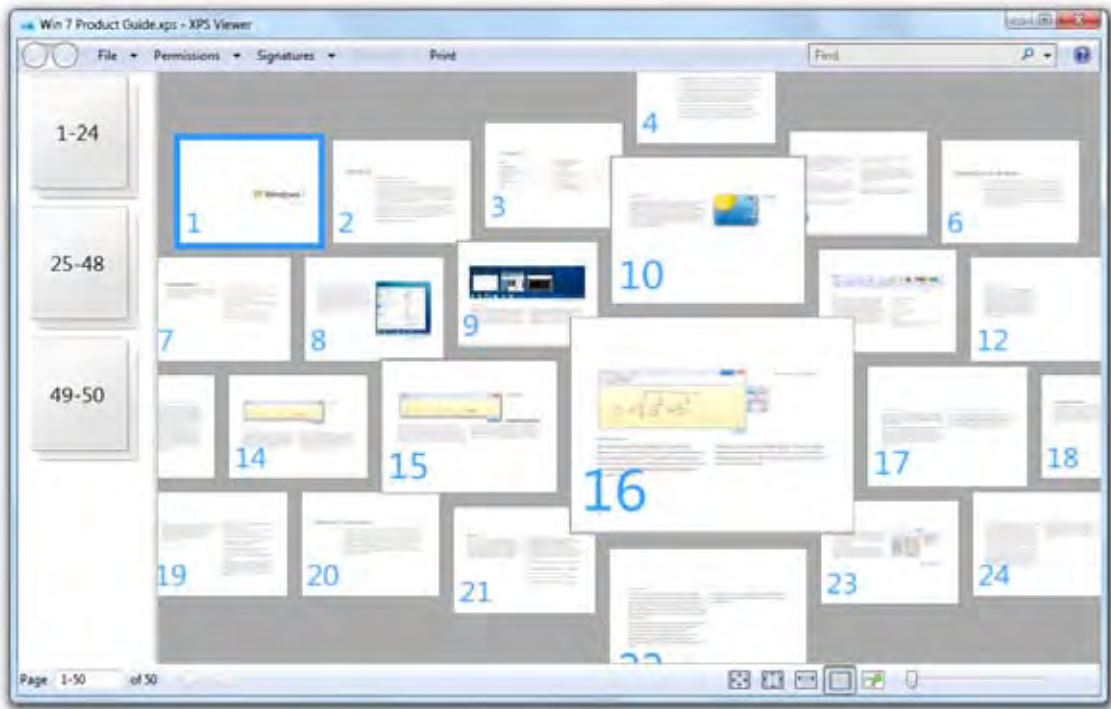
- Sticky Notes.** Sticky Notes in Windows 7 support ink and text input. You can paste text into Sticky Notes, resize them on the desktop, and use note colors to personalize or organize your Sticky Notes.



Sticky Notes

•**XPS Viewer.** XML Paper Specification (XPS) documents are fixed-format documents that can be shared and archived in a high-quality, efficient format. The XPS Viewer in Windows 7 enables you to open and read XPS-based documents without requiring a copy of the original authoring application. You can also use the XPS Viewer to digitally sign XPS documents and, if your company uses Windows Rights Management Services, limit access to who can open an XPS document and what they can do with it.

Compared to the version in Windows Vista, the XPS viewer in Windows 7 provides a more streamlined user interface, significant document navigation improvements, and relevancy-ranked XPS searches. Thumbnails provide an interactive view of several pages at a time, which is great for visually searching through long documents. And you can preview XPS documents within the Windows Explorer or Microsoft Office Outlook® preview panes.



An improved XPS Viewer makes document navigation easier

Find What You Need, Easily

Windows 7 helps you search more efficiently, regardless of whether what you're looking for is on your computer, another Windows 7 PC on your home network, or on the Web. These search enhancements go hand-in-hand with improvements to the Aero Desktop and Windows Explorer to make finding what you want fast and easy.

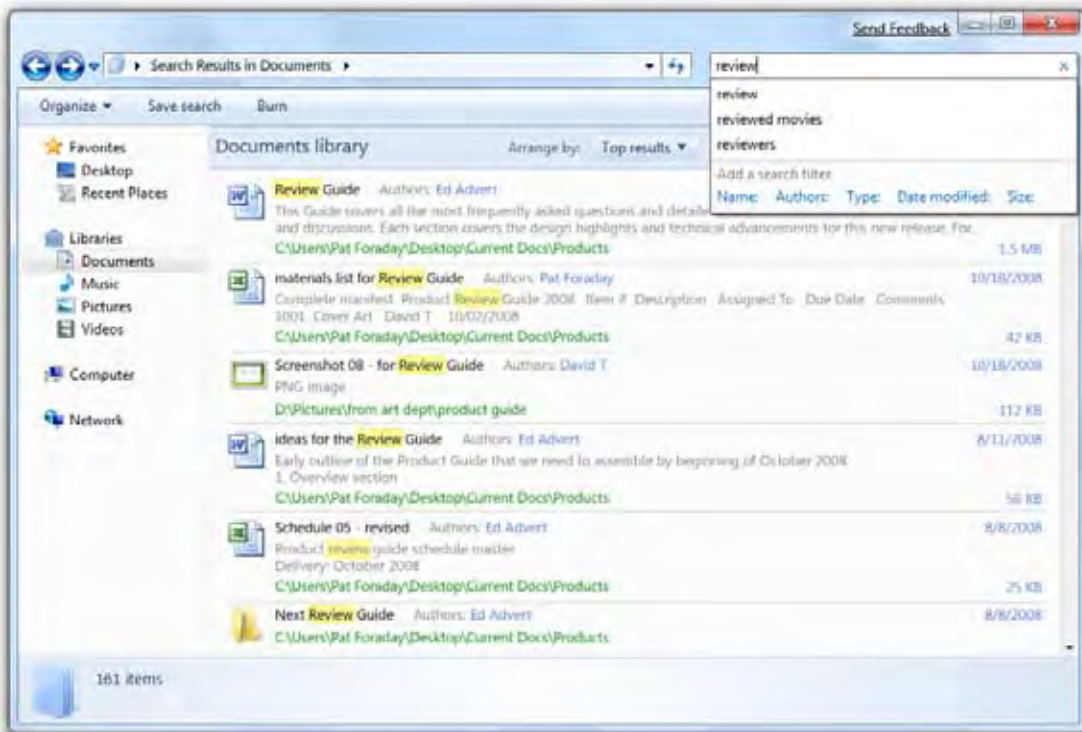
Start Menu Search

Start menu search provides a fast and easy access point for all your applications, data, and computer settings. Just type a few letters in the search box and you'll be presented with a list of matching documents, pictures, music, e-mail, and other files, all arranged in relevant categories. You can also search for Control Panel tasks directly from the Start menu, so you can quickly adjust computer settings.

Search also looks for files in your Libraries, allowing you to search locations beyond your PC directly from the Start menu. Search results are grouped according to your Libraries, so the results are easy to understand. In corporate environments, your system administrator can define up to five search destinations beyond your PC. When you select one to search, the search will be executed on a remote server and the results delivered to you through the familiar Windows Explorer user interface.

Smart Input and Recent Searches

Finding what you want starts with asking the right question. Windows 7 helps you search smarter by presenting input recommendations based on previous searches and dynamic filter suggestions to help you narrow-down results.



Search makes smart recommendations while you type

Improved Search Relevance

Windows 7 makes search results more relevant and easier to understand. The search engine uses an improved algorithm to determine relevance and rank results. Within those results, words from the search query are highlighted within snippets of file content or the file path to help you better understand your search results and whether a particular result meets your needs.

Search in Windows 7 also makes results more relevant by enabling you to more easily specify where you want to search, such as in a specific physical location on a hard drive, across a number of such locations, or on a specific Web site. Searches that you initiate from the Start menu look at all the data in your Libraries, while searches that you initiate from Windows Explorer look within a particular library, such as Documents.

Search Federation

Most people don't store all their files and content in one place. Instead, their information is scattered across multiple PCs, external hard drives, servers, and Web sites. Search Federation in Windows 7 enables you to reach beyond your computer to easily find what you need across all those locations, making the process as simple as searching on your local PC. Just add your favorite locations to Windows 7 and you can search them as well.

If you're at work, you can even search within popular business programs such as Microsoft Office SharePoint® Server. (Windows 7 uses OpenSearch—an existing public standard—to search for content on the Internet and remote servers.)

More information on this feature can be found in the Windows 7 for IT Professionals section of this document.

Home Networking Made Simple

Today more than 50 percent of all U.S. households have more than one PC¹, and this trend is only increasing. If you're one of those households, chances are the PCs in your home are not working as well together as you would like, even if you've managed to create a home network.

For example, do you have two or more computers in the home but only one printer? If you're like most people, when you need to print a file that's on your laptop in your bedroom on the printer in your den, you probably e-mail the file from one PC to another or transfer it on a USB drive. And if you need to find a file but don't know which computer it's stored on, chances are you're in for a long night as you traipse from PC to PC and search each one.

Windows 7 makes it much easier to connect the technology in your home, and to share media, files, and devices across all your PCs.

HomeGroup

Today, setting up a home network can be a difficult task, and sharing content and printers across PCs requires even more technical savvy. HomeGroup, a new feature in Windows 7, makes connecting the computers in your home a painless process. After your HomeGroup is set up, sharing files across the various PCs in your home—and many other devices as well—is as easy as if all your data were on a single hard drive.

Computers running Windows 7 automatically identify and connect with each other. Once in a HomeGroup, that printer in your den is shared automatically with all of the PCs in your home. Similarly, you can store digital photos on a computer in your den and easily access those photos from a laptop anywhere in your home.

When you join a HomeGroup, you will immediately see other PCs in the group listed under the "HomeGroup" node in the Windows Explorer navigation pane—and

can interact with Libraries shared from other computers just like the items on your hard drive. You can browse those Libraries (and view them the way you want), search a specified Library or user's machine, or select "HomeGroup Users" to search across all the PCs in your HomeGroup. HomeGroup also enables you to specify exactly what you want to share. You can choose to keep data on a PC private, or to share additional folders with your entire HomeGroup for quick and easy access.

HomeGroup also supports domain-joined computers. When your domain computer is joined to a HomeGroup, it automatically has access to your home printer and content shared to the HomeGroup. By default, sharing files with others in the HomeGroup is turned off for a domain-joined computer. IT professionals can control how HomeGroup works with Group Policy, preventing an employee from accidentally giving his or her 8-year-old son access to corporate files that are stored on a domain-joined company laptop.

¹ The State of Consumers and Technology Benchmark, Forrester, 2006.

Windows Connect Now (WCN)

Are you looking for an easy way to set up a more secure wireless network in your home? If so, Windows 7 can help. Windows Connect Now supports Wi-Fi Protected Setup (WPS)—an industry standard—to reduce the complexity involved in setting up a wireless router or access point. Windows Connect Now also makes it easy to connect computers, mobile devices, and other network-enabled wireless devices to that network. Just use Windows 7 to discover and request access to your wireless network. To accept the request, you can simply press the WPS button on the wireless router or access point. Your computer will automatically get the network settings from your wireless router or access point and set up a wireless connection—you won't have to remember or type in a password every time to connect.

Easily Connect Wireless Devices to Your Home Network

Would you like to connect and set up a wireless printer in your home for everyone to use? Windows 7 makes adding network-capable wireless devices that are certified for Windows 7 easy. Simply launch the 'Add a Device' wizard to discover your new device and type in the PIN located on the device, upon which Windows 7 will automatically configure the device to connect to your wireless network. After your device is connected, Windows 7 will automatically download and install the device drivers for it. With Windows 7, extending your home network with exciting new wireless devices such as printers, network attached storage devices, and digital media players is easier than ever.

Stay Connected On-the-Go

We live in a mobile world, taking our laptops and devices with us as we move between home, work, and other places. Through our travels, we want to stay connected to the people and things we care about. Windows 7 breaks down the barriers that can get in the way, making it easy to stay connected wherever you go.

Get Online, Stay Online

With Windows 7, you can easily get online and stay online as you move from place to place. Whether you're switching from one network to another, attempting to access the Internet from a device, or taking advantage of mobile broadband, Windows 7 keeps you connected.

View Available Network (VAN)

Windows 7 makes viewing and connecting to all of your networks simple and consistent. You'll always have one-click access to available networks, regardless of whether those networks are based on Wi-Fi, Mobile Broadband, Dial-up, or your corporate VPN.



Better views of network connections

Wireless Device Network

Sometimes you may have only one Internet connection available and want to share it with other wireless devices—or connect your wireless devices to your PC when you're away from your home wireless network. Windows 7 lets you use your wireless-enabled PC as a wireless access point. You can connect wireless-enabled devices such as portable printers and digital cameras directly to your computer. And if your PC is connected to the Internet, those devices can access the Internet through your PC.

Mobile Link

With Windows 7, it's much simpler to connect your computer to the Internet using a wireless data card, regardless of which cellular provider you use. The process is similar to connecting to any other wireless network, and is done using the View Available Networks feature. You don't need to install any additional software—just insert your wireless data card and your PC will connect to the Internet automatically. And if your PC has a built-in data card, you'll be connected to the Internet wherever there's cellular service.

Be Productive Anywhere

Productivity for mobile workers is often dictated by connectivity and corporate security measures. Windows 7 helps you remain productive by providing faster, more consistent, and more secure access to corporate resources. You can remotely access your work desktop and applications from home, access files stored on a server when you're offline, and have your desktop and settings follow you as you move from one PC to another.

DirectAccess

With Windows 7, working outside the office becomes simpler. DirectAccess, a new feature, enables you to more securely connect to your corporate network over any Internet connection—without having to use virtual private networking to access a work application, network folder, intranet site, or SharePoint site. Connectivity to your work network is easily established whenever you have an Internet connection. Your experience accessing corporate resources over an Internet connection is almost indistinguishable from your experience when you access these resources from your desk at work. When you're connected from home, you can access public Web sites without going through your work network. DirectAccess also enables your IT department to administer your PC whenever it's connected to the Internet, so you can easily stay up-to-date with company policies.

More information on this feature can be found in the Windows 7 for IT Professionals section of this document.

VPN Reconnect

Although DirectAccess offers strong benefits, your company may not be able to implement it right away—and may continue to rely on VPN connections in the meantime. In the past, when using a VPN connection, you had to redial it whenever you lost underlying Internet connectivity. But not anymore. VPN Reconnect in Windows 7 provides consistent VPN connectivity by automatically reestablishing a VPN connection when you temporarily lose your Internet connection. For example, if you're connected to the Internet using wireless broadband and pass through an area without reception, Windows 7 will automatically reconnect any active VPN connections when Internet connectivity is reestablished.

More information on this feature can be found in the Windows 7 for IT Professionals section of this document.

RemoteApp™ and Desktop Connections

If you use Remote Desktop to connect to your office computer or applications from other locations, you'll find that RemoteApp and Desktop Connections in Windows 7 improves that experience, making it easier to connect and be productive. With Windows 7 and Windows Server 2008 R2, programs accessed in this way are available on the Start menu, alongside programs that are installed on your PC, with icons automatically kept up-to-date. And with the addition of support for audio recording, multimedia playback, and more, the experience will be remarkably similar to running applications locally on your PC.

More information on this feature can be found in the Windows 7 for IT Professionals section of this document.

Offline Access to Network Resources

When you're out of the office and don't have an Internet connection, Offline Files provides a great way to continue to work with documents and files that are stored in another location, such as on your work network. For example, while travelling on a long flight, you can work on a copy of a file that's cached on your computer, and any changes you make will automatically be synchronized to the central server the next time you connect to the corporate network.

Before Windows 7, when IT professionals implemented Offline Files, you had to wait for files to be moved to the server when you logged on for the first time, potentially causing a long delay. Windows 7 alleviates this potential source of frustration and lost productivity by first copying data files to the local Offline Files cache, and then synchronizing the cache with the server in the background.

More information on this feature can be found in the Windows 7 for IT Professionals section of this document.



Business program feeds appear on the Start menu

Get More Out of Your Devices

In the past, you probably had to deal with complex configuration screens just to get your devices connected. After that, you may have found that you didn't have the software you needed to use your device, or that you had the software but it was too complicated to use—and different for every device.

Windows 7 simplifies the process of connecting devices to your PC, makes it easier to manage the devices you use, and helps you easily access common device-related tasks. From initial setup through day-to-day use, working with devices has never been easier. Windows 7 provides a central place—called Devices and Printers—that makes it much simpler to manage all your devices. For some very common devices (such as multifunction printers, cell phones, portable media players, and digital still cameras), Windows 7 provides a very rich and intuitive experience, called Device Stage™.

Devices and Printers

Devices and Printers provides a single place to access all of your connected and wireless devices. From this single location, you can interact with your devices, browse files, or manage settings. You can easily connect devices to your PC using USB, Bluetooth, or Wi-Fi, and simple wizards will walk you through the setup process, reducing previously complex configuration tasks to just a few mouse clicks.

Regardless of how you connect a device, Windows 7 recognizes it and attempts to automatically download and install any drivers needed for that device. Most devices just work without installing any additional software. After your device is connected, you'll see it in the Devices and Printers folder, and can easily access key tasks you may want to perform, such as customizing your mouse or Web cam settings.

The Devices and Printers folder offers a central location to interact with all of your print, fax, and scan devices, replacing the multiple locations you had to go to manage those functions in the past. In addition, your multifunction printing devices will appear just as they do on your desk—as a single, unified device instead of multiple separate devices.



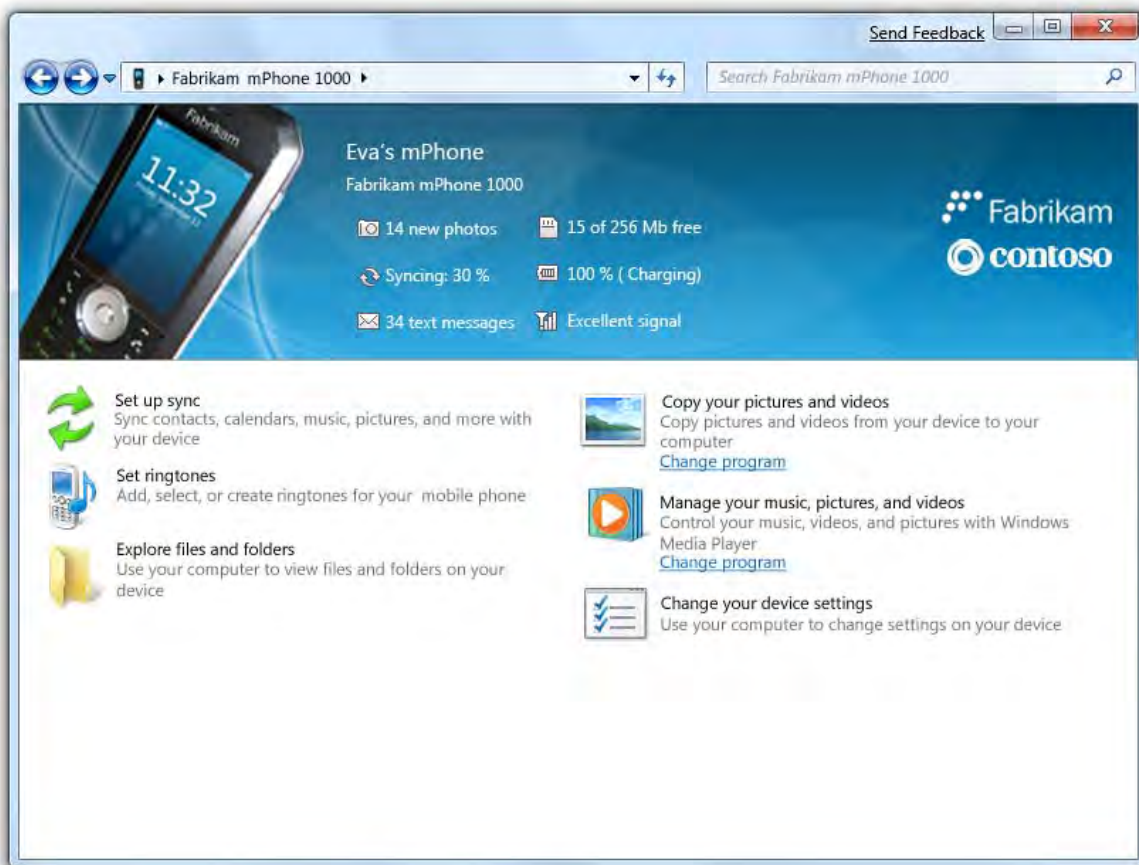
Devices and Printers shows more details about your devices

Device Stage

In the short time since Microsoft launched Vista, the world has seen amazing changes in the nature of devices. They've gone from being single-function peripherals to complex, multi-function devices with a large amount of local storage and the ability to run applications. And they've evolved from a single type of connection—such as USB—to multi-transport devices that support USB, Bluetooth, and WiFi. Finally, many of today's devices are aware of—and are often integrated and sold with—services that are delivered over the Internet. These fundamental changes have led the Windows 7 engineering team to rethink how Windows works with devices to make it easier for you to recognize and use your devices, including all the unique features, applications, and services that come with them.

Windows 7 offers a user experience—called Device Stage—that's designed to help you do the variety of things that make your devices great. For mobile phones, portable media players, cameras, and printers connected to a Windows 7 PC, Device Stage lets you see your device status and run common tasks from a single, elegant window that's customized for each device. Device Stage windows have the same structure for every device, but the contents of each window are designed and populated by the device manufacturer.

For portable devices such as digital still cameras and cell phones, anytime you connect a device, you'll see a photo-realistic image of that device right on the taskbar. From there, you can easily launch the Device Stage for that device or quickly access tasks for the device with a right-click of the mouse.



Seeing details about your devices and managing them is easier

Whether you want to fax and scan with your multifunction printer or synchronize music and acquire images from your mobile phone, Device Stage makes the job fast and easy. And because device manufacturers can customize the experience for each device, you'll be exposed to new tasks and online services that let you get even more from your devices.

The entire Device Stage experience—including branding elements, task definitions, status information, and links to download custom software or navigate to custom locations on the Web—is defined by an XML document and bitmaps that hardware vendors provide to Microsoft. After Microsoft receives this document, it's digitally signed and distributed to your PC using the Windows Metadata Information Service—the same service Microsoft uses to serve album art and TV listings.

A few tasks that are easily accessed and accomplished through Device Stage include the following:

- **Media Sync** lets you easily synchronize important data and media between Windows 7 and devices such as cell phones or portable media players.
- **PIM Sync** makes it easier for you to keep personal information—such as your contacts, calendar, tasks, and notes—synchronized between your PC and devices.
- **Ringtone Editor** enables you to create ringtones from sound files on your PC. Where supported by the device, it also lets you preview a ringtone, save it directly to your phone, set it as a primary ringtone, or assign it to one or more of your contacts.

(Note: This feature is not available in the PDC build.)

Unleash New Device Possibilities

Windows 7 unleashes entirely new possibilities for your devices. You no longer need to manually switch printers when you move from work to home. New ways to connect wireless devices will help you reduce cable-clutter, and you can now burn files to Blu-Ray drives. You'll be able to optimize the text and colors on your screen, and, if you have a portable PC, you can more easily take advantage of external monitors.

Location Aware Printing

Do you print to multiple printers, one at home and another at work? With Windows 7, you no longer need to select the printer to match your location. When you change network locations, such as when taking your work laptop home for the evening, the default printer setting can change to reflect the best printer for that new location. When you print at work, Windows 7 will print to your work printer. When you print at home, Windows 7 will automatically select and use your home printer.

Wireless Device Experience

No wires? No worries. You can install and start using a certified Bluetooth, wireless USB, or network-connected device in just a few minutes. Windows 7 displays all the wireless devices that are available to install and use; simply choose a device, enter a pin number, and start using it.

Wireless technologies supported in Windows 7 include the following:

- **Bluetooth 2.1.** Windows 7 adds support for Bluetooth 2.1, an important update to Bluetooth wireless technology specifications that can enhance your productivity when using Bluetooth devices. It enables simpler, more secure pairing between devices, and delivers power savings that can increase battery life twofold to fourfold. IT professionals can use Group Policy to easily turn off Bluetooth device pairing for Windows 7 PCs.
- **Ultra Wideband (UWB) and Wireless USB (WUSB).** UWB and WUSB are new technologies that provide wireless alternatives to USB cables. Support for UWB and WUSB in Windows 7 lets you take advantage of new wireless devices and wireless USB hubs, eliminating cable clutter and giving you access to more devices to use with your PC. Windows 7 supports the UWB/WUSB Wireless Host Controller Interface (WHCI), Device Wire Adapter (DWA) controller, and native WUSB devices.

Blu-ray Disc Write Support

Windows 7 PCs that include a Blu-ray read/write drive enable you to burn data files such as documents, photos, movies, music, video and other data files to Blu-ray discs.

Sensor and Location Platform

Today, many of us rely on GPS devices to help find our way, or devices that measure temperature and humidity to help predict the weather. With previous versions of Windows, device manufactures had to integrate these types of devices with the PC on a one-off basis, and many were not integrated at all.

Windows 7 makes it much easier for applications to use sensor and location devices—such as an ambient light sensor, GPS device, or a temperature gauge. Applications can use sensors that are built into the computer, connected through wired or wireless connections, or connected through a network or the Internet. A sensor control panel lets you view sensor properties, enable or disable sensors, change their descriptions, and control access to sensors. Application developers can build new capabilities on top of sensor and location platform in Windows 7, so you'll benefit from new applications that take advantage of data from sensors.

Monitor Support

LCD monitors have become increasingly popular and affordable over the last few years, and are capable of delivering incredibly crisp text and graphics. However, Microsoft internal research shows that most people aren't benefiting from this technology as much as they could. In fact, many aren't even running their LCD monitors at their native resolution, instead sacrificing image and text clarity in exchange for larger text.


Windows 7 delivers improved support for monitors—especially LCD displays—to help you get the most out of them. You can adjust the size of text, optimize its clarity, and color-calibrate your monitor. And if you have a portable PC, you can more easily take advantage of external displays.

- **Display Color Calibration.** Ever wonder why colors appear differently on different devices, monitors, or when printing? The color capabilities of all of those devices can vary dramatically. Display Color Calibration in Windows 7 helps you to adjust your display to be as close as possible to the sRGB standard color space. It guides you through a simple series of adjustments using your display's front panel controls, on screen controls, and easy-to-use visual calibration targets.

- **High DPI Support.** Microsoft research shows that only half of the people who use Windows have their display set to its native resolution, with many people “bumping down” the resolution of their displays because they cannot read the small text. However, this often causes text and parts of the user interface to appear fuzzy, and prevents people from viewing digital photos or high definition (1080p or 720p) video at full fidelity. If you have the right hardware and display drivers, Windows 7 will automatically select the optimal display resolution for your monitor. You can easily change the resolution if you like, or you can keep the optimal resolution so that photos and videos are displayed at fill fidelity—and still make your text larger and more readable by choosing to display it at 125% or 150% of its normal size. This setting is adjusted in Control Panel, where you can choose from 100% (96 DPI), 125% (120 DPI), or 150% (144 DPI).
- **ClearType®.** ClearType is a software technology that improves the readability of on-screen text for LCDs, Pocket PCs and flat-panel monitors. The ClearType Tuner helps you customize the appearance of text on your screen to suit your preferences and work well with your hardware. It checks that your monitor or monitors are running at optimal resolution and enables you to improve the clarity of on-screen text, making it appear more detailed and smooth.
- **Improved Support for External Displays.** If you have a mobile PC, you may want to connect it to an external display—for example, to watch a movie at home or give a presentation at work. Windows 7 makes it easier to connect to external displays because all of the common display-related features are consolidated in one place, under Display in Control Panel. And with Windows 7, you can press the Windows key + P to toggle between your laptop screen and an external display.

Make it easier to read what's on your screen

You can change the size of text and other items on your screen by choosing one of these options. To temporarily enlarge just part of the screen, use the [Magnifier](#) tool.

Smaller - 100% (recommended) Preview 

Medium - 125%

Larger - 150%

Apply

Easily resize text on your screen

Show desktop only on computer display (current setting)



Switch from laptop display to a monitor by clicking Windows key+P

Keep Your Life In-Sync with Windows Live

Great communication and sharing services that help you stay connected to the people and things you care about are fundamental to your Windows experience. Whether you're using the rich applications that come with Windows or your favorite services on the Web, you want your experience to remain flexible and up-to-date as your needs change and new Web-based offerings emerge. And you don't want to be confused by overlapping features in the Windows operating system and Windows Live.

In Windows 7, certain Windows Vista features such as Mail, Photo Gallery, and Movie Maker will be delivered through Windows Live. This will make it easier for you to have an up-to-date set of applications that work well with the latest Live Services, so that you can more easily create, manage, and share the various elements of your digital life. With Windows Live, you get a complete set of services that enable you to integrate, share, and use all your digital "stuff"—including contacts, e-mail accounts, profiles, photos, files, calendars, and outgoing or incoming notifications—from any PC or Web-enabled mobile phone.

Windows Live Essentials

Beginning with Windows 7, certain functionality that was included in previous versions of Windows will be provided through Windows Live. This suite of applications—called Windows Live Essentials—will be regularly updated to provide innovative functionality and best-of-breed integration with Windows Live and other popular Web-based services.

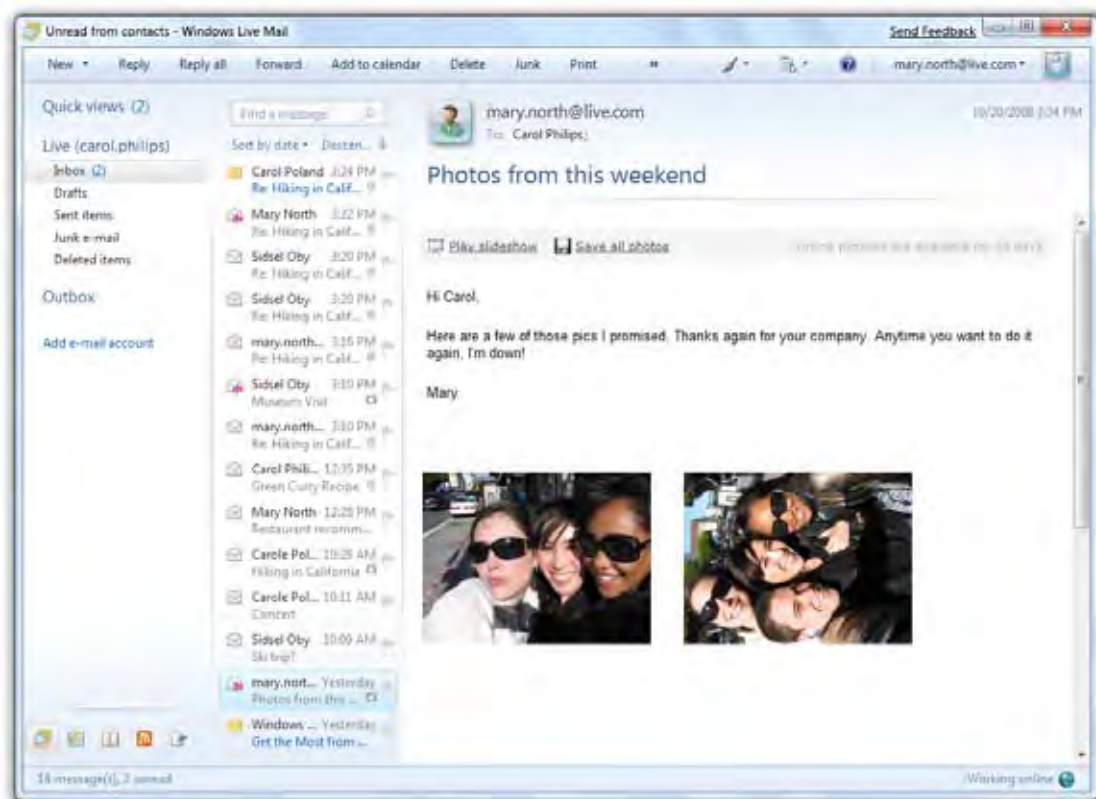
By delivering this functionality through Windows Live Essentials rather than as a part of the Windows operating system, you'll benefit from more rapid delivery of new features and services while maintaining the capabilities and benefits you value from the Windows desktop experience. This approach also eliminates the potential for confusion between similar features in the operating system and those provided by Windows Live. You can obtain Windows Live Essentials by downloading it from the Web and in some cases when you purchase a new PC.

Components of Windows Live Essentials will include the following:

Windows Live Mail

Windows Live Mail is a great application for accessing Windows Live Hotmail®, Windows Live Calendar, and Windows Live Contacts—even when you're offline. Support for POP and IMAP also makes it easy to access and manage third-party e-mail services, such as Yahoo!*, Gmail, and AOL. And, with "photo mail" built in, you can send high-resolution photos to friends without clogging their inboxes. Instead, they'll receive light, embedded thumbnail images, along with links to easily download the full-resolution versions or to see the images played as a slide show.

(*Note that POP access is only available with Yahoo!Plus, not with free Yahoo! email accounts.)



Use multiple e-mail accounts with Windows Live Mail

Windows Live Photo Gallery

Windows 7 offers unrivaled capabilities for capturing images from your digital camera. Once those images are on your PC, Windows Live Photo Gallery provides comprehensive tools for editing your photos, organizing them, and easy publishing to the Web. You can even tag photos in Photo Gallery so that you can easily find them later. Photo Gallery incorporates a revolutionary face detection technology that works with you to help make people-tagging simple. Photo Gallery also includes photo-stitching, a feature that lets you build panoramic views from a collection of photos. And Windows Live Photo Gallery lets you easily publish to both Windows Live™ Photos and other popular photo-sharing services, and order prints directly from 71,000 worldwide print services partners.



Tagging photos makes them easier to find later

Windows Live Messenger

The latest release of Messenger not only includes a completely new look and feel, but it's also designed to let you make it your own—you can personalize nearly everything. It's easy to change your profile picture, background scene, and status messages whenever you like, or to create a dynamic avatar or record a short video. For more fun, you can create multiple display pictures, called "moods," and alter what your contacts see by the emoticons you use in your conversations. And in response to one of the most common customer requests, you can now safely include hyperlinks in your personal status message. You can also designate your own signature sound that contacts hear when you start a conversation, and you can assign unique sounds to the people in your contact list. Windows Live Messenger also makes it easy to monitor what's new with your circle of friends, share photos, or call a friend's mobile phone with a single mouse-click. So whatever form of communication you choose, Windows Live Messenger makes it easy.



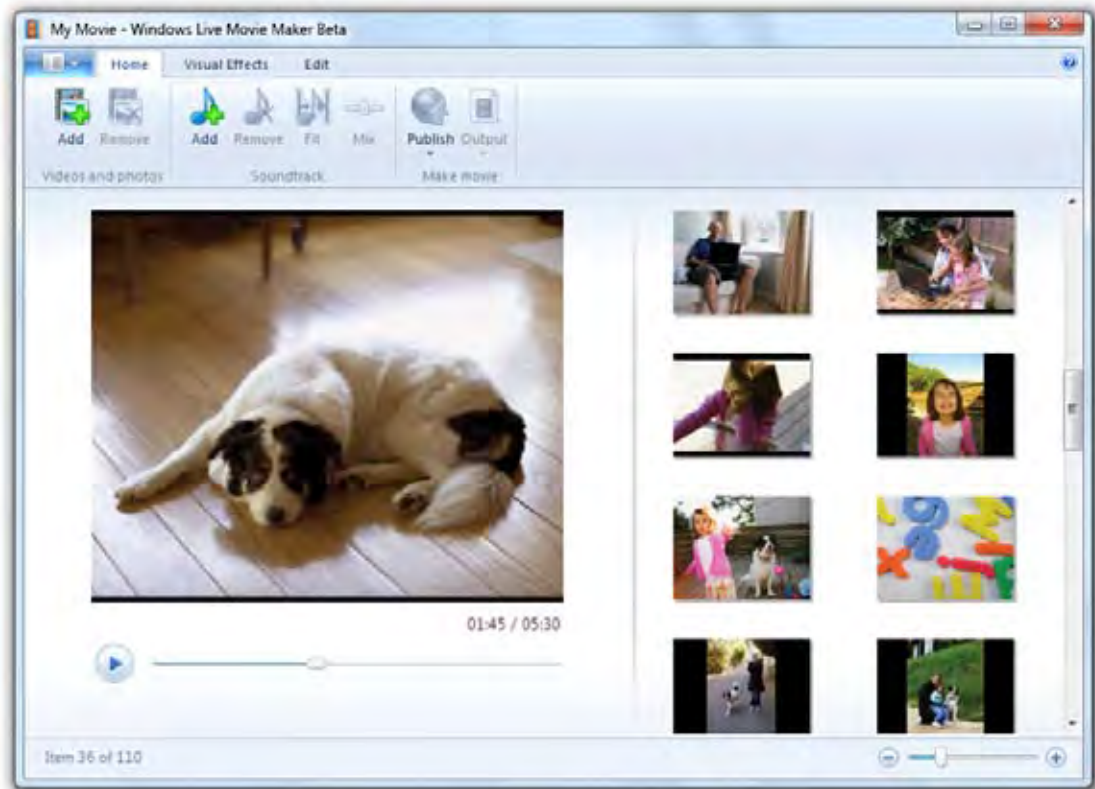
Chat and interact with friends in Messenger

Windows Live Writer

Windows Live Writer, a blogging application, provides a full set of tools to blog on Windows Live Spaces, as well as other popular blogging services such as Blogger, Wordpress, Typepad, LiveJournal, Sharepoint, and Community Server. It enables you to create, preview, and publish rich content as you go, all within a familiar Windows-based interface. However, Windows Live Writer isn't just for hard-core bloggers—it's a great storytelling tool that's easy for anyone to use. Creating and formatting blog entries is a lot like using Microsoft Word, but with features that are specific to blogging. You can arrange and edit images within a blog entry and add videos from YouTube or MSN® Soapbox—all directly from your PC, without ever having to leave the software or open a Web browser.

Windows Live Movie Maker Beta

Windows Live Movie Maker Beta is a new application that enhances your ability to share memories. Using it, you can easily turn photos and video memories into great looking movies that you can share with family and friends on the Internet, on CDs or DVDs, on your TV, on your cell phone, or on your portable video device, using one of many codecs and software plug-ins available today.



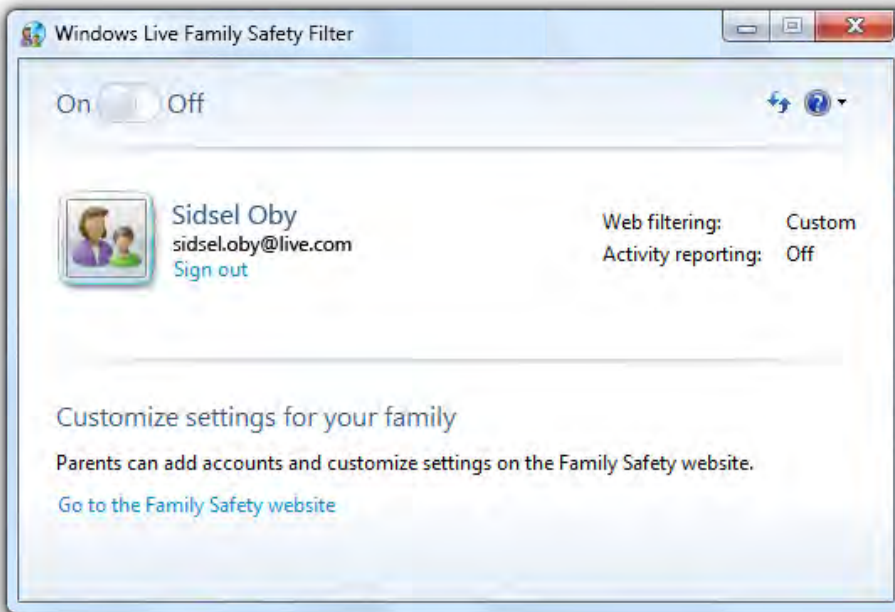
Create and publish movies with Windows Live Movie Maker

Windows Live Family Safety

Windows Live Family Safety provides a set of controls to help parents keep children safe by managing which Web sites kids can visit and who they can communicate with online. Windows Live Family Safety even generates reports for parents, so that they can monitor their kids' activity. Best of all, it lets parents do this from anywhere—on their PC, the Web, or their mobile phone. Family Safety works seamlessly with Windows 7 Parental Controls.

Windows Live Toolbar

Windows Live Toolbar provides at-a-glance summaries and access to the people and information you care about. And it gives you quick access to your Windows Live services such as Windows Live Mail and Windows Live Calendar so that you can easily share stuff you find on the Web.



Monitor children's activities in Family Safety

Windows Live Services

In addition to the rich client applications and experiences provided through Windows Live Essentials, Windows Live delivers other compelling functionality, which can be accessed through Windows Live Essentials or a Web browser. That functionality includes:

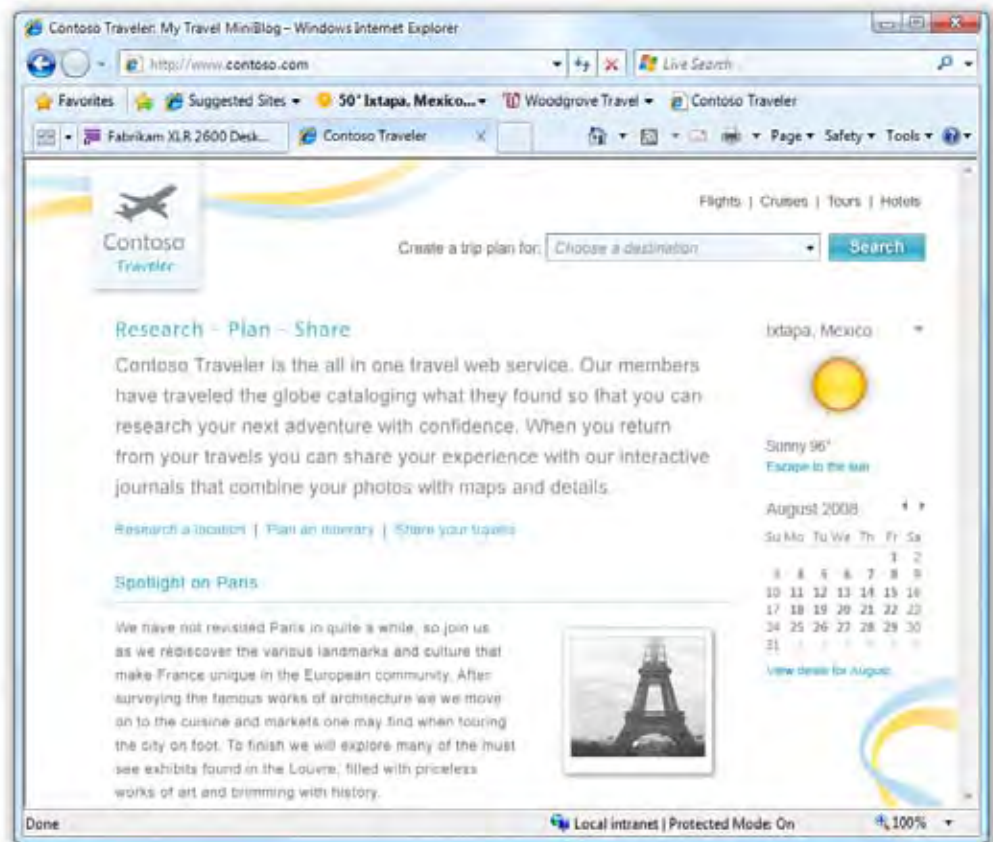
- **Windows Live Photos**, which provides a home for your photos on the Web.
- **Windows Live Profile**, which lets you easily share who you are and what you're doing—and makes it easier to broadcast key information and updates to your contacts.
- **Windows Live People**, which is where you can store and manage all your contacts.
- **Windows Live Spaces**, which includes social features such as your profile, news feeds, a "personal canvas/ Web page," and an easy-to-use blogging service.
- **Windows Live Home**, which provides a place to stay up to date on the recent online activities of your contacts.
- **Windows Live SkyDrive™**, which meets your file sharing and storage needs on the Web.
- **Windows Live Groups**, which provides a set of online tools for groups like clubs, teams, and families to connect with each other online.
- **Windows Live Calendar**, which provides an easy way to keep your life in sync.
- **Windows Live Events**, which enables you to create e-mail invitations and Web pages for your next event.
- **Windows Live Hotmail**, which enables you to access multiple e-mail accounts from one place—with more storage and less spam than ever before.

Additional information on the above Windows Live services—and on Windows Live in general—is available in the Windows Live Wave 3 Reviewers Guide.

The Web at Your Service with Internet Explorer 8

Browsing the Web is the single most popular activity on the PC, with both the time people spend on the Web and the range of things they can do on it are continuing to grow. Those increases are matched by the rate of change on the Web itself, which has transitioned from a collection of primarily static Web pages to a network of interconnected sites and services, through which communities of users who expect up-to-date, personalized content interact with each other and share information.

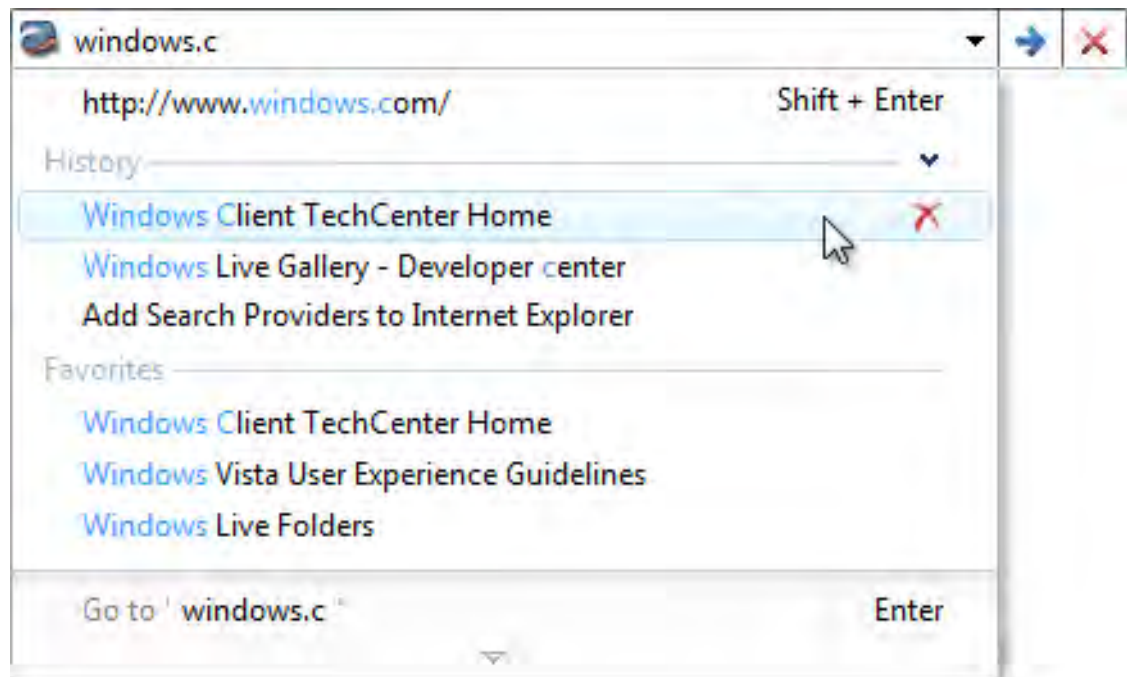
Since Microsoft delivered Internet Explorer 7, millions of people around the world have taken advantage of its security improvements, tabbed browsing, built-in Search box, and other features to improve their Web browsing experience. Internet Explorer 8 builds on that momentum, meeting changing user needs through significant enhancements in four main areas: speed and efficiency; the ability to “reach beyond the page;” safety, choice, and control, and compatibility with both existing Web sites and new Web standards.



Faster and Easier

You've told Microsoft that you want a faster, easier Web experience. The browser must start quickly, new tabs must open immediately, and Web pages must rapidly render and respond to your input. Just as important, you want to quickly and easily find, organize, and navigate to content of interest.

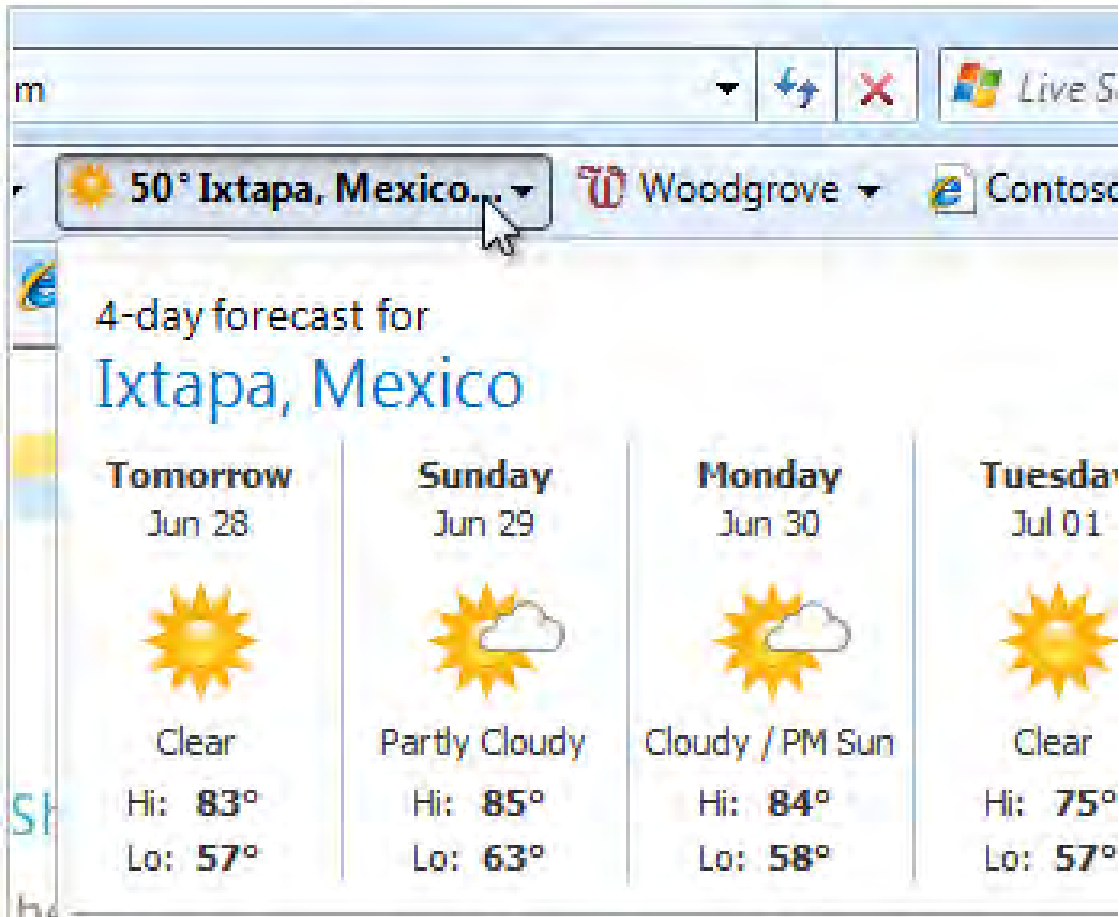
Internet Explorer 8 starts up faster, creates new tabs in a snap, and loads and runs Web sites much more quickly (including sites based on JavaScript), making the entire Web experience feel more immediate. Improvements to the Address Bar, Search, Tabs, and Favorites Bar make common tasks quicker as well, helping you surf the Web more efficiently and making it easier to find and access content of interest.



The address bar suggestions help you get to sites quickly

Reach Beyond the Page

You also need a way to “reach beyond the page” you’re currently browsing to monitor information on other sites of interest, look up the definition of a word, find a map of a location, search for more information, or merely find other interesting content. Internet Explorer 8 includes new features that help you more efficiently use the Web. Accelerators make it easier to take action on information on Web pages, and Web Slices enable you to instantly monitor changes on sites of interest. In addition, the Search box in Internet Explorer 8 has been improved to allow search providers to deliver rich, visual search suggestions in real time, as you type a query.



Access Web Slice content from the favorites bar

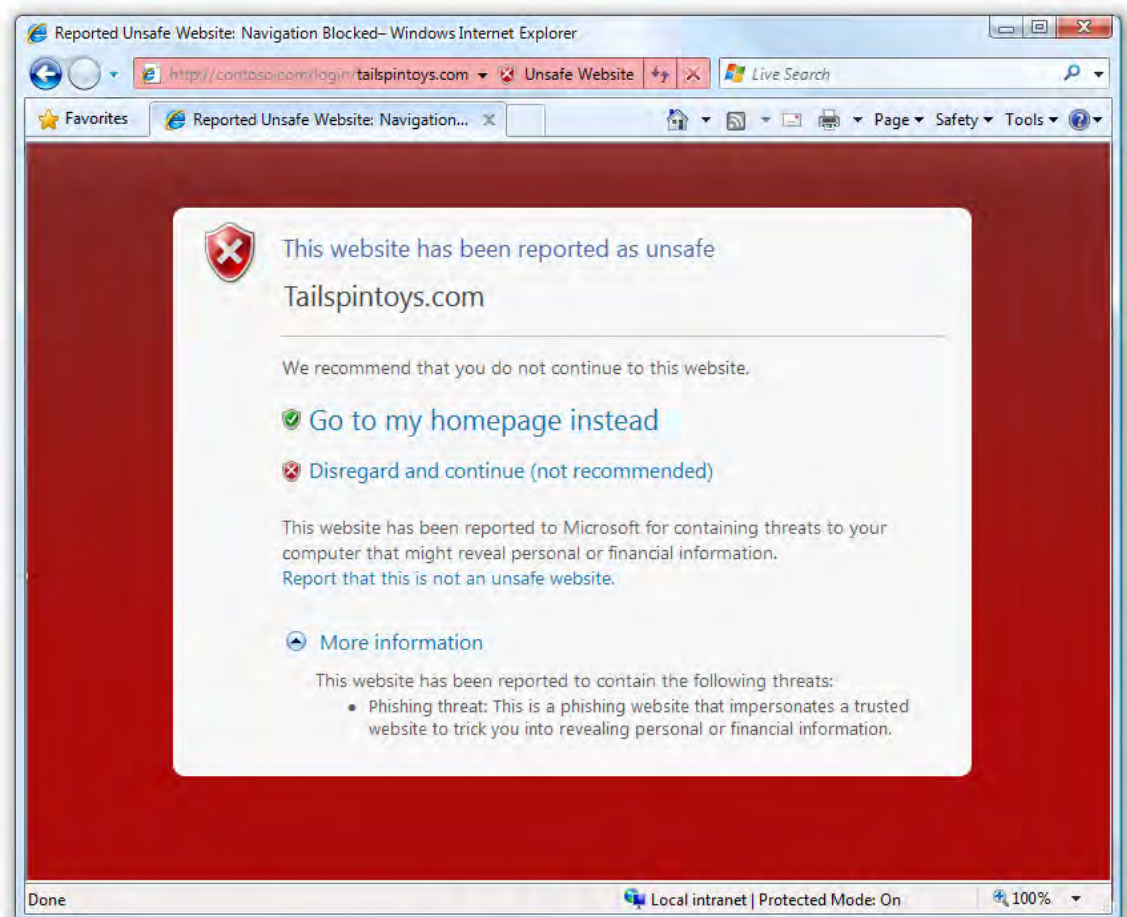
Safety, Choice, and Control

The Web can be a dangerous place, with many “bad” sites that attempt to download malicious code, trick you into divulging personal information, or track your actions without your knowledge or consent. To deliver peace of mind, a browser must help protect against such threats, putting you in control of the software on your PC and how your Web surfing activities are monitored. Inspiring such confidence also requires a browser that works reliably, providing the ability to undo mistakes or bad decisions and to recover quickly from errors when they do occur.

Internet Explorer 8 delivers improved protection against security and privacy threats, including the ability to help identify malicious sites and block the download of malicious software. Privacy is enhanced through InPrivate Browsing, which provides the ability to surf the Web without leaving a trail on a shared PC, and through InPrivate Blocking, which delivers increased

choice and control over how Web sites can track your actions. Internet Explorer 8 helps inspire confidence and trust through improved restrictions for ActiveX Controls, enhanced add-on management, improved reliability (including automated crash recovery and tab restoration), and enhanced support for accessibility standards.

Internet Explorer 8 also improves Web browsing by making it easier for you to undo—and automatically helping to protect against—mistakes or bad decisions. For example, improvements to the Address Bar and Instant Search Box make it easier for you to delete unwanted results, such as a mistyped address. You can disable unwanted toolbars with a single mouse-click, can easily reopen closed tabs, and can delete your browsing history while retaining information for sites in your Favorites.



SmartScreen® Filter helps protect you from unsafe Web sites

Compatibility

None of the improvements in Internet Explorer 8 will matter if Web sites look bad or work poorly. Internet Explorer 8 provides a leap forward in compliance with Web standards, enabling Web sites to be created more efficiently and to operate more predictably. However, millions of Web sites have been built for Internet Explorer 7, and some of those sites might not display correctly with the new Internet Explorer 8 layout engine. Microsoft realizes that, at the same time it embraces new standards that will define the Web of the future, it also has a responsibility to maintain compatibility with existing Web sites from one browser version to the next.

Internet Explorer 8 will ship with multiple layout engines, putting the decision as to whether Internet Explorer 8 should support legacy behaviors or strict standards in the hands of Web developers, who can specify which layout engine to use on a page-by-page basis. For Web pages that are designed for Internet Explorer 7 but don't specify that, Internet Explorer 8 has a Compatibility View

button that you can use to display them as they were meant to be viewed, providing an easy way to fix display problems such as out-of-place menus, images and text.

When Internet Explorer 8 detects a Web site that is designed for an older version of the browser, the Compatibility View button appears next to the Refresh button on the Address Bar. Pressing the button causes Internet Explorer 8 to switch to the Internet Explorer 7 rendering engine. The state of the button is saved for that Web page, eliminating the need for you to press it again when you return to the same page at a later time.

More information about all the new features and capabilities in Internet Explorer 8 can be found in the Internet Explorer 8 Beta 2 Evaluators Guide.

Windows Web Site

Today, there are dozens of Microsoft Web sites that offer you information about Windows, making it hard to know which one has the information you need. A new Windows Web site solves that problem, providing a single site to go to find information about Windows products and features and how to use them. The site describes the features and benefits of Windows 7, and can help you choose the right edition and the best hardware and software for you. Once you decide to upgrade or buy a product, shopping is easy.

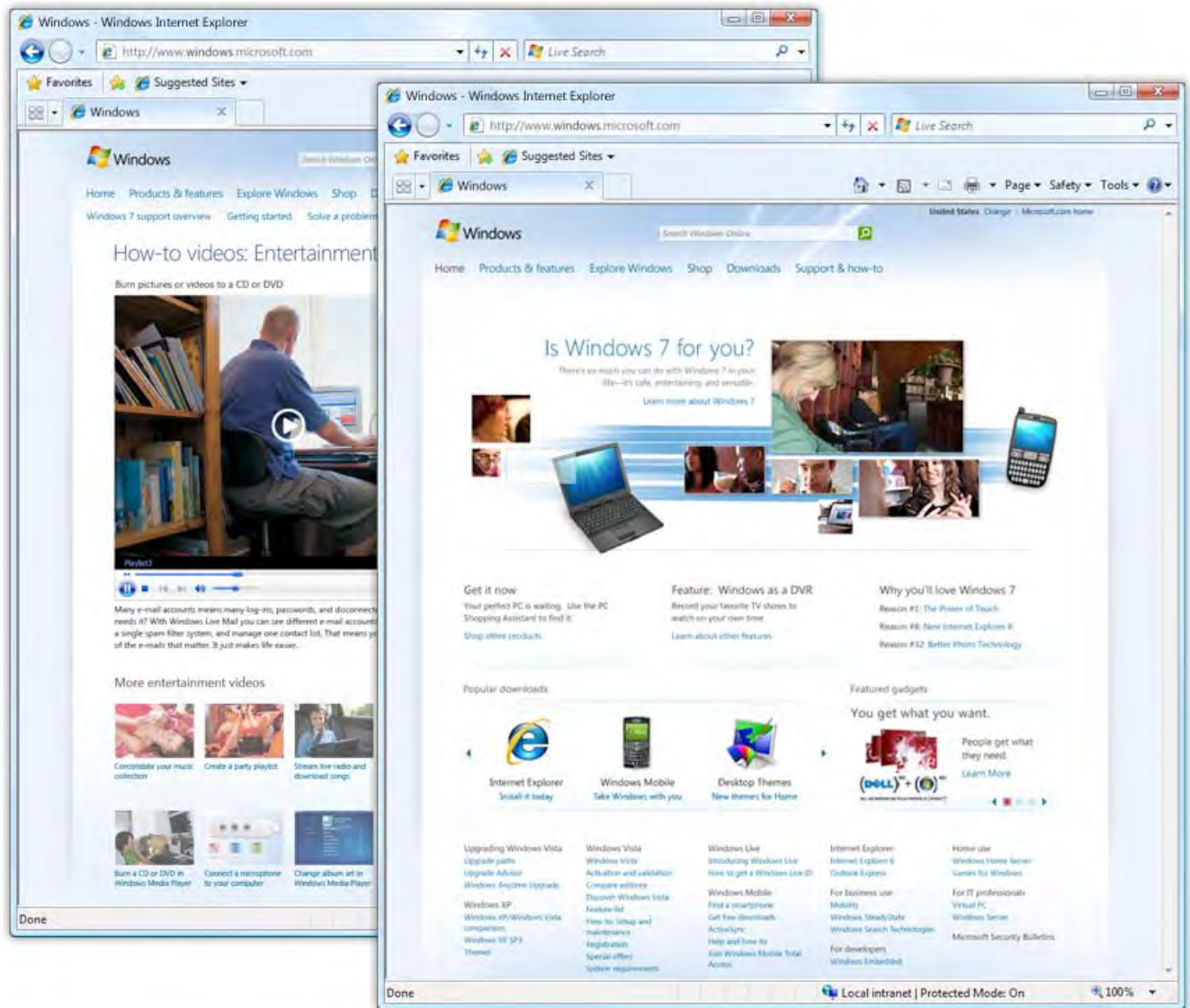
On the Windows Web site, you'll find descriptions of the key scenarios and features that you can experience with Windows 7. You'll see videos and content that make it easy to understand how to get the most out of Windows 7. The site also shows you how Windows 7, Windows Live, and Windows Mobile work together to help you more quickly accomplish your everyday tasks.

The Windows Web site also offers ways to enhance your PC experience, including personalization tips and

downloads. If you need help with a task, you'll find quick and accurate solutions. You can search the site for help using non-technical language, and you'll see results that reflect the real problems other customers have faced. Help is offered through conventional instructions as well as multimedia videos and tutorials. And if a self-help solution isn't enough, the Windows Web site makes it easy to get advanced technical assistance by contacting someone in Microsoft customer service directly.

Finally, you'll see opportunities to tell Microsoft about the quality of your experience. The Windows Web site collects your feedback and the site is constantly updated and improved based on the feedback that you and others provide.

(Note: This feature is not yet available.)



The Windows Web site extends your Windows experience

Windows 7 for End Users:

New Things Possible

As technology continues to advance, Microsoft is working to translate those developments into exciting new capabilities. In Windows 7, Microsoft is building on its investments in next-generation user interfaces, moving beyond the mouse and keyboard to enable you to use your PC with multi-touch gestures, handwriting, or voice.

Windows 7 also introduces new media sharing capabilities that make your PC a great hub for experiencing audio, video, and pictures throughout your home. An enhanced Windows Media Center offers one-stop access to your favorite TV shows, whether they're on-air or on the Internet.

Now you can watch and listen in high fidelity like never before. With little effort, you'll be able to watch a movie in high-definition, listen to high-quality digital music on your PC or an audio/video receiver, and watch or record high-definition digital TV shows.

And, Windows 7 offers more options than ever to customize and personalize your PC, with themes that match your personal style. Windows 7 puts you in control of your computing experience with a clean and uncluttered desktop, and a quieter computer experience, with fewer pop-ups and interruptions.

More Choice in How You Interact with Your PC

Windows 7 builds on the touch and Tablet PC features of Windows Vista to give you more choice and control over how you interact with your PC. Enhancements include better handwriting recognition, support for new multi-touch displays, broader language support for Tablet PCs, and enhanced accessibility features.

Windows Touch

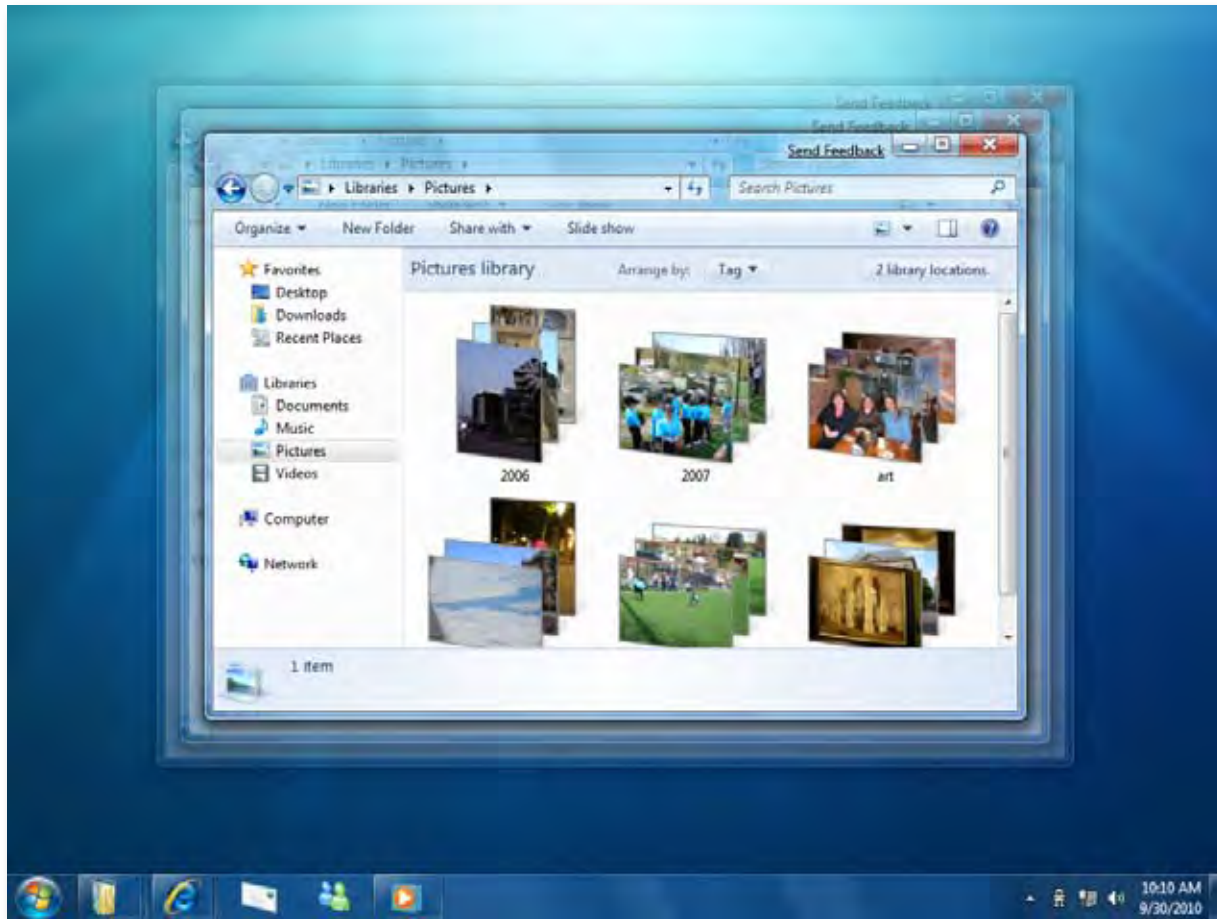
Humans are tactile beings, with brains that are wired for touch. Computers and devices can come to life in entirely new ways when you use your finger to control what happens on the screen, making the process much faster, easier, and more intuitive than using a mouse and keyboard.

In Windows 7, controlling the computer by touching the screen is a core user experience, with visual feedback provided for tap and double-tap gestures. The Start menu, Windows Taskbar, and Windows Explorer are touch-friendly, with larger icons that are easier to select with your finger. Browsing the Web with Internet Explorer 8 is easier too—just use your finger to scroll down a Web page or browse your favorite links. You can even use your finger to arrange the pictures in a photo album.

Windows 7 also introduces support for new **multi-touch technology**, enabling you to control what happens on the screen with more than one finger. For example, you

can zoom in on an image by moving two fingers closer together, like you're pinching something, or zoom out by moving two fingers apart. You can rotate an image on the screen by rotating one finger around another, and can right-click by holding one finger on your target and tapping the screen with a second finger. Touch gestures provide direct visual feedback, and interact with underlying content in a natural and intuitive way. With multi-touch, your computing experience will seem so real that you may never want to pick up a mouse again.

The multi-touch features built into Windows 7 also provide a rich development platform for software developers. The platform enables full access to multi-touch data and provides rich manipulation APIs for stretching, rotating or moving objects. This will open up a whole new world of multi-touch applications on Windows 7.



Resize a window by touching the corners

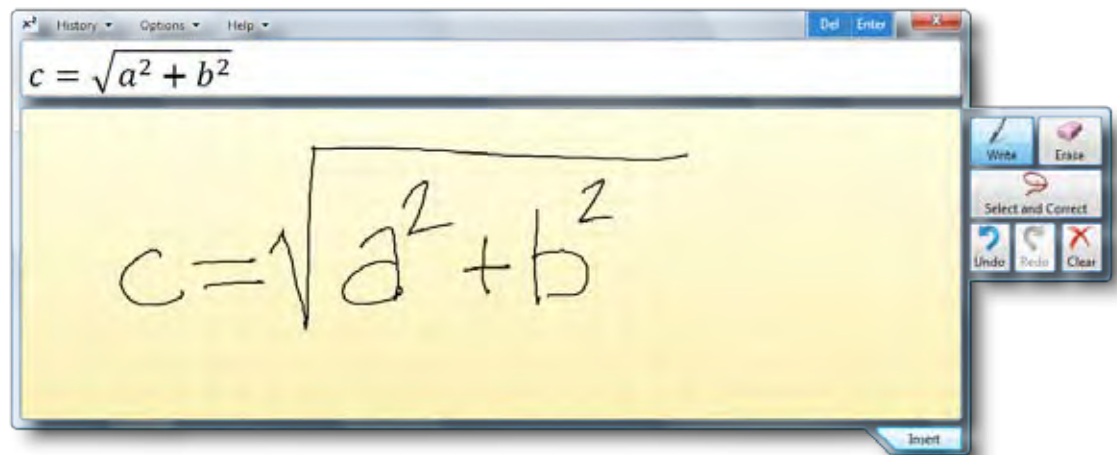
Tablet PC Enhancements

The ease of use provided by Tablet PCs has made them part of many peoples' daily lives. Windows 7 improves pen input in several ways, beginning with greater accuracy and speed for handwriting recognition. Windows 7 also delivers support for handwritten math expressions, personalized custom dictionaries for handwriting recognition, and support for new languages.



Easy text correction

If you work with math expressions, you'll be especially pleased with how you can use handwriting recognition to input them in Windows 7. The **Math Input Panel** is a new accessory that recognizes handwritten math expressions, provides a rich correction experience, and inserts math expressions into target programs. **Math Input Control**, which offers the same recognition and correction functionality, enables developers to integrate math handwriting recognition into programs directly for a higher degree of control and customization.



Math expressions are recognized

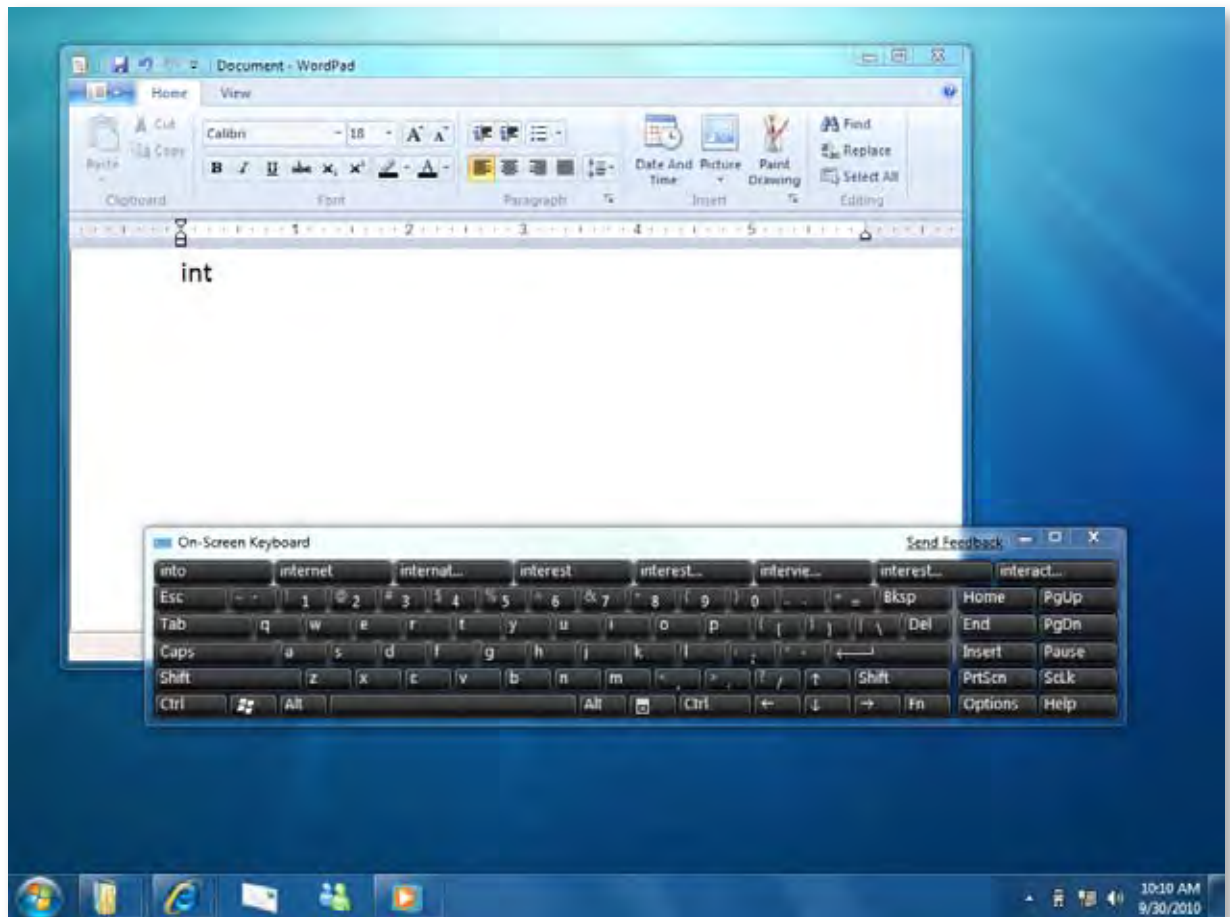
When using the soft keyboard in Windows 7, text prediction helps you enter text more efficiently. Just type a few letters and you'll be offered a list of words that match. Based on the words you use frequently and the corrections that you make, Windows 7 will become even better at predicting what you type over time.

Windows 7 also makes it easy to create and install custom dictionaries that improve handwriting recognition in scenarios with specialized vocabularies, such as medicine. For example, the developer of an electronic medical prescription pad could add drug names to the application.

In addition, Windows 7 supports handwriting recognition in more languages, adding support for Swedish, Danish, Norwegian, Finnish, Portuguese (Portugal), Polish, Russian, Romanian, Catalan, Serbian Latin, Croatian, Serbian-Cyrillic, and Czech to the 12 languages supported by Windows Vista². Also, handwriting recognition for East Asian languages (Chinese Simplified, Chinese Traditional, Japanese, and Korean) shows recognizable improvement.

Supported languages for Text Prediction when using the soft keyboard are expanded beyond US English and UK English to include French, German, Italian, and East Asian languages (Korean, Chinese Simplified, Traditional Chinese, and Japanese.) New languages supported for Text Prediction with pen input include Chinese Simplified and Chinese Traditional.

Windows 7 exposes many the operating system enhancements that contribute to an improved Tablet PC experience for access by software developers, so that they can make their applications more useful to you as well. For example, updated Ink Analysis APIs in Windows 7 enhance and accelerate the development of ink-enabled applications—and make it easier to integrate basic shape recognition features. Through these capabilities, you'll benefit from more options in programs that can take advantage of the unique capabilities of your Tablet PC, as well as richer functionality within those applications.



Text prediction makes typing easier on the soft keyboard

² Windows Vista supports handwriting recognition for Tablet PCs in 12 languages: English (US), English (UK), German, French, Spanish, Italian, Dutch, Portuguese (Brazil), Chinese Simplified, Chinese Traditional, Japanese, and Korean.

Accessibility

Windows 7 delivers accessibility enhancements that can be especially relevant for people with special needs. Improvements include more personalized speech recognition, improved screen magnification, and a new on-screen keyboard.

Speech

Windows Speech Recognition enables you to tell your computer what you want it to do—for example, you can easily dictate an e-mail by speaking the recipient's name and the content of the message. Speech recognition accuracy is improved in Windows 7. Speech recognition in Windows 7 also supports dictation in many common applications.

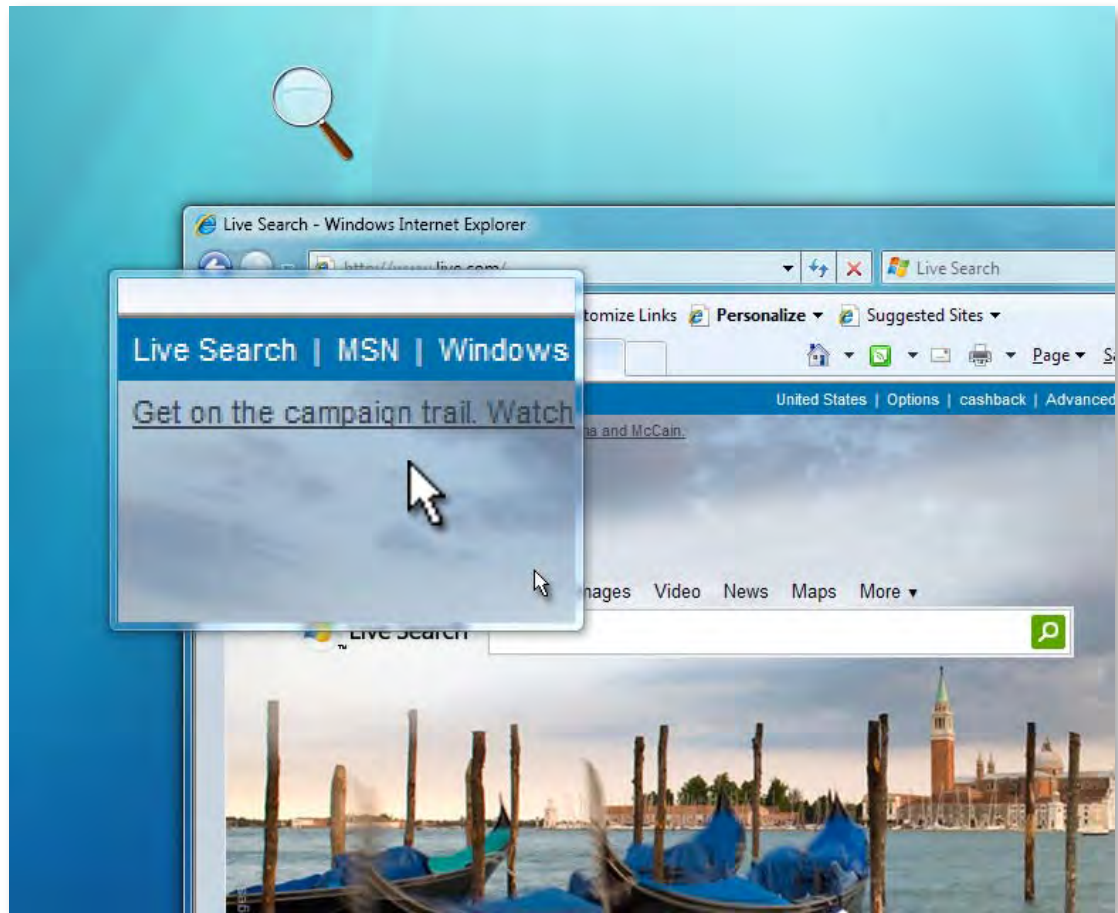
Magnifier

Magnifier is available whenever you need to magnify the entire screen or parts of it. It's particularly helpful for people who have low-vision or difficulty seeing the

screen, but it's useful for anyone who wants to view objects on the screen that are difficult to see. You can use full-screen mode to magnify the entire desktop or lens-mode to magnify only a portion of the screen. In Windows 7, Magnifier works with DirectX content and supports the use of a pen, touch, and keyboard shortcuts in full-screen magnification.

Accessibility Support Tools

Windows 7 helps software developers deliver accessibility features within their applications more easily as well, giving you greater choice and improved functionality with respect to accessibility-enabled applications. For example, the UI Accessibility Checker in Windows 7 provides a convenient graphical tool for software developers and testers to verify whether their user interface conforms to key accessibility requirements.



Magnifier enlarges parts of the screen

More Media, More Places

Today we have access to more digital media than ever, with options that range from prerecorded DVDs to digital music and broadband TV. Windows 7 brings your media world together, whether you're listening to music, watching TV and movies, playing games, or creating rich photo experiences. It's now easier to create an exciting media experience that gives you quick access to more music, video, and TV—and enables you to enjoy that content when you want and where you want.

Windows Media Player

Windows Media Player in Windows 7 plays more media more easily, and delivers a richer media experience. Whether you want to listen to your favorite songs while you're working or watch a DVD in full-screen mode, playback starts fast and is consistent. Windows 7 can also play more types of media than ever before, so you can play more of your content without having to switch players or download additional software.

Enhancements to Windows Media Player that you'll find in Windows 7 include the following:

- **Listen to and View More Media.** Are you tired of having to use different media players to listen to, view, transfer, and manage different media formats? Windows Media Player in Windows 7 supports more media formats, making it easier for you to manage and play your media from one place—and to synchronize your media across a broad range of devices. Common media formats supported include WMV, WMA, MPEG-4, AAC, and AVC/H.264.
- **Enhanced DVD Playback.** Improved playback performance in Windows Media Player makes

watching DVD movies more enjoyable. When you insert a DVD, it will start quickly and transition directly into full screen mode. You won't even have to press "Play" because Windows 7 will start the movie for you.

- **Lightweight Playback Mode.** Windows Media Player includes a new lightweight playback mode that is optimized for your media content and tasks. So whether you're listening to music while browsing the Web or watching a high-definition movie trailer in full-screen mode, consuming your favorite media has never been simpler.



Playing media is uncluttered and easy

- **Taskbar Thumbnail.** When you're watching a movie or listening to a song, you can quickly see its title by hovering over the Windows Media Player icon in the taskbar. An improved Windows Media Player toolbar gives you instant access to playback controls, so you can quickly skip a song or pause playback.



Quick preview from the taskbar

- **Jump List Integration.** With Windows 7, you can quickly access your favorite music, videos, and recorded TV. The new Jump Lists on the Start menu and Windows Taskbar give you quick access to media you use the most. These items are tailored for you based on media you play.



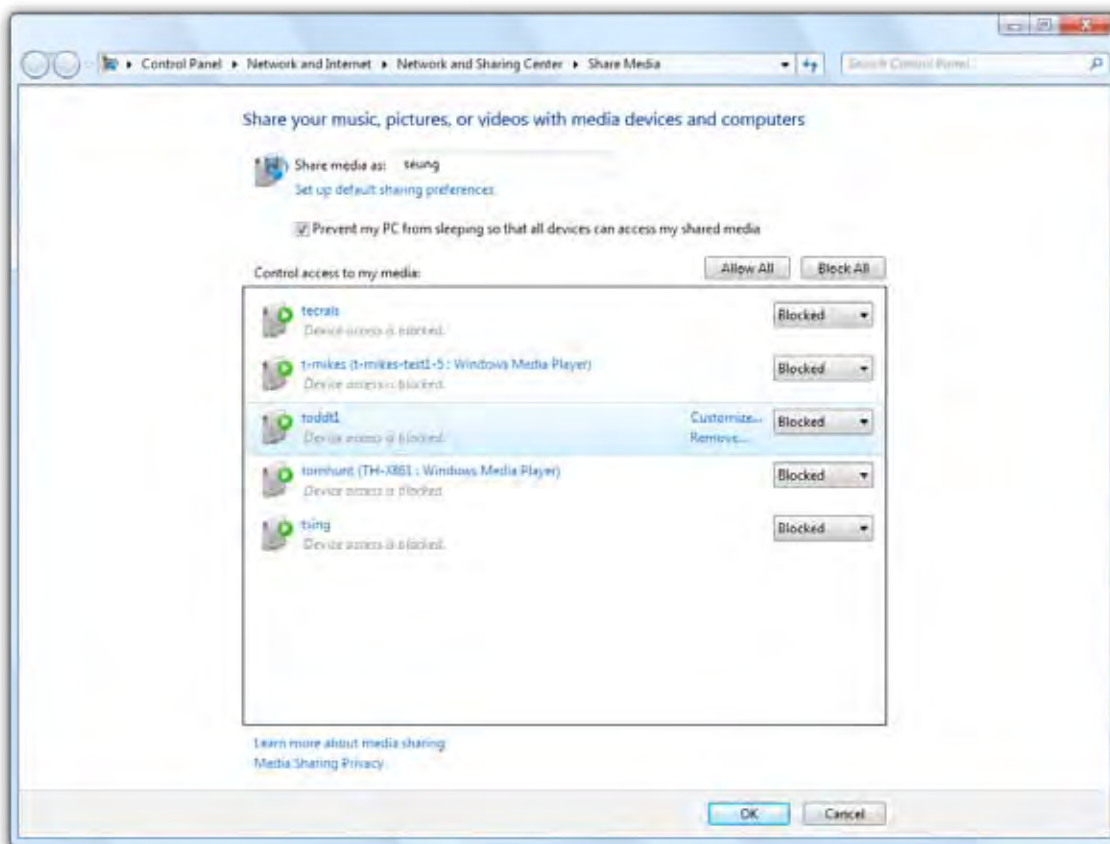
Quick jumps to media in Jump Lists

Media Streaming

Do you want to stream media around your home, but don't know which devices and settings to change? As people bring more PCs into the home, there are more physical places where music, pictures, and video are stored. However, very few people are using media over home networks today.

The new media sharing experience in Windows 7 simplifies the process and reduces complexity, so you won't need a media professional to set up media streaming. You'll find that it's easier to find the settings you want to change and understand your choices.

When you set up a HomeGroup, or set up media streaming from within Windows Media Player, your music, pictures, and videos are immediately available on the other PCs and devices in your HomeGroup. That's all you need to do to begin accessing media throughout your home. As you add new PCs, media servers, and playback devices to your HomeGroup, you'll be able to share media with them—no additional steps needed. Of course, you can always restrict access to media you don't wish to share.



Stream media throughout your home

Media “Play-To”

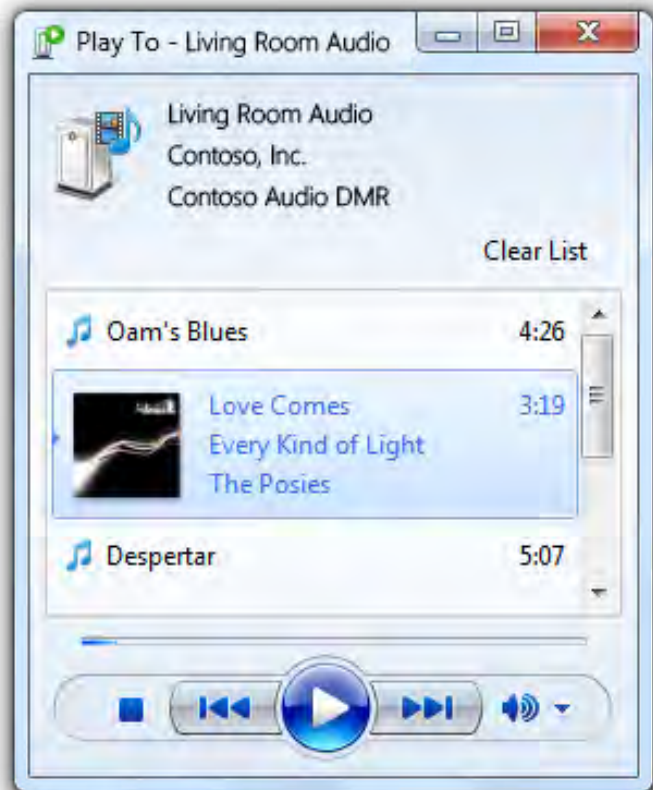
Do you have media on your computer that you want to play on your home entertainment system? More and more consumer electronics devices are building in the capability to connect to a network or to the Internet. However, the user interfaces on those devices can be inconsistent or difficult to use, especially if you have a large collection of digital media.

Windows 7 makes it easy to use your home audio-video system and other networked media devices to play music, watch videos, and display photos that reside on your PC. Using your PC as a controller, you can stream digital media directly to your Digital Living Network Alliance (DLNA) v1.5-compliant digital media renderer (DMR) or to another PC running Windows 7—across your home network.

Windows 7 supports the DLNA v1.5 standard, so you’ll have access to a broad range of devices and functionality. If a device is DNLA v1.5 compliant, you can

use your Windows 7 PC to stream media to that device, play back media streamed from that device, or browse and play media on Windows PCs or third-party devices. You can even stream content from one DNLA v1.5-compliant device to another.

For example, say you’re sitting on your couch, using your laptop to read e-mail or surf the Web. You’d like to listen to some music, but you don’t want to hear it coming out of your laptop’s speakers—and you don’t want to get up and go find your portable media device. With Windows 7, you don’t have to. Just open Windows Media Player, right-click on what you’d like to hear, select Play To, and you’ll see a list of other devices and PCs on which you can play your music. If your media receiver doesn’t support the file format for your media, Windows Media Player automatically detects that and transcodes the file into a format that your media receiver can play. If you have a HomeGroup setup, you can even choose from media Libraries that are on different PCs.

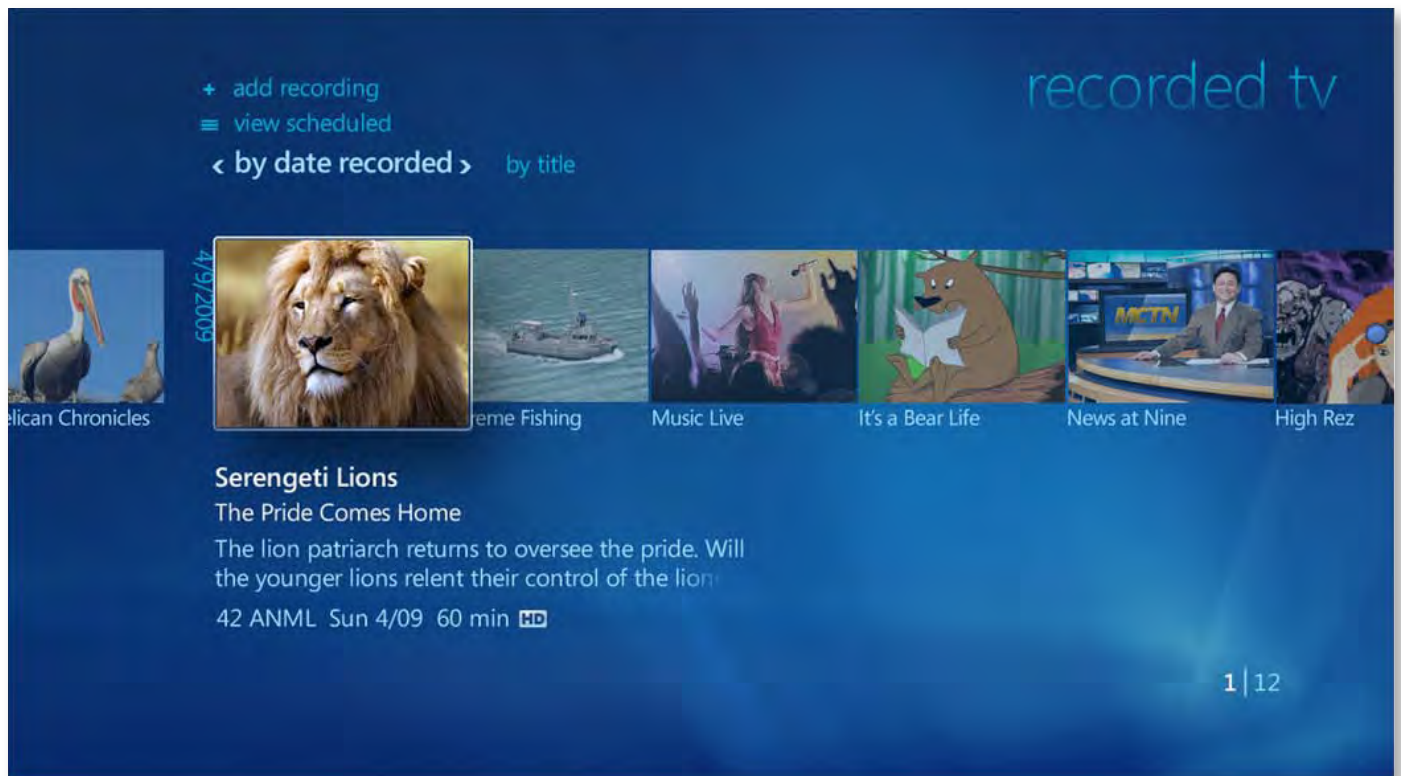


Play media on your home audio system

Media Center

Media Center in Windows 7 makes watching TV, movies, and other video content on your PC easier than ever. Connect your Windows 7 PC to the Internet and Media Center transforms it into a TV with access to online movies and TV shows. Want more TV? Just add one of the many supported broadcast TV tuners to turn your PC into a digital video recorder for major TV networks.

With Media Center, you can easily browse broadcast or broadband TV schedules to find the shows you want to watch or record, watch recorded TV shows on your PC or a big-screen TV, and synchronize them to a laptop or portable device to enjoy on-the-go. With a streamlined user interface and support for new content types and digital TV, Media Center is the perfect way to enjoy a compelling media and entertainment experience throughout your home.



Browse recorded TV shows

Key enhancements to Media Center in Windows 7 include the following:

- **Internet TV.** Windows 7 integrates the growing amount of media content on the Internet into the Media Center experience. You can choose from a variety of online TV shows and movies, all organized into a single TV guide view. Search for shows across multiple networks and providers, and instantly watch them on your PC or save them for later. Windows 7 Media Center also makes it easy to discover and watch shows related to what you're currently watching. When you watch a TV show you've recorded, you'll see that the program information includes thumbnails for other online episodes and links to related information, such as Internet movie trailers or related shows.
- **Broader Support for Global TV Standards.** Get more TV and turn your PC into a digital video recorder by adding one of the newly supported broadcast TV tuners. Windows 7 Media Center includes support for a wider range of TV standards to meet the needs of television viewers around the world. Digital TV in Windows 7 works in more than 20 global markets, with certified support for the United States ATSC and QAM cable standard, Japan's ISDB standards (ISDB-T and ISDB-S), European DVB TV standards (DVB-T, DVB-S), and Pay TV standards.
- **Sharing TV Around the Home.** If you have multiple PCs running Media Center in your HomeGroup, you can access TV libraries (in addition to your music, photos, and videos) on those different PCs. You can easily copy a TV show to your portable PC to enjoy on-the-go. Windows 7 Media Center ensures that all unprotected Windows TV (WTV) recordings can be discovered, played, and copied by any PC running Windows 7 in the HomeGroup; and that all "Copy Freely" and "Copy Once" protected WTV recordings can be discovered, played, and copied using Windows 7 Media Center.
- **Enhanced UI.** New features such as turbo scroll make finding the media you want faster, enabling you to quickly move through a large library or TV guide by pressing and holding the right cursor. You can quickly jump to what you want by clicking the seek bar when viewing a show. Through its enhanced user interface, Windows 7 Media Center makes TV as personal as your PC.

High Fidelity Media PC

With Windows 7, it's easier to enjoy a high-fidelity media experience. Improved sound management features enhance your enjoyment of audio played through your PC, and graphic enhancements make the details in pictures and games pop on your screen, bringing those experiences to life.

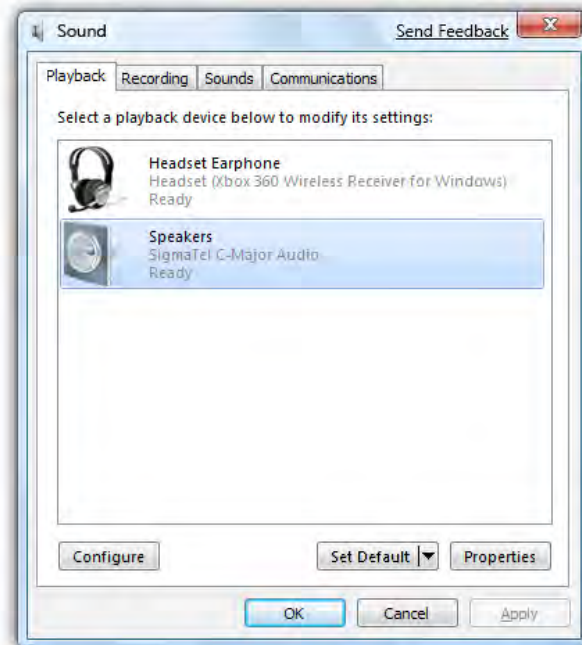
Outstanding Sound

Whether you're playing music, watching a video, or listening to voicemail through your computer, you need a quality sound experience. Windows 7 always sounds great, and makes it easy to use your PC and sound hardware for both entertainment and communications. And the sound does what you expect, providing an intuitive experience when using multiple sound devices.

Some of the sound enhancements in Windows 7 include the following:

Bluetooth Audio. You can easily pair a Bluetooth device to your PC and use that device to make voice calls or listen to music. Windows 7 supports Bluetooth headphones and speakers for playing music and Bluetooth headsets for voice calls. With Windows 7, you can use the same Bluetooth headset you use for your cell phone to make VOIP or Internet-based calls on your PC. Windows 7 also connects the controls on your Bluetooth devices to the proper Human Interface Device commands in Windows. For example, a "mute" command generated by pressing a button on your Bluetooth headphones is routed to the Windows volume control for that Bluetooth device—without interrupting music that may be playing on other devices.

Setting up Bluetooth audio devices is much easier with Windows 7 too. In Windows Vista, using a Bluetooth headset requires the installation of a separate driver, usually from a CD, and 17 separate steps in two different Control Panel locations. Windows 7 includes a standard Bluetooth audio driver that works with all devices compatible with published Bluetooth audio specifications. Just select the device from a list of available Bluetooth devices, and Windows 7 will automatically pair with the device and load the necessary drivers.



Manage multiple sound devices and choose how sounds play on each one

Automatic Stream Management. Windows 7 automatically routes sounds such as music, voice calls, and Windows sounds to the right devices. For example, a communications headset will receive audio for Voice over IP (VoIP) calls such as those from Live Messenger or Skype. If you're listening to music or watching a movie, the sound will automatically be directed through your speakers, not your headset. Sound moves logically and automatically to the right devices as they connect and disconnect, so you won't have to wade through dozens of controls to enable predictable communications and entertainment. If your PC has multiple sound devices, you can independently control the volume for each device with a single click on the familiar speaker icon in the Notification area. Best of all, because this functionality is built into Windows 7, applications can take advantage of it without changes to their code.

HDMI Audio. PCs provide a great place to store your digital media collection, and now you can easily connect your PC to your TV or audio/video (AV) receiver with one HDMI cable. An HDMI cable carries sound as well as video, so you'll no longer need multiple wires to connect your PC to your TV. Instead, using a single HDMI cable, you can stream mono, stereo, or multi-channel, high-definition audio and video for a wide range of playback experiences. When you connect your PC to your TV or AV gear in this way, Windows automatically detects the capabilities of the device and adjusts the sound settings for the right format and number of speakers. After you're connected, you can stream audio to your home audio system, TVs, and audio/video receivers—in most cases without having to install additional drivers.



Independent volume controls for sound devices

High-Fidelity Graphics

PCs with high-fidelity graphics hardware running Windows 7 give you an incredible visual experience, with movies, pictures, and games showing great depth and detail on TVs or high-bit color displays. Whether you're watching a movie or playing a game, you'll be delighted by advanced graphics technologies and hardware acceleration features.

DirectX 11, introduced in Windows 7, provides an unprecedented visual experience for next-generation games on new hardware. It's an experience that accelerates elegantly across multiple processor cores, display resolutions, memory configurations, and graphic adapters

Smooth animations also are fundamental to many graphical UI applications. Windows 7 introduces a native animation framework for managing the scheduling and execution of animations independent of any particular rendering technology, making it easier for software developers to deliver rich, interactive applications.

You Control Your Desktop

A cluttered Windows desktop is like a cluttered desk—it makes it harder to focus on the task at hand. Even if you like a cluttered desktop, you want it to be your own—with your stuff where you put it, and not full of stuff that just shows up without your consent. And when you're working, you want your desktop to stay out of your way—free of annoying pop-ups and notifications.

When you start using Windows 7, you'll immediately notice its clean and uncluttered appearance. The Notification Area in the lower-right corner is streamlined, so that only four icons are displayed by default. New icons don't appear automatically when you install programs; you control which icons to display. You control what gets placed where as you use your PC, so your desktop stays clean and reflects your personal preferences. In addition, Windows 7 is quieter—fewer pop-ups appear, and you'll see fewer notifications for daily activities

In addition, Windows 7 is quieter—fewer pop-ups appear, and you'll see fewer notifications for daily activities.

User Account Control notifications appear less often and, if your account has administrator rights, you can choose the level of notifications specific to your needs.



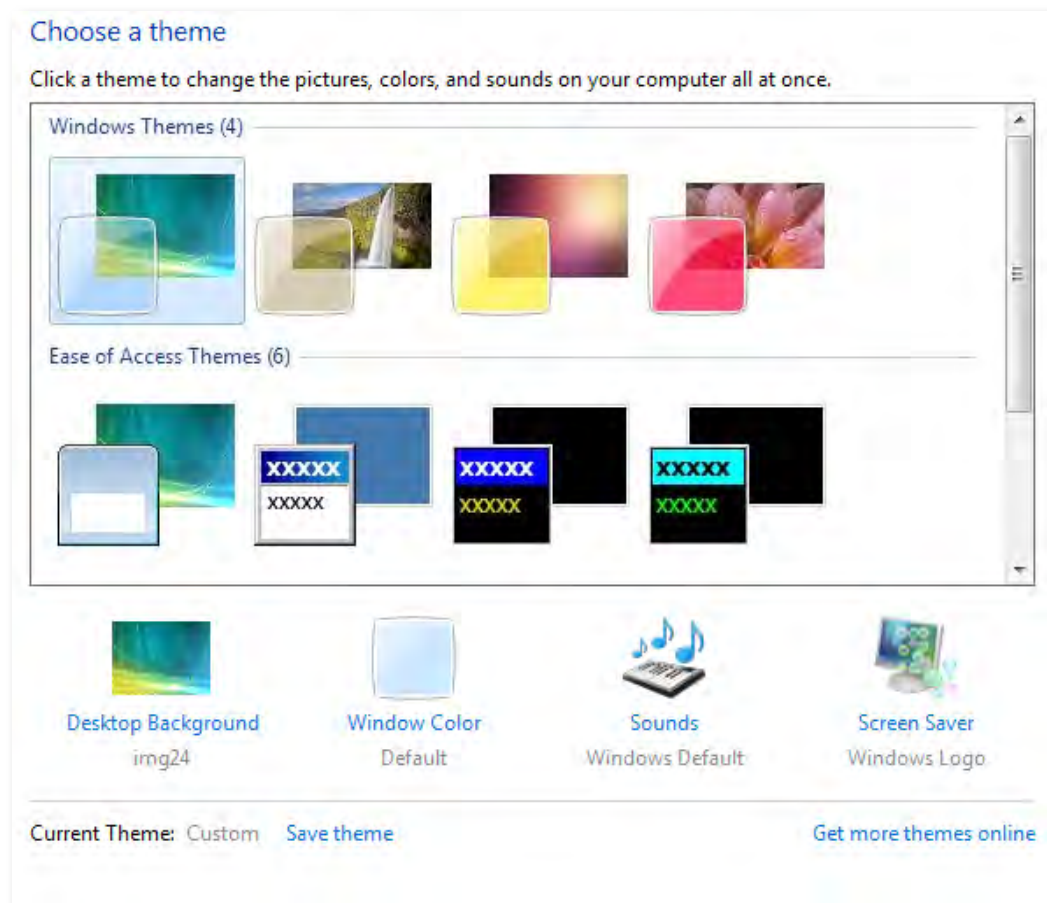
Fewer icons mean less clutter

Styles

Windows 7 comes with many new styles, so you'll have more options for making your computer reflect your own personal taste. Each style includes rich backgrounds, glass colors, a unique sound scheme, and a screen saver. You can also download new styles, and you can even create your own styles and share them with your friends and family. Glass color options are increased from 8 to 16.

Windows 7 also includes some styles that are customized for specific regions of the world. (See Culturally Relevant Desktop later in this document.)

(Note: In the PDC build, Styles are called Themes. These will be rebranded as Styles in future builds.)



Gadgets

Do you love the ease of tracking weather or traffic information in a handy gadget on your Windows Vista desktop, but find it frustrating that they're confined to the Windows Sidebar and disappear when you click the "show desktop" button? Or that they can't be resized? Windows 7 makes gadgets even easier to use, enabling you to position them anywhere on the desktop and make them smaller or larger. If you like to keep your gadgets at the edges of your screen, they'll snap into place as if they were magnets. The Peek feature (discussed under Aero Desktop Enhancements) lets you see behind open windows on your desktop to view your gadgets quickly. It's also easier for the applications you use to install helpful companion gadgets.



Gadgets can be put anywhere on the desktop

Globally Relevant

People around the world use and enjoy Windows, and all of them want to feel like Windows was made for them—to reflect how they represent dates, their local currency, and even their local culture. Windows 7 provides a locally relevant, culturally appropriate experience for a broad range of geographies worldwide.

Culturally Relevant Desktop

Windows 7 has new desktop styles tailored to different regions and languages, with special wallpapers, sounds, and Aero Glass colors to provide a more locally relevant experience. In addition, Internet Explorer favorites and RSS feeds are pre-populated, making you feel right at home.

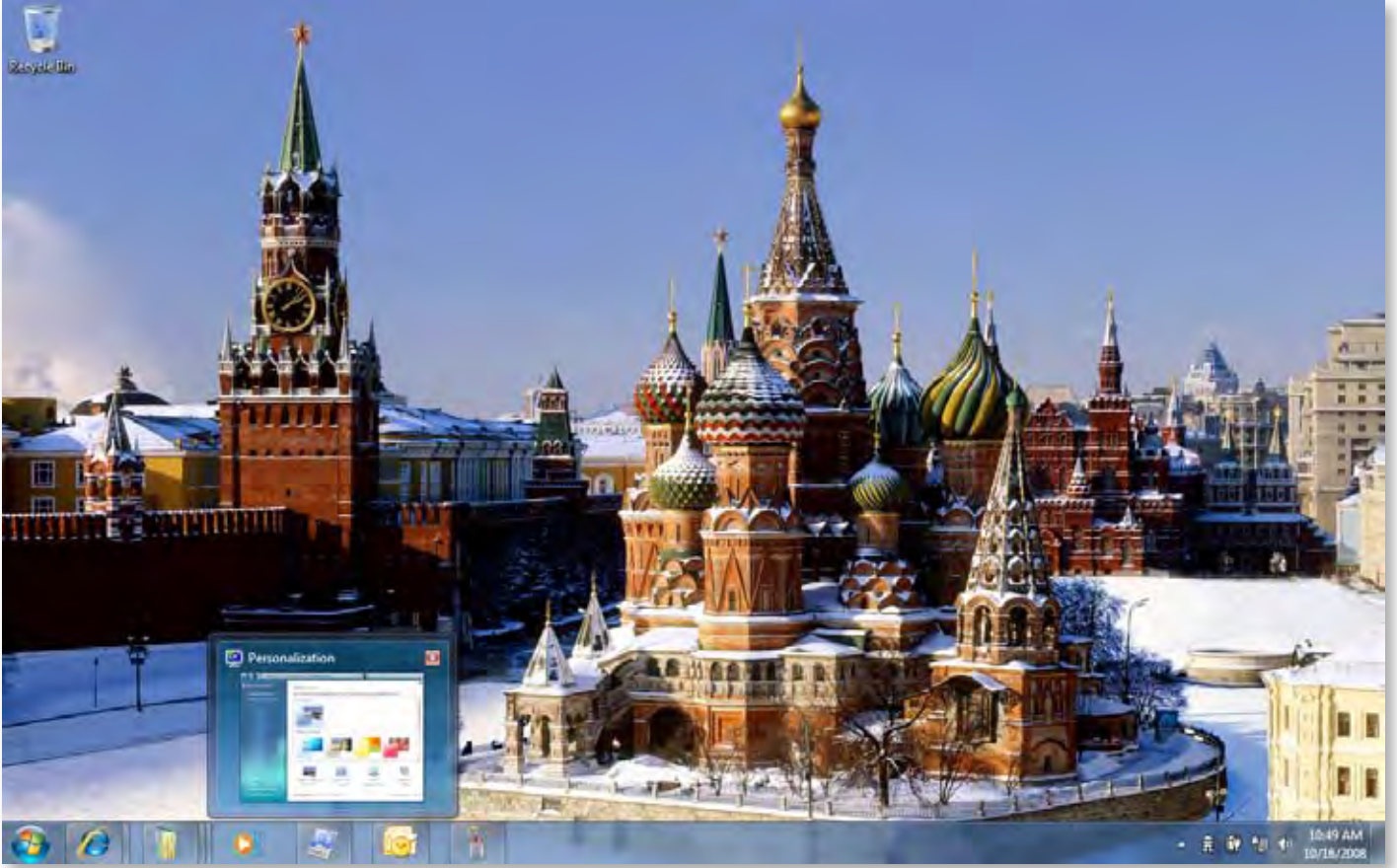
(Note: Not all locally relevant styles will be provided in the PDC build.)

Cultural Conventions

Regional options—such as currency and date format—are set automatically based on the locale you choose, and your preferences help shape the user experience across the applications on your desktop. Also, multilingual browsing no longer requires font installation or setting updates.

Language-Based Fonts

Windows 7 supports text display and fonts for more languages, which will help meet government requirements in countries that mandate support for national languages. Also, in Windows 7, fonts are classified by the languages they're associated with, so you'll see a list of fonts that are relevant based on the languages you use. If you've set up your computer to create documents in multiple languages and want to switch the font in a document, you'll see only choices that are relevant to the languages you use.



Customized style for Russia



New language fonts



Windows 7 for IT Professionals

Users are becoming more and more computer-savvy, and expect more from the technology they use at work.

They expect to be able to work from home, from branch offices, and on-the-road, without a drop-off in productivity. As the needs of users have changed, the demands on IT professionals have only increased. Today, IT professionals are being asked to provide more capabilities and support greater flexibility, while continuing to minimize cost and security risks.

With Windows 7, IT professionals can meet the diverse needs of their users in a way that's more manageable. Businesses can enable employees to work more productively at their desks, at home, on-the-road, or in a branch office. Security and control are enhanced, reducing the risk associated with data on lost PCs or external hard drives. PC management is streamlined, so it takes less work to deploy Windows 7 and keep it running smoothly. And because Windows 7 is based on the Windows Vista foundation, companies that have already deployed Windows Vista will find that Windows 7 is highly compatible with existing hardware, software, and tools.

Make Users Productive Anywhere

Windows 7 enables end users to be productive no matter where they are, or where the data they need resides. They can work faster and with fewer interruptions because Windows 7 delivers improved performance and reliability. They won't have to look in multiple places to find information because a single search can examine a SharePoint site on a company intranet as well as files on their PCs. With DirectAccess, mobile users will be able to simply and securely access corporate resources when out of the office. Users in branch offices with slow connections will be more productive as well because BranchCache™ in Windows 7 can be used to cache frequently accessed files and Web pages.

Enhance Security and Control

Windows 7 builds on the security foundation of Windows Vista, delivering increased flexibility in securing PCs and data. Businesses won't have to worry about sensitive data on lost laptops or USB drives because in addition to protecting internal PC hard disks, BitLocker can now encrypt external thumb drives and hard disks—and provide recovery keys so that the data is accessible when needed. For enterprises that demand the highest levels of compliance, IT professionals can use new application-blocking tools to dictate which applications are allowed to run on user PCs, providing yet another way to limit the risk of malicious software.

Streamline PC Management

Whether IT professionals manage and deploy desktops, laptops, or virtual environments, Windows 7 makes the job easier while enabling them to leverage the same tools and skills they use with Windows Vista. Advanced image management and deployment tools enable IT professionals to add, remove, and report on drivers, language packs, and updates—and push those system images out to user PCs using less network bandwidth. New scripting and automation capabilities based on Windows PowerShell™ 2.0 reduce the costs of managing and troubleshooting PCs. For IT professionals making the leap to client virtualization, Windows 7 helps them more easily maintain virtual machine images and provide a richer user experience over remote connections.

Microsoft Desktop Optimization Pack

The Microsoft Desktop Optimization Pack, which is updated at least once a year, completes the enterprise experience. By using Windows 7 and the Microsoft Desktop Optimization Pack together, enterprises can optimize their desktop infrastructure and gain the flexibility to address their unique business needs.

Companies can prepare to deploy Windows 7 as soon as possible by deploying Windows Vista and the Microsoft Desktop Optimization Pack today. Customers already running Windows Vista will find that Windows 7 delivers strong compatibility with Windows Vista software and devices, and that Windows 7 can be managed with many of the same tools they use to manage Windows Vista. Companies using the Microsoft Desktop Optimization Pack will have an even greater advantage when moving to Windows 7 because they can more easily migrate settings and applications.

Windows 7 for IT Professionals:

Make Users Productive Anywhere

At work, users are asked to get more and more done every day—and to work from a wide variety of locations. Many of the advancements in Windows 7 that make common tasks faster and easier also make people more productive in their work lives. Performance and reliability enhancements mean that users' PCs will be ready when they are, while UI advancements and new ways to interact with the PC (such as multi-touch) will help them complete everyday tasks faster and easier. The Windows 7 for End Users section of this document describes in detail how the improved fundamentals in Windows 7 will benefit PC users at home as well as at work.

Windows 7 also removes barriers that keep people from getting to their information, regardless where it's stored—on PCs, intranet portals, or devices. Windows 7 also helps users stay productive when on the road or working from a branch office. Windows 7 users will benefit from even greater flexibility when their companies take advantage of the Microsoft Desktop Optimization pack, which includes virtualization technologies to give users access to their desktop and applications from almost any PC.

Remove Barriers to Information

In Windows 7, search is better integrated with enterprise infrastructure. Users can search remote data sources and perform searches within encrypted files, and can easily switch from searching locally to searching enterprise repositories. IT professionals can publish important search locations through Group Policy. In addition, Windows 7 search significantly reduces the impact of indexing e-mail in Microsoft Exchange Server when “cached exchange mode” is disabled.

Search, Search Libraries, and Search Federation

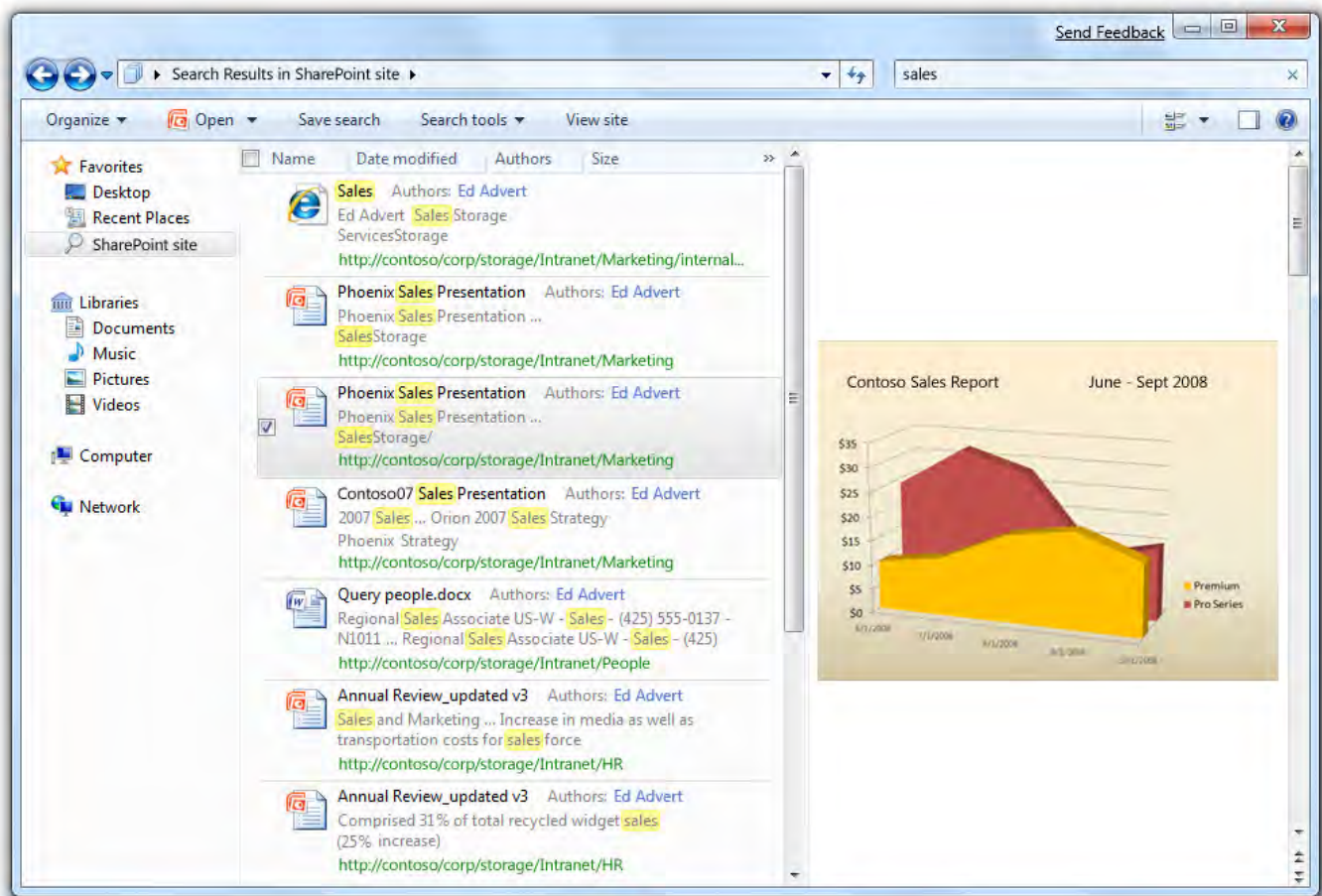
As discussed under Windows 7 For End Users, Start menu search provides a single place for end users to find what they need. Search results in Windows 7 are more relevant and easier to understand, and users can easily narrow-down or expand the locations being searched. Search Federation provides out-of-the-box support for searching beyond the user’s PC.

Developers and IT professionals can enable search engines, document repositories, Web applications, and proprietary data stores to be searched from Windows 7, without having to write and deploy client code. This enables end users to search the corporate intranet or the Web as easily as they can search their local files—all from within the same familiar Windows interface.

Windows 7 desktop search supports the public OpenSearch standard, so with a few minor updates, Web developers can take advantage of existing investments in RSS lists to quickly return results to Windows 7. In most cases, this represents a few days work for a Web developer. After a server is capable of responding to OpenSearch requests, a simple data-driven install file (called an Open Search Descriptor) is used to integrate the search results into Windows Explorer in Windows 7. These Open Search Descriptors can be placed on Web sites so that users can install them in a manner similar to subscribing to an RSS feed today. Office SharePoint Server 2007 and many third-party products already support search federation, so companies can immediately begin taking advantage of this feature in Windows 7.

Enterprise Search Scopes

IT professionals can deploy up to five search scopes on user PCs to point them to the right data sources and help them more easily find the data they need. Enterprise search scopes appear on the user’s Start menu and at the bottom of a list of search results in Windows Explorer.



Federated search results, including file previews

Access Information from Anywhere

According to several industry analyst firms, 2008 marks the point at which more portable PCs will be deployed in U.S.-based enterprises than desktop PCs. This transition is a clear indicator of the desire for increased mobility, whether users are traveling for business or simply taking work home at night. In addition, a growing number of companies are enabling users to work at home using their own computers, or to use any PC to access enterprise applications remotely. In short, flexible access to applications and data from work, home, and other locations is an essential component of any enterprise IT strategy.

With Windows 7, it's easy for users to get connected and stay connected, regardless of location or type of network. Windows 7 not only supports end user needs, but also enables IT professionals to meet those needs in a more secure, reliable, flexible, and cost-effective manner.

DirectAccess

DirectAccess enables remote users to access the corporate network anytime they have an Internet connection, without the extra step of initiating a VPN connection—and thus increases their productivity when out of the office. For IT professionals, DirectAccess provides a more secure and flexible corporate network infrastructure to remotely manage and update user PCs. DirectAccess simplifies IT management by providing an “always managed” infrastructure, in which computers both on and off the network can remain healthy, managed, and updated.

With DirectAccess, IT professionals maintain fine-grained control over which network resources users can access. For example, Group Policy settings can be used to manage remote user access to enterprise applications. DirectAccess also separates Internet traffic from access to internal network resources, so that users can access public Web sites without generating additional communications traffic on the corporate network.

To take advantage of DirectAccess, IT professionals need to deploy Windows Server 2008 R2 and implement IPv6 and IPSec.

VPN Reconnect

Although DirectAccess offers strong benefits, some companies will not be able to implement the necessary infrastructure right away. In the meantime, VPN Reconnect (described under Windows 7 for End Users) enhances the connectivity experience for end users who rely on VPN connections, thereby reducing support costs and help desk calls for IT professionals.

RemoteApp and Desktop Connections

With concerns over security, continual cost pressures, and the need to support remote users, companies are looking for ways to host client applications centrally—on servers in their data centers. For many years, Microsoft Terminal Services technology has enabled IT professionals to do just that. However, in previous versions of Windows, the end user experience for Terminal Services-hosted applications was noticeably different than their experience for client-hosted applications. The user interface for those applications was not as rich, and users couldn't launch them from the Start menu.

Windows 7 provides a better user experience when connecting to Terminal Services in Windows Server 2008 R2. Users can more easily connect to remote applications and remote desktop sessions from any Windows 7 PC, whether in the office or on the road. After a connection is established, users can access remote applications or desktops from the Start menu, just like they do for local applications. Applications launch, look, and feel just like they do when running locally. New applications that IT professionals make available automatically appear on the Start menu, so that users always have access to the latest programs.

Improved Roaming User Profiles

Windows 7 makes Roaming User Profiles more useful and reliable by enabling IT professionals to automatically synchronize users' profiles with the server while users are still logged on. Prior to Windows 7, this synchronization occurred only when users logged off. With this improvement, users can roam from one PC to another while remaining logged in to both PCs—and still have the same consistent environment.

BranchCache

Recent studies indicate that the number of branch offices—as well as the number of employees who visit those branch offices—is increasing. However, the productivity of branch office users can be negatively affected by network bandwidth limitations and latency in application response times. Some existing tools that Microsoft has provided to help IT professionals in this area include Background Intelligent Transfer Service in Windows XP and the Distributed File System Replication service in Windows Server 2008.

Improved Folder Redirection and Offline Files

As discussed in Windows 7 for End Users, Folder Redirection and Offline Files provide a convenient way for users to access files stored on a central server when not connected to the corporate network, with improvements in Windows 7 reducing initial wait times. Windows 7 also enables IT professionals to better manage Folder Redirection and Offline files. For example, they can use Group Policy to prevent specific types of files (such as music files) from being synchronized to the server. In addition, because Offline Files operates in a “usually offline” mode when users are not connected to the same local area network as the central server, performance is improved for branch office and remote access scenarios. Administrators can also control when offline files are synchronized with the server, set up specific time intervals for synchronization, block-out other times for purposes of bandwidth management, and configure a maximum “stale” time after which files must be resynchronized.

Windows 7 introduces BranchCache, the next step for improving end user productivity in branch offices. BranchCache caches content from remote file and Web servers in the branch location, so that users can more quickly access this information. The cache can be hosted centrally on a server in the branch location, or can be distributed across user PCs.

BranchCache supports the same network protocols that are commonly used in enterprises—namely, HTTP(S) and SMB—so that any applications based on these network protocols can automatically benefit from the technology. For example, because Windows Media Player uses the HTTP protocol, internal training videos can be cached and thus viewed efficiently by branch office users. BranchCache also supports network security protocols (such as SSL and IPSec), ensuring that only authorized clients can access requested data.

To take advantage of BranchCache, IT professionals need to deploy Windows Server 2008 R2.

Windows 7 for IT Professionals:

Enhance Security and Control

Viruses, spyware, root kits, and phishing scams pose a constant risk to users today. Windows 7 builds upon the proven security lineage of Windows Vista, retaining the multiple layers of defense that made Windows Vista the most secure version of the Windows client to date. At the same time, Windows 7 responds to requests from IT professionals to make the security features in Windows Vista more usable and manageable, and delivers new security features to help IT professionals more effectively address the continually evolving threat landscape.

As discussed in the Windows 7 For End Users section, Windows 7 was designed and developed using Microsoft's Security Development Lifecycle—and builds on the defense-in-depth security enhancements in Windows Vista, which form the foundation for Windows 7 security. Windows 7 is 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. In addition, Windows 7 is engineered to support Common Criteria requirements to achieve Evaluation Assurance Level 4 certification and Federal Information Processing Standard 140-2 evaluation.

IT professionals can take advantage of Advanced Group Policy Management and other features in the Microsoft Desktop Optimization Pack to further enhance security and control.

Protect Data on PCs and Devices

Windows 7 addresses the continued threat of data leakage with deployment and manageability updates to BitLocker™ Drive Encryption and the introduction of BitLocker To Go, which provides data protection for removable storage devices such as USB flash drives and portable hard drives. So whether users are traveling with their laptops, sharing large files with trusted partners, or taking work home, BitLocker-protected devices help ensure that only authorized users can read the data, even if the physical media is lost, stolen, or misused. Best of all, BitLocker protection is easy to deploy and intuitive for the end user, while leading to improved compliance and data security.

BitLocker

In Windows 7, core BitLocker functionality is enhanced to deliver an improved experience for IT professionals and end users—from simple enhancements such as the ability to right-click on a drive to enable BitLocker protection to the automatic creation of the required hidden boot partition. With Windows Vista, customers who deployed BitLocker after the operating system was installed had to potentially repartition the hard drive on each user's PC to create the second, hidden boot partition required by BitLocker. Windows 7 creates that second partition automatically, upon installation, greatly simplifying BitLocker deployments.

BitLocker in Windows 7 also adds Data Recovery Agent (DRA) support for all protected volumes. In Windows Vista, IT professionals had to maintain a unique recovery key for each BitLocker-encrypted volume. With DRA support, which was a common request from enterprise customers, IT professionals can dictate that all BitLocker protected volumes (OS, fixed, and the new portable volumes) are encrypted with an appropriate DRA, giving them a single key with which they can recover data on any BitLocker-encrypted volume.

BitLocker To Go

BitLocker To Go gives system administrators control over how removable storage devices can be used and the strength of protection required. Administrators can require data protection for writing to any removable storage device while still allowing unprotected storage devices to be used in a read-only mode. Group Policy can also be used to require strong passwords or a smart card for protected removable storage devices. Finally, BitLocker To Go provides configurable read-only support for removable devices on older versions of Windows, allowing users who are running Windows 7 to share BitLocker-protected files with users who are still running Windows Vista and Windows XP.

(Note: Read-only support for removable devices on older versions of Windows is not available in the PDC build.)

Protect Users and Infrastructure

Users who run unauthorized software can experience a higher incidence of malware infections and generate more help desk calls. However, it can be difficult for IT professionals to ensure that user desktops are running only approved, licensed software. Windows Vista supported Software Restriction Policy, which IT professionals could use to define a list of applications that users can or cannot run. Windows 7 reenergizes application control policies with AppLocker.

AppLocker™

AppLocker is a flexible, easily administered mechanism that enables IT professionals to specify exactly what is allowed to run on user desktops. It provides the flexibility to allow users to run the applications, installation programs, and scripts they need to be productive. With this capability, IT professionals can realize the security, operational, and compliance benefits of application standardization.

AppLocker provides simple, powerful, rule-based structures for specifying which applications can run. It introduces “publisher rules” that are based on an application’s digital signature, making it possible to build rules that survive application updates. For example, an organization can create a rule to “allow all versions greater than 9.0 of the program Acrobat Reader to run if it’s signed by the software publisher Adobe.” In this way, when Adobe updates Acrobat, IT professionals can safely deploy the application update without having to build another rule for the new version of Acrobat.

Build on Windows Vista Security Foundation

As IT professionals work to meet new end user needs, security remains a constant concern. Windows 7 builds upon the proven security lineage of Windows Vista, retaining the multiple layers of defense that have made it the most secure version of the Windows client to date. As mentioned in the Windows 7 for End Users section, Windows 7 was designed and developed using Microsoft's Security Development Lifecycle (SDL), with the defense-in-depth security enhancements of Windows Vista forming the foundation for Windows 7 security. Windows 7 not only builds on these enhancements to improve security, it also includes enhancements that make security management easier for IT professionals.

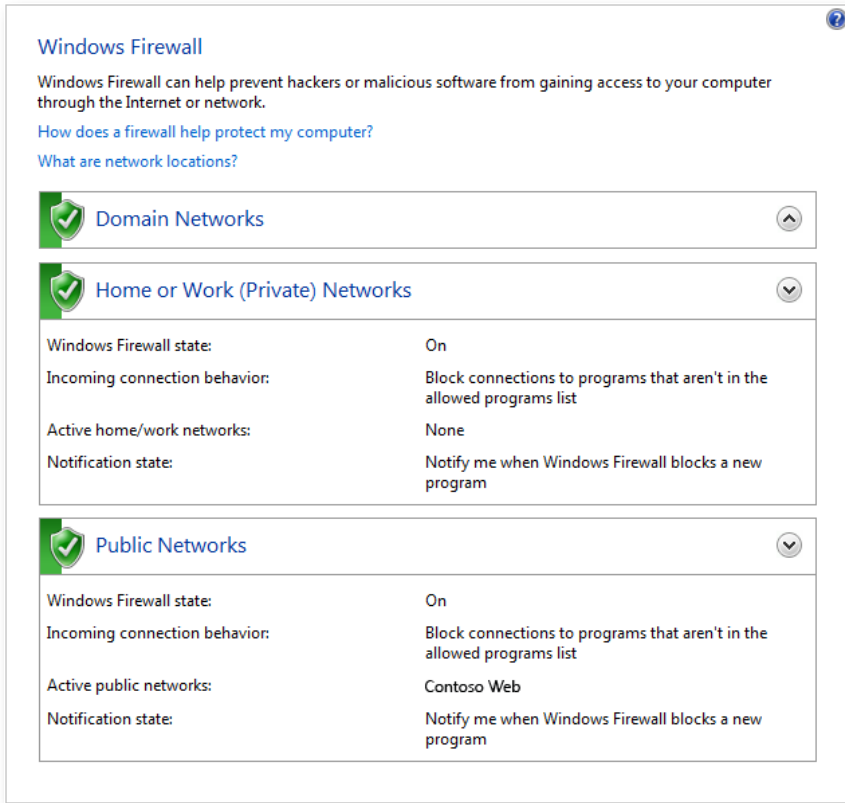
Multiple Active Firewall Profiles

In Windows Vista, firewall policy is based on the "type" of network connection established—such as Home, Work, Public, or Domain (which is a fourth, hidden type.) However, this can present security obstacles for IT professionals when, for example, a user connected to the Internet through a "Home" network then uses a virtual private networking to access to the corporate network. In such a case, because the network type (and thus the firewall settings) had already been set based on the first network to which the user connected, the firewall settings appropriate for accessing the corporate network could not be applied.

Windows 7 alleviates this source of pain for IT professionals through support for multiple active firewall policies, enabling user PCs to obtain and apply domain firewall profile information regardless of other networks that may be active on the PC. Through such capabilities, which are among the top features requested by enterprise customers, IT professionals can simplify connectivity and security policies by maintaining a single set of rules for both remote clients and clients that are physically connected to the corporate network.

Improved Smart Card Support

Password-based authentication has well-understood security limitations; however, deploying strong authentication technologies remains a challenge for many organizations. Building upon the smart card infrastructure advances made in Windows Vista, Windows 7 eases smart card deployment through support of Plug and Play. Drivers required to support smart cards and smart card readers are automatically installed, without the need for administrative permissions or user interaction, easing the deployment of strong, two-factor authentication in the enterprise. Also, Windows 7 extends the platform support of PKINIT (RFC 5349) to include ECC-based smart cards, allowing the use of Elliptic Curve-backed certificates on smart cards for Windows Logon.



Multiple firewall profiles manage security consistently regardless of connection type

Enhanced Audit

Windows 7 improves on the audit capabilities provided in Windows Vista, making it easier for organizations to meet regulatory and business requirements. Enhancements include simplified management of audit configurations through integration with Group Policy, why someone was granted or denied access to specific information, and easier monitoring of the changes made by specific people or groups.

Streamlined User Account Control

User Account Control (UAC) was introduced in Windows Vista to help increase security and improve total cost of ownership by enabling the operating system to be deployed without administrative privileges. Windows 7 continues the investment in UAC with changes that enhance the user experience and put users in more control of their prompting experience. The number of operating system applications and tasks that require elevation is reduced, so standard users can do more than before and will see fewer elevation prompts.

(More information on how UAC in Windows 7 enhances the end user experience can be found in the Windows 7 for End Users section.)

Domain Name System Security Extensions

The Domain Name System (DNS) is an essential protocol that supports many everyday Internet activities, including e-mail delivery, Web browsing, and instant messaging. However, the DNS system was designed more than three decades ago, without the security concerns we face today. DNS Security Extensions (DNSSEC) is a set of extensions to DNS that provide the security services required for today's Internet. Windows 7 supports DNSSEC as specified in RFCs 4033, 4034 and 4035, giving organizations the confidence that domain name records are not being spoofed and helping them protect against malicious activities.

Windows 7 for IT Professionals:

Streamline PC Management

Every enterprise is constantly working to stay on top of PC life-cycle issues, which can have a direct effect on costs, service levels, user productivity, and the ability to deliver business value. IT professionals need products that streamline all stages of the PC life cycle, including operating system and application deployment, ongoing management, and troubleshooting when things go wrong.

Windows 7 was designed to meet those needs. It delivers desktop and application deployment tools that build upon the advances made in Windows Vista, helping IT professionals more easily manage and deliver operating system images, provision drivers, and migrate user data and settings. Similarly, features such as Windows PowerShell 2.0, enhanced Group Policy, and the Windows Troubleshooting Platform help IT professionals to better manage PCs and troubleshoot problems, enabling them to keep users productive while working to reduce costs, maintain compliance, and improve operational efficiency. Windows 7 also includes several enhancements that make it easier for customers deploying virtual desktop infrastructures. Enterprises that want to further optimize PC life cycle management can take advantage of the advanced capabilities provided in the Microsoft Desktop Optimization Pack.

Easier Deployment from Windows Vista

Windows 7 enhances the desktop and application deployment experience for IT professionals in several ways, beginning with improvements in application and hardware compatibility that reduce the evaluation and readiness cycle. New system imaging tools expand upon the advances made for Windows Vista, enabling IT professionals to manage operating system images using a single, consolidated tool-set. Multicast Multiple Stream Transfer improves system image delivery over the network, and Dynamic Driver Provisioning enables IT professionals to reduce image sizes. Rolling out Windows 7 is faster and easier through an improved User State Migration Tool and enhancements to VHD image management and deployment.

(Note: For a detailed discussion of enhancements that support application and device compatibility, please see the Windows 7 for End Users section.)

Deployment Image Servicing and Management

The Deployment Image Servicing and Management (DISM) tool in Windows 7 provides a central place for IT professionals to build and service Windows images offline. DISM is a scriptable command-line tool that combines the functionality of several offline image management utilities provided for Windows Vista, including International Settings Configuration (IntlCfg.exe), PEImg, and Package Manager (PkgMgr.exe).

With DISM, IT professionals can update operating system images; add optional components; add, enumerate, and remove third party device drivers; add language packs and apply international settings; and maintain an inventory of offline images that includes drivers, packages, features, and software updates. DISM also supports use of Windows Vista scripts against Windows 7 system images by translating Package Manager commands into DISM commands. DISM can also be used to manage Windows Vista system images, providing better troubleshooting support and improved error reporting compared to previous tools.

Dynamic Driver Provisioning

With Dynamic Driver Provisioning in Windows 7, IT professionals can reduce the size of system images and the number of images to manage, and won't need to update images when new hardware is introduced. Drivers are stored centrally, separate from images, and can either be installed dynamically based on the Plug and Play IDs of a PC's hardware or as predetermined sets based on information contained in the BIOS. Plug and Play enumeration is performed when clients are deployed, with applicable drivers from the deployment server located and applied. Reducing the number of drivers on individual machines reduces the number of potential driver conflicts, ultimately speeding up installation and setup times.

Multicast Multiple Stream Transfer

Multicast Multiple Stream Transfer in Windows 7 enables IT professionals to deploy images across networks more efficiently. Instead of requiring separate direct connections between deployment servers and each client, it enables deployment servers to “broadcast” image data to multiple clients simultaneously. Multicast Multiple Stream Transfer also enables servers to group clients with similar bandwidth capabilities into network streams, ensuring the fastest possible overall transfer rate. IT professionals can define minimum performance thresholds to automatically remove slower computers from a multicast group. (This is different from standard multicast introduced in Windows Server 2008, in which the slowest PC “throttles” the transfer rate for all clients.)

User State Migration Tool

The User State Migration Tool (USMT) is a command line tool that enables IT professionals to migrate user profiles, files, and system and application settings from one operating system installation to another. For Windows 7, USMT adds a “hardlink migration” feature that migrates files from one operating system to another on the same PC without physically moving those files on the disk, providing significant performance gains compared to previous methods that move files. Instead, files are indexed and redirected through the use of links in the new operating system.

USMT for Windows 7 also reduces the need for IT professionals to write custom XML files to control migration by providing a dynamic algorithm that discovers user documents at runtime. Additionally, USMT for Windows 7 adds flexibility by enabling offline migrations and provides support for volume shadow copy, delivering the ability to successfully migrate files that are being used by an application at the time of file capture.

VHD Image Management and Deployment

Virtual machine images have traditionally required different management and deployment solutions than native file-based (WIM) system images. Windows 7 enables IT professionals to use the same processes and tools while managing WIM and VHD image files. From an image management perspective, Windows 7-based VHD files can be treated similarly to WIM files with regard to offline image servicing and image-based setup. IT professionals can manage virtual machine images using DISM and deploy virtual machine (VHD) files using Windows Deployment Services and multicast deployment options. VHD files can be deployed in an automated manner, just like WIM files, and can be natively booted into by Windows 7.

(Note: For more information about VHD Boot in Windows 7, see the VHD Boot section later in this guide.)

Keep PCs Running Smoothly

One of the best ways to minimize desktop support costs is to maintain a stable, secure desktop configuration. However, desktop configuration management can itself be a challenge. Windows 7 builds on enhancements in Windows Vista to enable IT professionals to more effectively manage desktop and mobile PCs. Features such as Windows PowerShell 2.0, enhanced Group Policy, and the Windows Troubleshooting Platform help IT professionals balance the need to keep users productive with the continual pressures they face to reduce costs, maintain compliance, and improve operational efficiency.

PowerShell Improvements

Windows PowerShell enables IT professionals to easily automate repetitive tasks, helping them increase consistency and be more productive. With Windows 7, IT professionals can use Windows PowerShell and its graphical scripting editor to write comprehensive scripts that access underlying technologies within Windows 7.

Some of the new automation capabilities in Windows 7 include the following:

- **PowerShell 2.0.** Built into Windows 7, Windows PowerShell 2.0 is a powerful, complete scripting language that supports branching, looping, functions, debugging, exception handling, and internationalization. It delivers a growing set of cmdlets that can be used to manage both Windows-based PCs and servers.
- **Windows PowerShell Integrated Scripting Environment.** PowerShell is a powerful command and scripting engine, but it's also very approachable to the novice scripter. The Windows PowerShell Integrated Scripting Environment makes PowerShell even easier to use, providing a graphical environment to write, debug, and execute PowerShell scripts.
- **PowerShell Remoting.** PowerShell uses the standard management protocol WS Management (WS-MAN) to invoke cmdlets on client PCs. Two types of remoting that are supported: **fan-out**, which provides one-to-many remoting capabilities that allow IT professionals to run management scripts across multiple PCs from a single console; and **one-to-one interactive remoting**, which enables IT professionals to remotely troubleshoot a specific machine.
- **Script Internationalization.** IT professionals can easily localize messages and content for PowerShell scripts using the .NET localization model. This can be especially useful for multinational companies, in which employees work in several different languages.

- **PowerShell Restricted Shell.** IT professionals can use the PowerShell Restricted Shell to create a custom shell, in which only certain commands and command parameters are available to system administrators. IT professionals also can set access permissions (or ACLs) on custom scripts, so that system administrators can only access scripts to which they have been granted rights. This increases the ability to drive automation across the organization by enabling IT professionals to delegate the ability to perform only certain tasks.
- **Richer Logon Scripts.** IT professionals can use PowerShell to create simple yet powerful logon, logoff, startup, and shutdown scripts that are executed through Group Policy, enabling them to configure PCs in a more advanced manner than by using simple batch files.
- **Automating Group Policy.** With the Group Policy Management Console, which is available as a separate download, IT professionals can use scripting to manage Group Policy Objects and create/edit registry-based Group Policy settings in Windows 7. In this way, they can save time and avoid errors when managing multiple Group Policies.

Flexible Administrative Control

Windows 7 enables IT professionals to flexibly manage PCs that are disconnected from the corporate network, limit which applications users can run, require removable storage devices to be encrypted, and more granularly audit user activity.

Management Beyond the Network. Organizations that use DirectAccess to provide users with seamless remote access to corporate resources using an Internet connection also can manage remote PCs more effectively. For example, Group Policy can be updated, PCs can be accessed using Remote Assistance, and enterprise management tools can deliver software and updates.

Group Policy Improvements. Windows 7 provides more comprehensive Group Policy settings, enabling IT professionals to better configure and manage user PCs. Additional settings are provided for security and data protection, and new scenarios that can be managed using Group Policy include BitLocker To Go, more granular auditing, and AppLocker. In addition, an improved administrative experience for Group Policy helps IT professionals take advantage of predefined best practices, further automate their activities, and use Group Policy Preferences (discussed next) to extend the range of managed settings.

- **Group Policy Preferences.** Group Policy Preferences extend the reach of what Group Policy can manage and how settings are applied. With Group Policy Preferences, system administrators can manage Windows components that are not Group Policy-aware, such as mapped network drives and desktop shortcuts. Windows 7 contains new Group Policy Preferences for flexible power management and more advanced task scheduling. Group Policy Preferences can also be used to deploy registry settings for managing applications. System administrators can even create custom Group Policy Preferences extensions.

Unlike traditional Group Policy settings, Group Policy Preferences are not “enforced.” Rather, they are treated “defaults” that users may be able to change. Preferences can be configured to reapply preferred settings every time that standard Group Policies are applied (if the user has made a change), or to use the preferred setting as a baseline configuration that the user can permanently change. This gives IT professionals the flexibility to strike an optimal balance between control and user productivity. Group Policy Preferences provides additional flexibility by enabling system administrators to configure unique settings for different groups of users or PCs within a single Group Policy object, without requiring WMI filters.

- **Starter Group Policy Objects.** Starter Group Policy Objects in Windows 7 are collections of preconfigured administrative templates that IT professionals can use as standard baseline configurations to create a live Group Policy Object. They encapsulate Microsoft best practices, containing recommended policy settings and values for key enterprise scenarios. IT professionals also can create and share their own Starter GPOs based on internal or industry regulatory requirements.
- **URL-Based Quality of Service.** System administrators today prioritize network traffic based on application, port number, and IP address. However, new initiatives such as software-as-a-service introduce the need to prioritize network traffic in new ways. Windows 7 provides the ability to implement Quality of Service based on URL. URL-based QoS is configurable through Group Policy, giving IT professionals the capabilities they need to more finely tune their networks.

Troubleshooting and Support

Windows 7 provides richer built-in troubleshooting capabilities, enabling end users to resolve more technical issues on their own—without having to call the help desk. If a call to the help desk is unavoidable, Windows 7 gives IT professionals the tools they need to resolve the issue quickly.

Problem Steps Recorder

A new feature in Windows 7, the Problem Steps Recorder can aid IT professionals in troubleshooting application failures. It allows end users to reproduce and record their experience with an application failure, with each step recorded as a screen shot along with accompanying logs and software configuration data. Problem Steps Recorder then produces a compressed file that can be sent to support staff to troubleshoot the problem.

Windows Recovery Environment (Windows RE)

With Windows Vista, IT professionals and OEMs had to take extra steps to deploy the Windows RE partition (which supports functions such as System Restore and Startup Repair). Windows 7 automatically installs Windows RE into the operating system partition by default, so that all users will have access to it.

Windows Troubleshooting Platform

Windows 7 delivers a comprehensive, extensible troubleshooting platform that uses a PowerShell-based mechanism to troubleshoot problems. Key components of the Windows Troubleshooting Platform are:

- **Windows Troubleshooting Packs.** Windows troubleshooting packs are collections of PowerShell scripts and related information. Troubleshooting packs can be executed remotely by IT professionals from the command line, and enterprises can control troubleshooting pack execution through Group Policy settings. Troubleshooting Packs can be easily authored by OEMs, ISVs, and IT professionals to address needs specific to their infrastructures or applications. Troubleshooting packs are packaged into CAB files for simple deployment to PCs across the enterprise.
- **Windows Troubleshooting Toolkit.** The Windows Troubleshooting Toolkit provides a graphical environment to assist IT professionals and third-parties in building rich troubleshooting packs. It links to the PowerShell Integrated Scripting Environment to facilitate the authoring of detection, resolution and verification scripts. The Windows Troubleshooting

Toolkit also includes a single-click, compile-and-run feature, which enables the author of a troubleshooting pack to easily compile it, sign it with a certificate, package it into a CAB file, and even test it—all by pressing a button in the toolkit's GUI. The Windows Troubleshooting Toolkit is provided as part of the Windows 7 Software Development Kit (SDK).

Unified Tracing

Problems with network connectivity can be very difficult for IT professionals to identify and resolve. While the network diagnostics included in Windows can resolve many problems for users and help avoid support calls, there are always cases for which assisted support is required. Before Windows 7, each networking component had its own method for tracing and collecting the information needed for troubleshooting, often with different output formats. This made it difficult for IT professionals to collect and analyze all of the information needed to solve the problem, often requiring several cycles of problem reproduction and data collection.

Unified Tracing provides a single tool for determining what's happening in the Windows 7 networking stack, making it much easier for support professionals, system administrators, and developers to diagnose and solve problems. It collects event logs and captures packets across all layers of the networking stack using only in-box tools, and groups the data into activities across individual components.

Remote Access to Reliability Data

Windows Vista introduced the Reliability Monitor, a graphical tool that correlated overall system stability and events such as application or device driver installations and system failures. This tool proved helpful in guiding support staff to identify the cause of many common problems.

Windows 7 provides programmatic access to reliability data through Windows Management Instrumentation (WMI), enabling IT professionals to remotely access that data for one or many PCs using Windows PowerShell, System Center Configuration Manager, System Center Operations Manager, and third-party management tools. In this way, IT professionals can easily check stability status and view recent events remotely, reducing the time it takes to solve problems.

Better Support for Client Virtualization

Virtual Desktop Infrastructure (VDI) enables user desktops running in virtual machines on centralized servers. VDI provides an alternative to traditional desktop environments for non-mobile workers, with benefits that include flexibility (including user access from multiple locations) and increased business continuity. Key issues with VDI today are total cost of ownership (because VDI requires a significant upfront investment in servers and infrastructure) and the quality of the user experience, which is delivered over the network.

Windows 7 delivers improvements in both of these areas—including richer remote graphics and improved performance and reliability—when coupled with Windows Server 2008 R2 Hyper-V. Also, through the introduction of direct VHD boot, Windows allows IT professionals to use the same image to deploy a virtual desktop as they use to deploy a typical PC.

Richer Remoting Experience

Windows 7 delivers a richer experience when users are connected to a virtual desktop—closer to the experience provided by a local Windows desktop. Some of the ways the user experience is improved include:

- **Graphics.** Windows 7 provides multi-monitor support for virtual desktops. This enables enterprises to realize the benefits of VDI in scenarios such as financial trading, where users need to view information on multiple physical monitors. Other graphics improvements include remoting of the Aero user interface and more fluid video performance with Windows Media Player. Specifically engineered 3-D applications are also remoted more efficiently.
- **Audio.** Support for bidirectional audio enables the use of microphones, meaning that remote desktops can use functionality such as VOIP, speech recognition, and unified communications. Improved audio playback over low-latency connections helps mitigate A/V synchronization issues when remoting multimedia content.
- **Devices.** Users can easily print to a local printer from their client PCs while operating in a VDI environment, without the need to install printer drivers on the server.

VHD Boot

VHD boot is a feature of Windows 7 that helps ease the transition between virtual and physical environments, enabling enterprises to reuse the same master image within a VDI infrastructure and on physical PCs. For example, imagine a call center with 100 users who work remotely through VDI, but need the same desktop images as their counterparts who work onsite using traditional PCs. This capability is designed for users in a highly managed environment and is best used with technologies such as Folder Redirection and Roaming User Profiles so that the user's state is not stored in the image.

In Windows 7, deployment tools such as WDS also support deployment and servicing of VHD files. Although this technology opens up new deployment scenarios, there will not be 100% parity in the end-user experience between WIM and VHD. This is why Microsoft only recommends physical deployment of VHDs to desktops in highly managed environments.

Windows 7 for IT Professionals:

On-Going Value From the Microsoft Desktop Optimization Pack

In addition to providing new enterprise benefits in each release of Windows, Microsoft regularly delivers new enterprise technologies through the Microsoft Desktop Optimization Pack for Software Assurance (MDOP). IT professionals can take advantage of MDOP technologies today to move closer to a fully automated desktop environment, easing the transition to Windows 7.

Technologies provided in the Microsoft Desktop Optimization Pack are described below.

Microsoft Application Virtualization

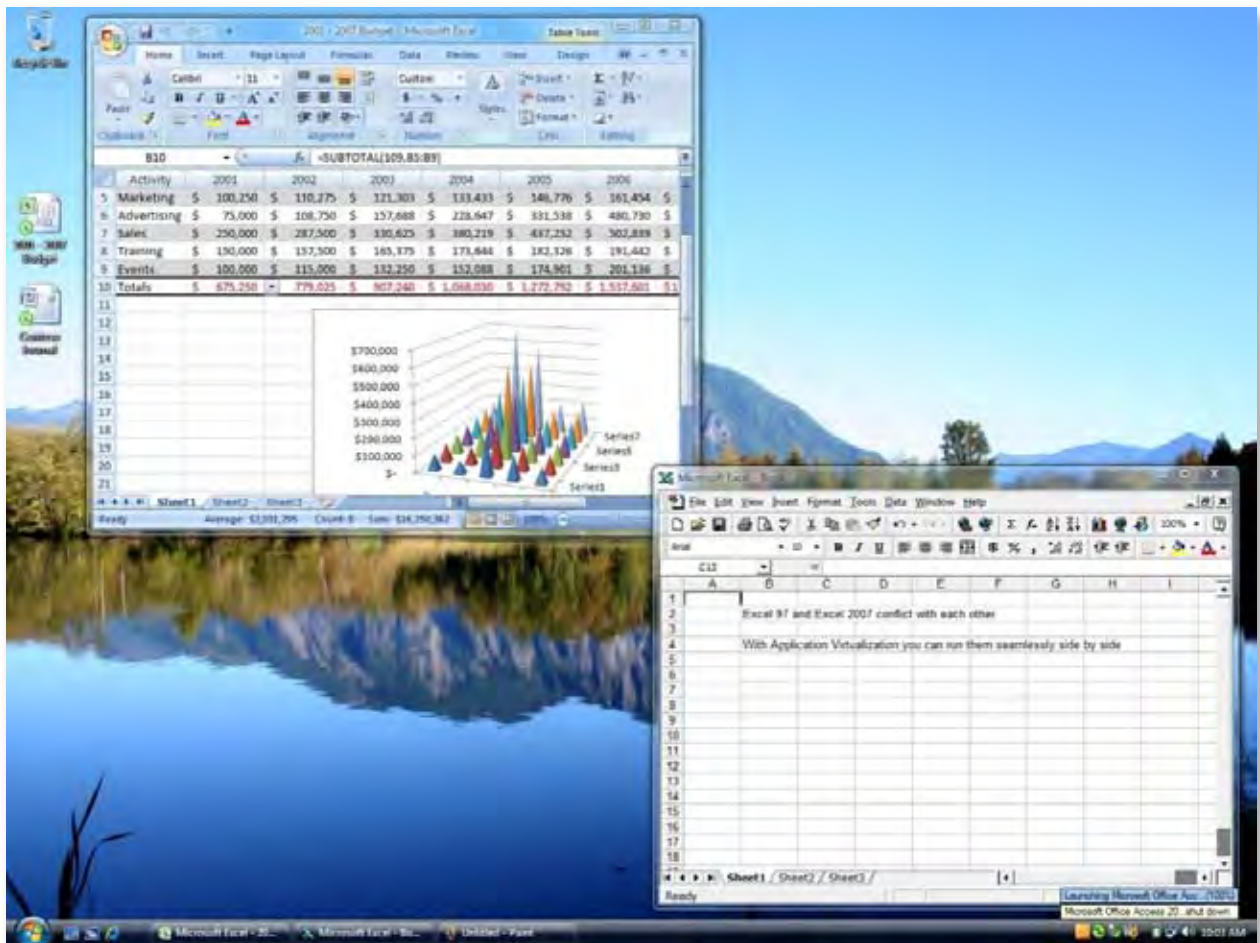
With Microsoft Application Virtualization, enterprises can deploy software applications that are never installed and never require regression testing, yet follow users anywhere, on demand. Windows-based applications are turned into centrally managed virtual services that are delivered to any desktop or laptop client worldwide. Application virtualization in MDOP complements the Virtual Desktop Infrastructure capabilities in Windows 7, enabling applications to be streamed to either physical or virtual desktops.

Microsoft Application Virtualization enables IT professionals to deploy new applications in days instead of months, without worrying about whether the application will play nicely with other programs. This helps IT professionals be more responsive to an organization's needs, such as automating business processes or increasing user productivity.

The application isolation provided by Microsoft

Application Virtualization can deliver exciting benefits, turning traditional Windows applications into services. Users can run applications locally without installing them, including multiple versions of the same application, and can benefit from roaming and free-seating. IT professionals will benefit from more flexible deployment models, reduced regression testing to avoid application-to-application conflicts, simpler and faster application and operating system migrations, and increased application support capabilities.

Application virtualization also simplifies upgrades to future versions of Windows. A company that virtualizes and streams all of its applications will be able to upgrade to a new version of Windows—such as Windows Vista or Windows 7—and make all end-user applications available to those users as soon they logon for the first time.

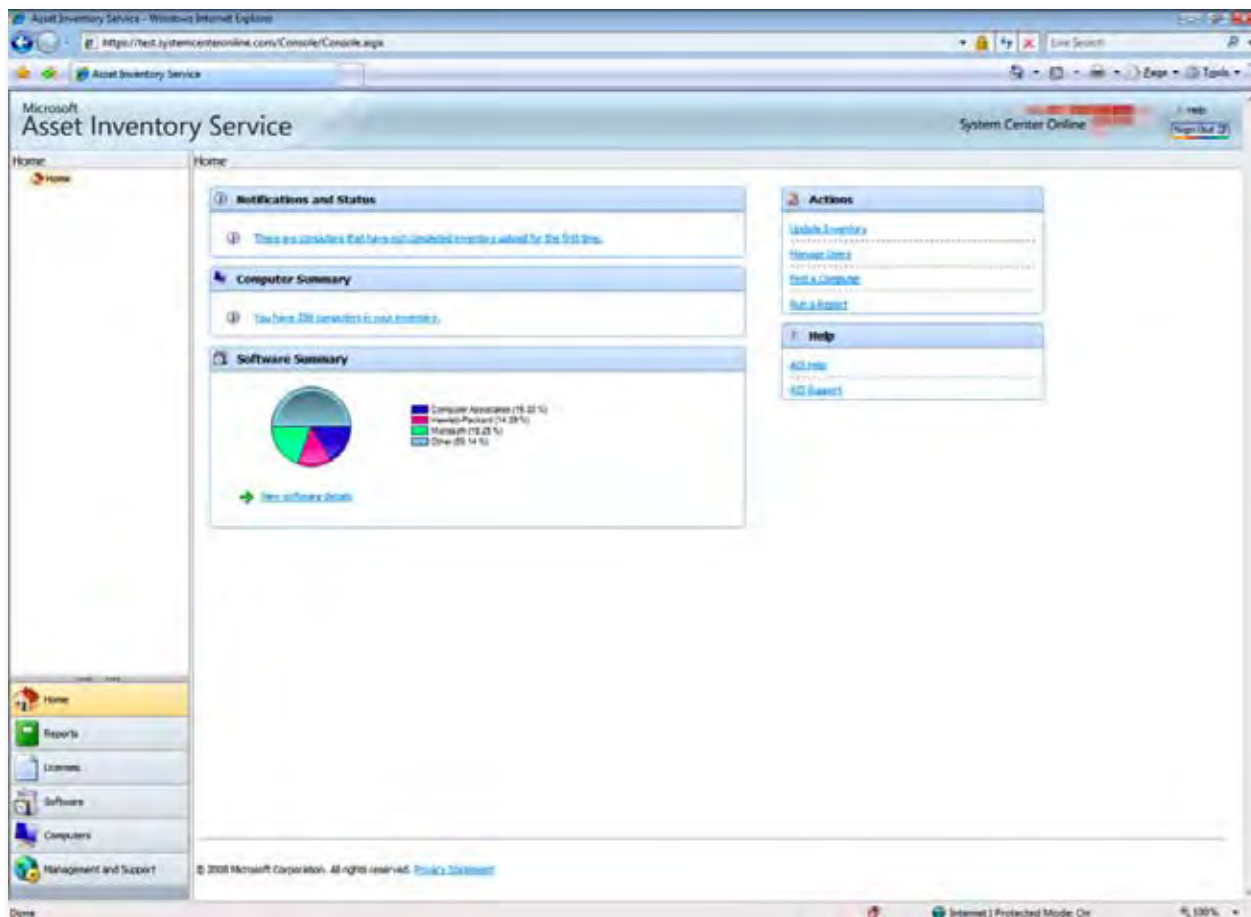


Side-by-side isolation enables each application to have its own virtual registry and run in its own virtual environment

Microsoft Asset Inventory Service

Effectively managing software-asset inventory is vital to ensuring compliance and optimizing IT budgets, and an accurate inventory of the applications used by a company is a necessary first step in planning an upgrade to a new version of Windows. The Microsoft Asset Inventory Service helps address those needs through its advanced software inventory scanning capabilities, using a robust database of software titles that enables application data to be translated into useful, IT-friendly information for access on-demand. Delivered as an easily administered, hosted service, the Asset Inventory Service is accessible from virtually anywhere in the world, making it easy for IT professionals to provide reports to others within an organization—even if they're not technical. It also supports remote users, telecommuters, and branch office scenarios.

With the Asset Inventory Service, IT professionals can quickly and easily identify installed applications that contradict corporate policies. Its rich categorization and intelligence features can be used in a broad variety of ways—from forecasting organizational needs to identifying individual computers for recovery and troubleshooting. Other key benefits provided by the Asset Inventory Service include ease of deployment, the ability to rapidly realize results, and low initial investment.

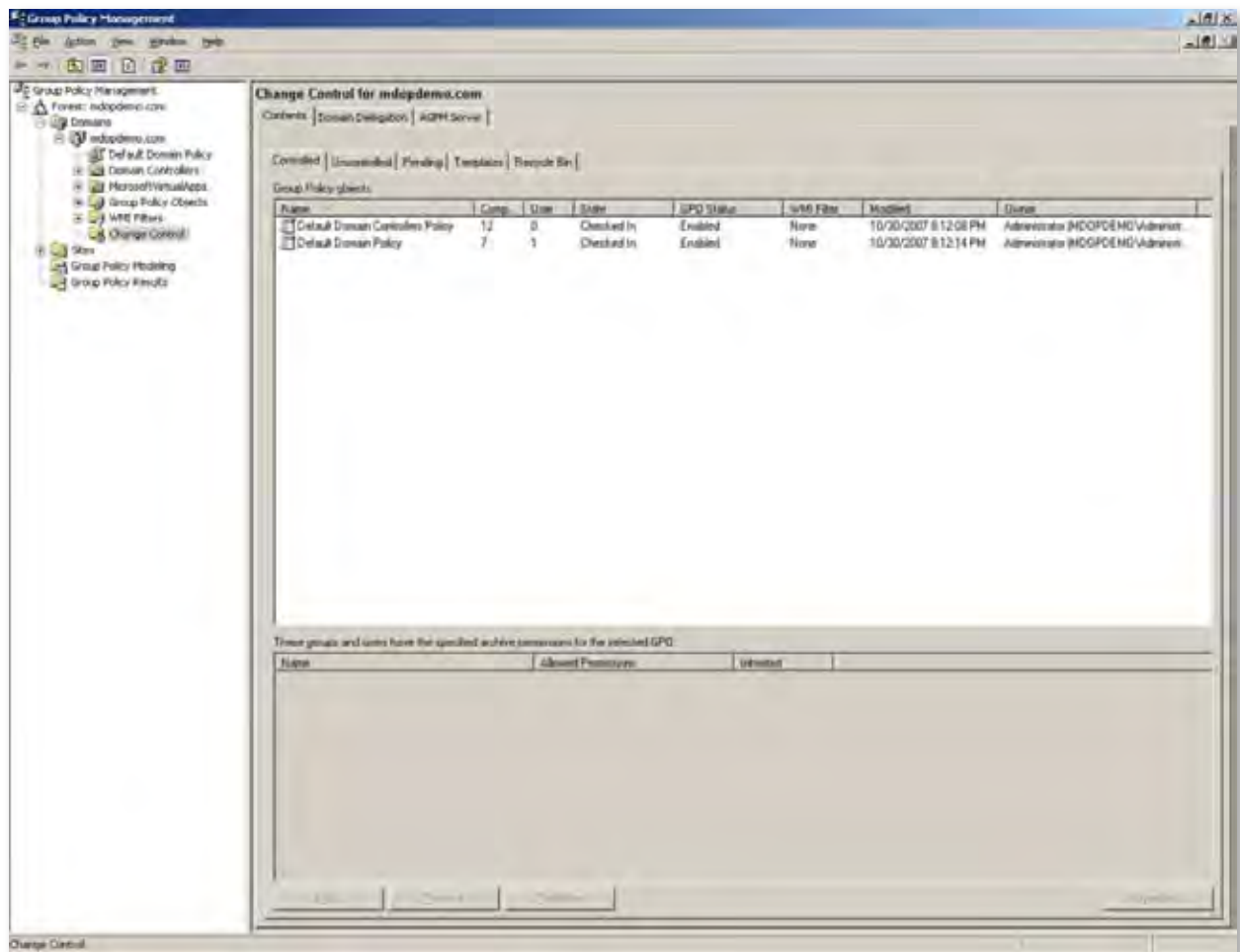


Asset Inventory Service management console

Microsoft Advanced Group Policy Management

Microsoft Advanced Group Policy Management enables IT professionals to take control of user desktops through effective change management, versioning, and rollbacks—all based on Group Policy Objects and a robust, role-based administration and delegation model. Not only can Advanced Group Policy Management help IT professionals take advantage of the power of Group Policy in the current version of Windows running on user PCs, but it will also help them to more fully take advantage of the new Group Policy enhancements in Windows 7.

With Advanced Group Policy Management, IT professionals can reduce the possibility of errors and better respond to requests to implement new or modified policies. It can even help bridge organizational gaps, such as departmental policies that may prevent desktop administrators from managing user PCs using Group Policy when server Group Policy Objects are managed by server administrators.



Advanced Group Policy Management acts as a native extension to the Group Policy Management Console

Microsoft Diagnostics and Recovery Toolset

The Diagnostics and Recovery Toolset enables IT professionals to quickly diagnose critical infrastructure problems. It provides advanced diagnostic tools that automate many complexities of the troubleshooting process, so that organizations can begin to turn troubleshooting into a well-documented process.

The Diagnostics and Recovery Toolset complements the capabilities provided by the new Windows Troubleshooting Platform in Windows 7, which is designed to resolve common issues when Windows 7 is running. IT professionals can use the Diagnostics and

Recovery Toolset to quickly diagnose and fix more severe issues, such as repairing unbootable or locked-out systems, recovering users' PCs without having to wipe and reload the operating system, restoring lost data, diagnosing system and network issues, and removing malware from infected systems while the systems are safely offline. These capabilities can help IT professionals keep users productive and reduce help desk costs.



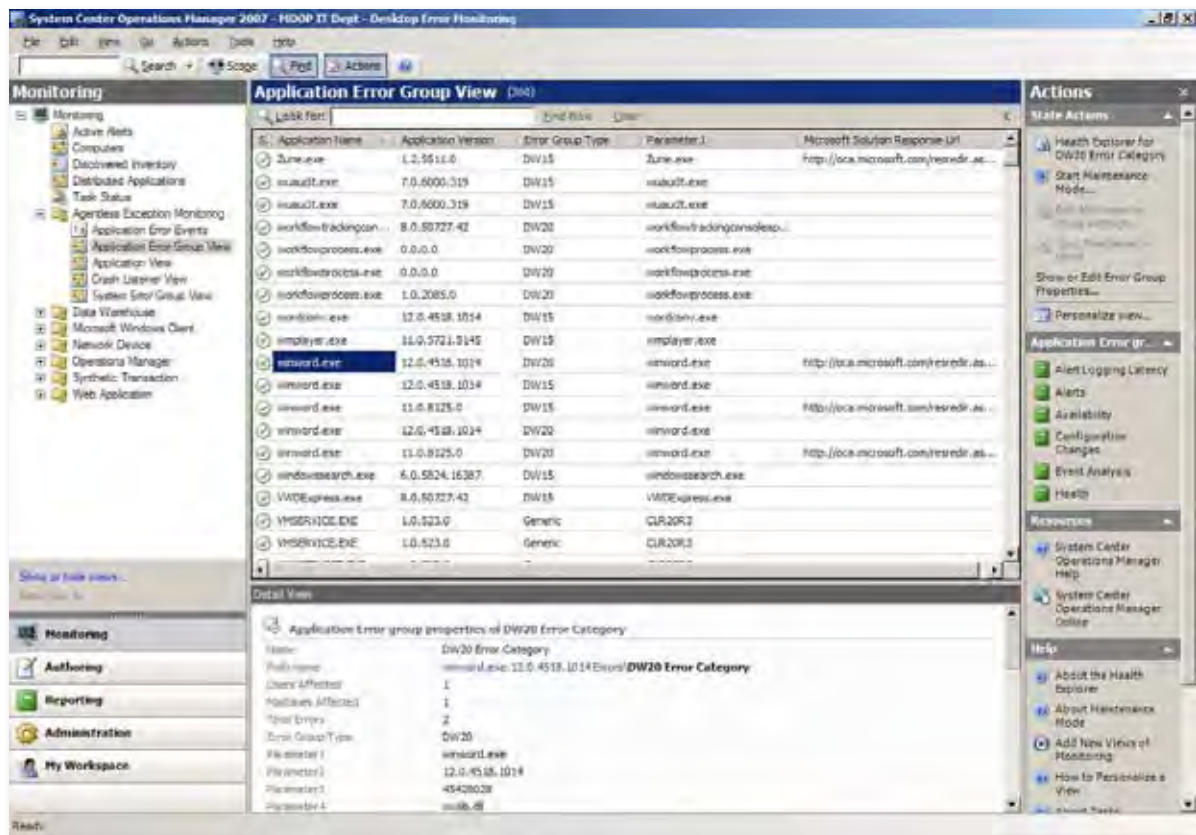
Numerous tools enable IT professionals to diagnose and repair problemsGroup Policy Management Console

Microsoft System Center Desktop Error Monitoring

Microsoft System Center Desktop Error Monitoring helps IT professionals proactively identify problems with applications and system components that may cause user PCs to crash or hang. It provides a scalable, low-cost, enterprise-ready solution for granular error filtering and alerting. Through its agentless crash monitoring technology, this tool can help identify the impact, probable cause, and means of resolution for failures.

Business users are more productive because many issues can be identified and fixed before they cause problems. And when users do need assistance, the help desk will have the information needed to diagnose and fix the problem.

System Center Desktop Error Monitoring provides tools and information to help IT professionals understand the environments in which users are working and proactively make user desktops more stable and reliable.



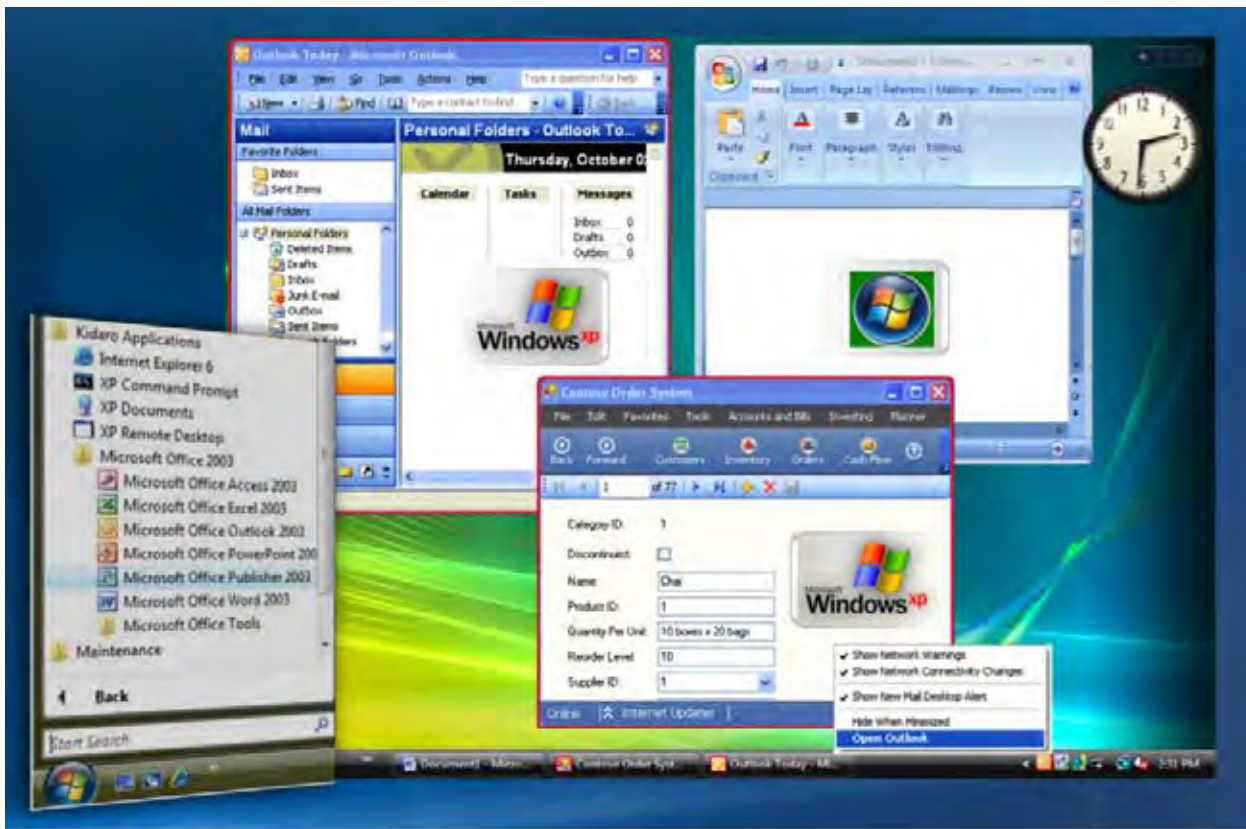
Desktop Error Monitoring reports application crashes and hangs

Microsoft Enterprise Desktop Virtualization

With Virtual Desktop Infrastructure and Windows 7, user desktops are remotely hosted. Another type of desktop virtualization is client-hosted virtualization, where an instance of Windows runs within a virtual machine—on top of a version of Windows running locally on the user's PC (for example, running an instance of Windows XP Professional within a VM on a Windows Vista PC for application compatibility purposes.)

Microsoft Enterprise Desktop Virtualization enhances the deployment and management of Microsoft Virtual PC images on a Windows desktop, providing an enterprise

solution for desktop virtualization. IT professionals can take advantage of Microsoft Enterprise Desktop Virtualization to deliver a seamless user experience regardless of local desktop configuration and operating system. Microsoft Enterprise Desktop Virtualization can help IT professionals address applications that are incompatible with installed desktop operating systems and accelerate operating system upgrades.



Applications installed in the VM appear on the desktop, as if they were running locally

Windows 7 for the Ecosystem

Note: The following is provided as a brief introduction of the benefits that Windows 7 will deliver to the ecosystem. More comprehensive documents focused on each type of partner will be published separately.

Early and ongoing conversations with OEMs, device manufacturers, and software developers have shaped the plans for Windows 7, and enabled Microsoft to deliver platform technology that provides new opportunities for partners and better end-to-end experiences for end users and IT professionals.

Benefits to OEMs

In conversations with OEMs throughout the design process, a few themes emerged. OEMs want more opportunities to differentiate their Windows PCs and help their brand stand out. They want Windows 7 to provide great support for the advanced hardware they plan to feature on new PCs. And they want Windows 7 to help them reduce costs in critical areas such as manufacturing and support. Microsoft took this feedback seriously, and offers new platform opportunities in Windows 7 for our OEM partners.

Enable Differentiation. Windows 7 brings together hardware and software to help OEMs stand out. It elevates the OEM brand throughout the first experience, offers highly visible extensibility points for OEM value-added software, and provides a unique set of build-to-order opportunities for online user personalization at the time of purchase. In Windows 7, OEMs have more entry points for value-added software, and those entry points are more tightly integrated into the fundamental experiences of the PC. Similarly, the Windows Live Wave 3 platform and programs enable OEMs to customize value-added service offerings, with more choice in online services and the opportunity to brand and extend those services.

Windows 7 has been designed with a strong focus on fundamentals, such as performance, battery life and reliability. However, great fundamentals can't be delivered by software alone; responsive performance, long battery life, and rock-solid reliability depend on hardware and software working together. Microsoft has been working closely with OEM partners throughout the design and development of Windows 7 to ensure that they can take advantage of its many enhancements to deliver PCs with outstanding fundamentals.

New Form Factors and Premium Hardware.

Windows 7 delivers great in-box support for new form factors and advanced hardware. New multi-touch capabilities will help drive sales of premium touch-enabled computers and Tablet PCs. An enhanced device experience will increase demand for devices, accessories,

and peripherals. And the high-fidelity graphics and many multimedia-related enhancements in Windows 7 will help make media-focused PCs even more attractive to consumers.

Help Lower Costs. Windows 7 builds upon the tools and processes introduced with Windows Vista to help OEMs reduce manufacturing and support costs. New deployment tools are designed to provide more flexibility in manufacturing environments and increase speed and efficiency on the manufacturing floor. A new Deployment Image Servicing and Management (DISM) tool replaces several previous tools, making it easier for OEMs to add and remove packages, manage drivers offline, and update a Windows Pre-installation Environment (PE) image. Windows 7 and DISM also enable OEMs to upgrade an image to a higher edition of Windows 7 offline, without booting into the operating system image. In response to OEM feedback, Windows 7 will be delivered as a single image—separate images are not needed for each edition or "SKU". The end result: OEMs will need to service fewer edition-based images.

The extensible diagnostics platform in Windows 7 provides a new vehicle for OEMs to reduce support costs. OEMs can provide their own diagnostic packages in-box or can make diagnostic packages available for customers to download, so that customers and support personnel can more easily and precisely diagnose and fix common problems.

Benefits to Device Manufacturers

Windows 7 delivers significant enhancements in the device experience, providing compelling new value for device makers as well as end users. Partnership with device makers was a key focus while designing Windows 7, and many decisions were made based on device manufacturers' feedback and insights. As such, Windows 7 is poised to address some of the key issues facing the device ecosystem today.

Compatibility, Reliability, and Ease of Use. The device experience in Windows 7 is designed on existing connectivity protocols and driver models to maximize compatibility with existing devices. The Devices and Printers control panel gives users a single location to find and manage all the devices connected to their Windows 7 PCs—and provides easy access to device status, product information, and key functions such as faxing and scanning to enhance and simplify the customer experience with a Windows 7-connected device.

Connectivity. Seamless user experiences begin with the ability to connect devices easily. Windows 7 shows users all wireless devices available for them to install and use—they simply pick a device, confirm the connection, and start using it. Users can install and use a Certified Bluetooth, Windows Connect Now, or network-connected device in just a few minutes and, regardless of which connection method the user chooses, the PC always sees it as the same device. Additional drivers are retrieved automatically from Windows Update, and, when appropriate, users are given an option to download and install additional applications for the device. All of this helps reduce support calls and increase customer satisfaction.

Differentiation and Branding. For some common devices such as multifunction printers, cell phones, portable media players, and digital still cameras, Windows 7 provides an enhanced experience, called Device Stage. Device Stage provides users with an easy new way to access devices and advanced options for managing them, with devices in use shown on the taskbar with a photo-realistic icon. This taskbar icon can include quick access to common device tasks, as well as status indicators that let users quickly discern battery status, device synchronization status, remaining storage capacity, and so on. Device makers can customize this experience to highlight device capabilities and branding, and can include links to product manuals, additional applications, community information and help, or additional products and services such as ring tones, photo printing, and print cartridges.

Benefits to Developers

Developing software has never been more exciting. The world has never been more connected and interactive, with advances in connectivity, mobility, natural interfaces, graphics, and media enabling software developers to support new scenarios, enhance the user experience, and further differentiate their services and solutions. However, developers also face pressure to deliver more in less time—and to optimize the security, reliability, performance, interoperability, flexibility, and power consumption of their applications.

The Windows 7 operating system is the essential platform for developers, enabling them to deliver innovative, intuitive applications that are mobile-aware, connected, and high-fidelity. Windows 7 provides a flexible, complete foundation that empowers software developers to differentiate themselves from the competition, maximize investments, and generate new revenues. Enhancements in Windows 7 also make it easier for developers to enhance the performance, reliability and security of their applications.

Build on a Solid Foundation. Great user experiences start with a solid foundation, and Windows 7 provides just that. Windows 7 focuses on the fundamentals—ensuring that the operating system is reliable and compatible, and works with the applications and devices people use today. Improved resource management and system performance make the operating system nimbler and more responsive. Fundamental security enhancements, along with more streamlined User Account Control, maintain stability and safety while minimizing user interruptions. Windows 7 also helps developers be more productive, with improved debugging tools, data and documentation to accelerate software development, and an enhanced MSI engine that makes deployment easier and more manageable.

Enable Richer Application Experiences. Windows 7 offers new capabilities that help developers create products that make the most of today's hardware and deliver exciting new innovations to customers. Multi-touch, ink and gesture support, along with improved handwriting and speech recognition, make it easier

for developers to add new input capabilities to their applications. A new taskbar, destinations and shell integration enhance discoverability and usability for all applications. New controls and APIs help developers easily add Ribbon-style controls, menus and galleries. And developers can more easily take full advantage of today's hardware capabilities, with high-fidelity graphics and media, enhanced performance through multi-core functionality, and Device Stage, which enables new software experiences for the wide range of devices people use every day.

Deliver the Best of the PC and the Web. Windows 7 is designed to be the best platform for services that span the PC, the Web and the devices people use every day. It enables developers to write once, and run anywhere: they can build for the Web with Internet Explorer 8, add rich media with Silverlight and extend their experiences to the rich client with Windows Presentation Foundation—all using the same familiar platform and tools. The Windows Web Services API enables developers to create powerful Web services with minimal effort. And, Federated Search and accelerators help them extend Web-based capabilities to the client—and vice versa.



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