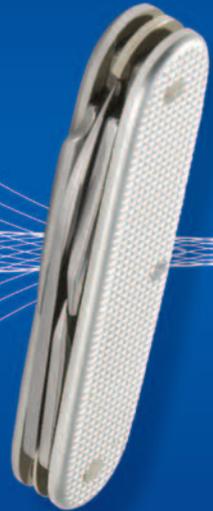


Microsoft®

# Windows® 8 Administration

William R. Stanek  
*Author and Series Editor*



# Pocket Consultant

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*To my wife—for many years, through many books, many millions of words, and many thousands of pages, she's been there, providing support and encouragement and making every place we've lived a home.*

*To my kids—for helping me see the world in new ways, for having exceptional patience and boundless love, and for making every day an adventure.*

*To Karen, Martin, Lucinda, Juliana, and many others who've helped out in ways both large and small.*

—WILLIAM R. STANEK



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# Introduction

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Writing *Windows 8 Administration Pocket Consultant* was a lot of fun—and a lot of work. As I set out to write this book, my initial goals were to determine how Windows 8 was different from its predecessors and what new features and options were available. As with any new operating system, I had to do a great deal of research and a lot of digging into the internals of the operating system to determine exactly how things work.

For anyone transitioning to Windows 8 from an earlier release of Windows, the extensive UI changes will be among the most substantial revisions to the operating system. Windows 8 now supports a touch-based user interface (UI), as well as the traditional mouse and keyboard. When you are working with touch UI-enabled computers, you can manipulate onscreen elements in ways that weren't possible previously. You can do any of the following:

- **Tap** Tap an item by touching it with your finger. A tap or double-tap of elements on the screen generally is the equivalent of a mouse click or double-click.
- **Press and hold** Press your finger down and leave it there for a few seconds. Pressing and holding elements on the screen generally is the equivalent of a right-click.
- **Swipe to select** Slide an item a short distance in the opposite direction compared to how the page scrolls. This selects the items and also may bring up related commands. If press and hold doesn't display commands and options for an item, try using swipe to select instead.
- **Swipe from edge (Slide in from edge)** Starting from the edge of the screen, swipe or slide in. Sliding in from the right edge opens the Charms panel. Sliding in from the left edge shows open apps and allows you to switch between them easily. Sliding in from the top or bottom edge shows commands for the active element.
- **Pinch** Touch an item with two or more fingers and then move the fingers toward each other. Pinching zooms in or shows less information.
- **Stretch** Touch an item with two or more fingers and then move the fingers away from each other. Stretching zooms out or shows more information.

You also are able to enter text using the onscreen keyboard. Although the UI changes are substantial, they aren't the most significant changes to the operating system. The most significant changes are below the surface, affecting the underlying architecture and providing many new features. Some of these features are revolutionary in that they forever change the way we use Windows.

Because *Pocket Consultants* are meant to be portable and readable—the kind of book you use to solve problems and get the job done wherever you might be—I had to carefully review my research to make sure that I focused on the core

aspects of Windows 8. The result is the book you hold in your hands, which I hope you'll agree is one of the best practical, portable guides to Windows 8. Toward that end, the book covers everything that you need to perform the core configuration, optimization, and maintenance tasks.

Because my focus is on giving you maximum value in a pocket-size guide, you don't have to wade through hundreds of pages of extraneous information to find what you're looking for. Instead, you'll find exactly what you need to address a specific issue or perform a particular task. In short, the book is designed to be the one resource that you turn to whenever you have questions regarding Windows 8 configuration and maintenance. It zeroes in on daily procedures, frequently used tasks, documented examples, and options that are representative, while not necessarily inclusive.

One of the goals for this book is to keep its content concise so that it remains compact and easy to navigate, while at the same time packing it with as much information as possible to make it a valuable resource. Instead of a hefty 1,000-page tome or a lightweight, 100-page quick reference, you get a valuable resource guide that can help you quickly and easily perform common tasks, solve problems, and implement everyday solutions.

## Who Is This Book For?

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The focus of *Windows 8 Administration Pocket Consultant* is on the Standard, Professional, and Enterprise editions of Windows 8. The book is designed for:

- Accomplished users who are looking to configure and maintain Windows 8
- Current Windows system administrators and support staff
- Administrators upgrading to Windows 8 from earlier releases of Windows
- Administrators transferring from other platforms

To pack in as much information as possible, I had to assume that you have basic networking skills and a basic understanding of Windows operating systems. As a result, I don't devote entire chapters to understanding Windows basics, Windows architecture, or Windows networks. I do, however, cover desktop customization, mobile networking, TCP/IP configuration, user profiles, and system optimization. The book also goes into depth on troubleshooting, and I've tried to ensure that each chapter, where appropriate, has troubleshooting guidelines and discussions to accompany the main text. From the start, troubleshooting advice is integrated into the book, instead of being captured in a single, catchall troubleshooting chapter inserted as an afterthought. I hope that after you read these chapters and dig into the details, you'll be able to improve the overall experience of your users and reduce downtime.

## How Is This Book Organized?

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*Windows 8 Administration Pocket Consultant* is designed to be used for configuration, optimization, and maintenance, and as such, the book is organized by job-related tasks rather than by Windows 8 features. The books in the Pocket Consultant series are down-and-dirty, in-the-trenches books.

Speed and ease of reference are essential elements of this hands-on guide. The book has an expanded table of contents and an extensive index for finding answers to problems quickly. Many other quick reference features have been added as well, including step-by-step instructions, lists, tables with fast facts, and extensive cross-references.

## Conventions Used in This Book

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I've used a variety of elements to help keep the text clear and easy to follow. You'll find code listings in monospace type, except when I tell you to actually type a command. In that case, the command appears in **bold** type, as does any text that the user is supposed to type. When I introduce and define a new term, I put it in *italics*.

Other conventions include the following:

- **Best Practices** To examine the best technique to use when working with advanced configuration and maintenance concepts
- **Caution** To warn you about potential problems you should look out for
- **Important** To highlight important concepts and issues
- **More Info** To provide more information on a subject
- **Note** To provide additional details on a particular point that needs emphasis
- **Real World** To provide real-world advice when discussing advanced topics
- **Security Alert** To point out important security issues
- **Tip** To offer helpful hints or additional information

I truly hope you find that *Windows 8 Administration Pocket Consultant* provides everything that you need to perform the essential tasks on Windows 8 systems as quickly and efficiently as possible. You are welcome to send your thoughts to me at [williamstanek@aol.com](mailto:williamstanek@aol.com). Thank you.

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# Introduction to Windows 8 Administration

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**W**indows 8 is designed primarily as an operating system for client devices. This chapter covers getting started with Windows 8 and the fundamental tasks you need for Windows 8 administration. Throughout this and the other chapters in this book, you'll find detailed discussions of changes that enhance all aspects of computer management and security. Although this book focuses on Windows 8 administration, the tips and techniques discussed throughout the text can help anyone who supports, develops for, or works with Windows 8.

Keep in mind that this book is meant to be used in conjunction with *Windows Server 2012 Pocket Consultant* (Microsoft Press, 2012). In addition to coverage of broad administration tasks, server-focused books in the Pocket Consultant series examine directory services administration, data administration, and network administration. This book, on the other hand, zeroes in on user and system administration tasks. You'll find detailed coverage of the following topics:

- Customizing the operating system and Windows environment
- Configuring hardware and network devices
- Managing user access and global settings
- Configuring mobile networking
- Using remote management and remote assistance capabilities
- Troubleshooting system problems

Also, it is important to note that just about every configuration option in the Windows operating system can be controlled through Group Policy. Rather than add caveats to every discussion that feature A or B can be configured only if allowed in Group Policy, I'm going to assume you are smart enough to understand the global impact of Group Policy on system configuration and management. I'm also going to assume you are familiar with the command line and Windows PowerShell. This will allow me to focus on essential tasks for administration.

## Getting Started with Windows 8: The Quick Tour

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Windows 8 is the latest release of the Windows operating system for client computers. Windows 8 natively supports image-based installation and deployment. Windows 8, Windows 8 Pro, and Windows 8 Enterprise support 32-bit x86 and 64-bit x64 processors for PCs and tablets. Windows 8 RT supports ARM processors. For many advanced features, including BitLocker, Encrypting File System, Domain Join, Group Policy, and the Remote Desktop host, computers will need Windows 8 Pro or Windows 8 Enterprise.

Separate distribution media is provided for 32-bit and 64-bit editions of Windows 8. To install the 32-bit edition of Windows 8 on an x86-based computer, you need to use the 32-bit distribution media. To install the 64-bit edition of Windows 8 on an x64-based computer, you need to use the 64-bit distribution media. Generally, if you are running a 32-bit operating system and want to install a 64-bit operating system (on hardware that supports both), you need to restart the computer and boot from the installation media. The same is generally true if you want to install a 32-bit operating system on a computer running a 64-bit operating system.

**NOTE** Windows 8 RT normally is preinstalled on devices with ARM processors, and it is very different from other editions of Windows 8.

Windows 8 uses modularization for language independence and disk imaging for hardware independence. Each component of the operating system is designed as an independent module that you can easily add or remove. This functionality provides the basis for the configuration architecture in Windows 8. Microsoft distributes Windows 8 on media with disk images that use compression and single-instance storage to dramatically reduce the size of image files. The format for disk images is the Windows Imaging (WIM) format.

The Windows Preinstallation Environment 4.0 (Windows PE 4.0) replaces MS-DOS as the preinstallation environment and provides a bootable startup environment for installation, deployment, recovery, and troubleshooting. The Windows Preboot Environment provides a startup environment with a boot manager that lets you choose which boot application to run to load the operating system. On systems with multiple operating systems, you access pre-Windows 7 operating systems in the boot environment by using the legacy operating system entry.

User Account Control (UAC) enhances computer security by ensuring true separation of standard user and administrator user accounts. Through UAC, all

applications run using either standard user or administrator user privileges, and you see a security prompt by default whenever you run an application that requires administrator privileges. The way the security prompt works depends on Group Policy settings. Additionally, if you log on using the built-in Administrator account, you typically do not see elevation prompts.

Windows 8 has several key UI elements, including:

- Start screen
- Charm bar
- Search panel
- Desktop Settings panel
- PC Settings screen
- Apps screen (also referred to as All Apps)

With Windows 8, a Start screen replaces the traditional Start menu. Start is a window, not a menu. Programs can have tiles on the Start window. Tapping or clicking a tile runs the program. When you press and hold or right-click on a tile, an options panel rather than a shortcut menu is displayed.

From Start, one way to quickly open a program is by pressing the Windows key, typing the file name of the program, and then pressing Enter. This shortcut works as long as the Apps Search box is in focus (which it typically is by default).

Pressing the Windows key toggles between the Start screen and the desktop (or, if you are working with PC Settings, between Start and PC Settings). On Start, there's a Desktop tile that you can tap or click to display the desktop. You also can display the desktop by pressing Windows key + D or, to peek at the desktop, press and hold Windows key + , (that's the Windows key plus the comma key).

The Charm bar is an options panel for Start, Desktop, and PC Settings. With touch UI, you can display the Charm bar by sliding in from the right side of the screen. With a mouse and keyboard, you can display the Charm bar by moving the mouse pointer over the hidden button in the upper-right or lower-right corner of the Start, Desktop, or PC Settings screen; or by pressing Windows key + C.

The Charm bar has five charms:

- **Search** Tap or click the Search charm to display the Search panel. Any text typed while on the Start screen is entered into the Search box on the Search panel. The Search box can be focused on Apps, Settings, or Files. When focused on Apps, you can use Search to quickly find installed programs. When focused on Settings, you can use Search to quickly find settings and options in Control Panel. When focused on Files, you can use Search to quickly find files.
- **Share** Tap or click the Share charm to share from a desktop app. For example, when working with the Maps app, you'll typically see options for sharing the map you are working with.
- **Start** Tap or click the Start charm to toggle between Desktop and Start (or, if you are working with PC Settings, between Start and PC Settings).
- **Devices** Tap or click the Devices charm to work quickly with attached devices, such as a second screen.

- **Settings** Tap or click the Settings charm to access the Settings panel, which provides access to important options, including the power options for sleep, shutdown, and restart.

**TIP** Normally, Apps Search is the default. Thus, from Start, you can quickly open a program by typing the program name and pressing Enter.

You also can display the Settings panel by pressing Windows key + I. From the settings panels, you can:

- View connected network and network status.
- View and change audio output levels.
- Change brightness levels of the display (portable devices only).
- Hide notifications temporarily.
- Access power options.
- Display the touch keyboard (touch UI devices only).
- Access the PC Settings screen (by clicking Change PC Settings).

Start Settings, Desktop Settings, and PC Settings have nearly—but not exactly—identical Settings panels. The Start Settings panel has a Tiles option that you can tap or click to display an option for adding or removing tiles for the administrative tools to the Start screen and an option for clearing personal information from tiles. The Desktop Settings panel has several quick links, including:

- **Control Panel**, for opening Control Panel
- **Personalization**, for opening personalization settings in Control Panel
- **PC Info**, for opening the System page in Control Panel
- **Help**, for opening Windows Help and Support

Thus, when you are working with the Desktop, one way to quickly open Control Panel is by pressing Windows key + I and then clicking Control Panel on the Settings panel.

File Explorer is pinned to the Desktop taskbar by default. This means you also can access Control Panel by following these steps:

1. Open File Explorer by tapping or clicking the taskbar icon.
2. Tap or click the leftmost option button in the address list.
3. Tap or click Control Panel.

Another technique you'll want to quickly master is getting to the Apps screen, which lists installed apps alphabetically within app categories.

The Apps screen is displayed whenever you start an Apps search. When the Settings panel and the Apps screen are both displayed, tap or click in an open area of the Apps screen to hide the Settings panel. The keyboard shortcut for opening the Apps screen from Start or Desktop is Windows key + Q. Another way to open the Apps screen is to start an Apps search and then tap or click in an open area of the Apps screen to hide the Settings panel.

On the Apps screen, the apps listed under the Windows System category are ones you'll often use for administration, including Command Prompt, Computer, Control Panel, Task Manager, File Explorer, and Windows PowerShell.

**NOTE** With Windows 8 Pro and Windows 8 Enterprise, Windows PowerShell normally is added as a feature. From Start, a quick way to open Windows PowerShell is to type **powershell** and press Enter. This shortcut works so long as Windows PowerShell is the first match found for the keyword "powershell." If multiple matches are found, tap or click the one that you want to run rather than pressing Enter.

**TIP** If you've opened the Apps screen on your computer, you may want to add pinned items to Start or the desktop taskbar. To do this, press and hold or right-click the item and then tap or click Pin To Start or Pin To Taskbar as appropriate. For easier administration, I recommend adding Command Prompt, Computer, Control Panel, and Windows PowerShell to the taskbar.

With Windows 8, you may want to use Windows PowerShell as your go-to prompt for entering both standard Windows commands and Windows PowerShell commands. Although anything you can type at a command prompt can be typed at the Windows PowerShell prompt, it's important to remember that this is possible because Windows PowerShell looks for external commands and utilities as part of its normal processing. As long as the external command or utility is found in a directory specified by the PATH environment variable, the command or utility is run as appropriate. However, keep in mind that Windows PowerShell execution order could affect whether a command runs as expected. For Windows PowerShell, the execution order is (1) alternate built-in or profile-defined aliases; (2) built-in or profile-defined functions; (3) cmdlets or language keywords; (4) scripts with the .ps1 extension; and (5) external commands, utilities, and files. Thus, if any element in 1 to 4 of the execution order has the same name as a command, that element will run instead of the expected command.

Windows 8 ships with Windows PowerShell. When you've configured Windows PowerShell for remoting, you can execute commands on remote computers in a variety of ways. One technique is to establish a remote session with the computers you want to work with. The following example and partial output shows how you can check the Windows edition on remote computers:

```
$s = new-ssession -computername engpc15, hrpc32, cserpc28
invoke-command -session $s {dism.exe /online /get-currentedition}
```

The following is the resulting partial output:

```
Deployment Image Servicing and Management tool
Version: 6.1.7600.16385
```

```
Image Version: 6.1.7600.16385
```

```
Current Edition : Ultimate
The operation completed successfully.
```

The internal version number for Windows 7 is 6.1, while the internal version for Windows 8 is 6.2. Thus, based on this output, you know the computer is running Windows 7 Ultimate edition (and hasn't been upgraded to Windows 8 yet).

**NOTE** With the `New-PSSession` command, you use the `-ComputerName` parameter to specify the remote computers to work with by Domain Name System (DNS) name, NetBIOS name, or IP address. When working with multiple remote computers, separate each computer name or IP address with a comma. For more information on working with Windows PowerShell and using remoting, see Chapter 6, "Using Sessions, Jobs, and Remoting," in *Windows PowerShell 2.0 Administrator's Pocket Consultant* (Microsoft Press, 2009).

## Understanding 64-Bit Computing

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Since it was introduced for Windows operating systems, 64-bit computing has changed substantially. Not only do computers running 64-bit versions of Windows perform better and run faster than their 32-bit counterparts, they are also more scalable because they can process more data per clock cycle, address more memory, and perform numeric calculations faster.

There are two different 64-bit architectures:

- **x64** This architecture is based on 64-bit extensions to the x86 instruction set, which is implemented in AMD Opteron (AMD64) processors, Intel Xeon processors with 64-bit extension technology, and other processors. This architecture offers native 32-bit processing and 64-bit extension processing, allowing simultaneous 32-bit and 64-bit computing.
- **IA64** This architecture is based on the Explicitly Parallel Instruction Computing (EPIC) processor architecture, which is implemented in Intel Itanium (IA64) processors and other processors. This architecture offers native 64-bit processing, allowing 64-bit applications to achieve optimal performance.

However, the prevalent architecture is x64, and it is the primary 64-bit architecture for PCs and tablets that is supported by Windows 8. In general, 64-bit computing is designed for performing operations that are memory intensive and that require extensive numeric calculations. With 64-bit processing, applications can load large data sets entirely into physical memory (that is, RAM), which reduces the need to page to disk and increases performance substantially.

Currently, the prevalent firmware interfaces are

- Basic input/output system (BIOS)
- Extensible Firmware Interface (EFI)
- Unified Extensible Firmware Interface (UEFI)

Itanium-based computers differ in many fundamental ways from computers based on the x86 and x64 specifications. Whereas Itanium-based computers use EFI and the GUID partition table (GPT) disk type for boot and system volumes, computers based on x86 use BIOS and the master boot record (MBR) disk type for

boot and system volumes. Computers based on x64 use UEFI wrapped around BIOS or EFI, as discussed in the “Navigating and Understanding Firmware Options” section in Chapter 4, “Managing Firmware, Boot Configuration, and Startup.” This means that there are differences in the way you manage computers with these architectures, particularly when it comes to setup and disk configuration. However, with the increasing acceptance and use of UEFI and the ability of Windows 8 to use both MBR and GPT disks regardless of firmware type, the underlying chip architecture won’t necessarily determine what firmware type and disk type a computer uses. This decision is in the hands of the hardware manufacturer.

**NOTE** Techniques for using MBR and GPT disks are covered in detail in Chapter 12, “Managing Disk Drives and File Systems.” Generally, BIOS-based computers use MBR for booting or for data disks and GPT only for data disks. EFI-based computers can have both GPT and MBR disks, but you must have at least one GPT disk that contains the EFI system partition (ESP) and a primary partition or simple volume that contains the operating system for booting.

In most cases, 64-bit hardware is compatible with 32-bit applications; however, 32-bit applications perform better on 32-bit hardware. Windows 64-bit editions support both 64-bit and 32-bit applications using the Windows on Windows 64 (WOW64) x86 emulation layer. The WOW64 subsystem isolates 32-bit applications from 64-bit applications. This prevents file system and registry problems. The operating system provides interoperability across the 32-bit/64-bit boundary for the Component Object Model (COM) and for basic operations such as cutting, copying, and pasting using the Clipboard. However, 32-bit processes cannot load 64-bit dynamic-link libraries (DLLs), and 64-bit processes cannot load 32-bit DLLs.

In the shift to 64-bit computing, you may want to track which computers in the enterprise support 64-bit operating systems, which computers are already running 64-bit operating systems, or both. With Windows PowerShell, you can:

- Determine whether a computer has a 64-bit operating system installed by using the `OSArchitecture` property of the `Win32_OperatingSystem` object. An example is

```
get-wmiobject -class win32_operatingsystem | fl osarchitecture
```

And the resulting output is

```
osarchitecture : 32-bit
```

- Determine whether a computer supports a 64-bit operating system by using the `Name` and `Description` properties of the `Win32_Processor` object:

```
get-wmiobject -class win32_processor | fl name, description
```

```
name           : Intel(R) Core(TM)2 Quad CPU           @ 2.66GHz
description    : x64 Family 6 Model 15 Stepping 7
```

Here, the first sample output tells you the computer is running a 32-bit version of Windows. The second sample output tells you the computer has an x64 processor. As a result, you know the computer can be upgraded to a 64-bit version of Windows 8.

Rather than check each computer individually, you can create a script to do the work for you. For sample scripts and complete walkthroughs, see Chapter 8, “Inventorying and Evaluating Windows Systems,” in *Windows PowerShell 2.0 Administrator’s Pocket Consultant*.

## Deploying Windows 8

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With Windows 8, you can deploy custom builds to computers through manual and automated processes. To deploy Windows using manual processes, you need to create the required boot and installation images and optionally create recovery images. To automate the deployment process, you need to install Windows Deployment Services. Whether you use a completely manual process, a completely automated process, or some combination of the two, you’ll perform similar administrative tasks. These tasks require you to understand and use the Windows Assessment and Deployment Kit (Windows ADK) for Windows 8 and Windows Deployment Services.

The Windows Assessment and Deployment Kit for Windows 8 is available from the Microsoft Download Center ([download.microsoft.com](http://download.microsoft.com)) and contains the tools for deploying Windows images, including

- Application Compatibility Toolkit (ACT)
- The standard deployment and imaging tools
- User State Migration Tool (USMT)
- Volume Activation Management Tool (VAMT)
- Windows Assessment Services
- Windows Assessment Toolkit
- Windows Performance Toolkit (WPT)
- Windows Preinstallation Environment (Windows PE)

You can use Windows Deployment Services to deploy Windows 8 over a network. You can add the Windows Deployment Services role to any server running Windows Server 2012.

Windows 8 and Windows Server 2012 use Windows PE 4.0. Windows PE 4.0 is a bootable startup environment that provides operating system features for the following:

- **Installation** When you install Windows 8, the graphical tools that collect system information during the setup phase are running within Windows PE.
- **Deployment** When a new computer performs a network boot, the built-in Preboot Execution Environment (PXE) client can connect to a Windows Deployment Services server, download a Windows PE image across the network, and then run deployment scripts within this environment.
- **Recovery** Windows PE enables you to access and run the Startup Repair tool if Windows 8 fails to start because of a corrupted system file.
- **Troubleshooting** You can manually start Windows PE to perform troubleshooting or diagnostics testing if Windows 8 is experiencing problems that can’t otherwise be diagnosed.

Windows PE is modular and extensible, and it provides full access to partitions formatted using the FAT or NTFS file system. Because Windows PE is built from a subset of Windows components, you can run many Windows applications, work with hardware devices, and communicate across IP networks. Several command-line tools are available in Windows PE, including:

- **BCDBoot** A tool that initializes the boot configuration data (BCD) store and allows you to copy boot environment files to the system partition.
- **Bootsect** A tool for creating and working with boot sectors on hard disks and flash drives.
- **Copype** A tool for creating a directory structure for Windows PE files and then copying the Windows PE media files. Running this tool is a prerequisite for creating bootable Windows PE media.
- **DiskPart** A tool for creating and working with disks, partitions, and volumes.
- **DISM** An advanced tool for servicing and maintaining images.
- **Drvload** A support tool for adding device drivers and dynamically loading a driver after Windows PE has started.
- **ImageX** A tool for capturing and applying Windows images.
- **Lpksetup** A tool for adding and removing a language pack.
- **Makewinpemedia** A tool for creating bootable Windows PE media.
- **Net** A set of support commands that enables you to manage local users, start and stop services, and connect to shared folders.
- **Netcfg** A tool that configures network access.
- **Oscdimg** A tool for creating CD and DVD ISO image files.
- **Wpeinit** A tool that initializes Windows PE every time it boots.

Copype and Makewinpemedia are new tools that allow you to more easily create bootable Windows PE media. You use Copype to set up the Windows PE build environment. After you optimize the build as necessary, you can use Makewinpemedia to create the bootable media, which can be a CD, DVD, USB flash drive, or external USB hard drive.

## Using DISM

Deployment Image Servicing and Management (DISM) is one of the most important deployment tools. DISM is included with Windows 8 Pro and Windows 8 Enterprise.

Using DISM, you can manage online and offline images of the Windows operating system, including images for deployment and those for virtual machines. Windows Image (.wim) files are used to deploy Windows 8. Virtual hard disk (.vhd) files are used with virtual machines. The same commands work on WIM and VHD files.

You can use DISM to:

- Add and remove packages. Packages can include language packs, patches, utilities, and so on.
- Enable and disable Windows features.
- Add and remove third-party device drivers.

You can run DISM at an elevated administrator command prompt by following these steps:

1. On the Apps screen, Command Prompt is listed under the Windows System category. Or, if you are working with Start, type **cmd**.
2. Press and hold or right-click the Command Prompt shortcut on the Apps screen, and then tap or click Run As Administrator.  
If you see the User Account Control prompt, proceed as you normally would to allow the application to run with administrator privileges.
3. In the Command Prompt window, enter **dism /?** to view available options for DISM.
4. To view commands available for working with online images, enter **dism /online /?**.

Although DISM is designed to work primarily with offline images and images you've mounted, you can use some DISM commands to get important information about the live operating system running on a computer. Table 1-1 provides an overview of DISM Online subcommands you can use with live operating systems. For example, if you want to display a list of Windows editions to which a computer can be upgraded, you can enter the following command:

```
dism /online /get-targeteditions
```

**TABLE 1-1** DISM Online Commands for Live Operating Systems

SUBCOMMAND	DESCRIPTION
<code>/Disable-Feature /featurename:FeatureName</code>	Disables a specified feature. Feature names are case sensitive.
<code>/Enable-Feature /featurename:FeatureName</code>	Enables a specified feature. Feature names are case sensitive.
<code>/Get-CurrentEdition</code>	Displays the currently installed edition of Windows.
<code>/Get-DriverInfo /driver:DriverName.inf</code>	Displays information about a specified third-party driver that is installed in the driver store. Driver names are not case sensitive.
<code>/Get-Drivers</code>	Displays information about all third-party drivers that are installed in the driver store.
<code>/Get-FeatureInfo /featurename:FeatureName</code>	Displays information about a specified feature. Feature names are case sensitive.
<code>/Get-Features</code>	Displays information about Windows features that are installed.
<code>/Get-Intl</code>	Displays information about the default system user interface language, system locale, default time zone, keyboard language, and installed languages.

SUBCOMMAND	DESCRIPTION
/Get-PackageInfo /package:PackageName	Displays information about a specified package. Package names are case sensitive.
/Get-Packages	Displays information about Windows packages that are installed.
/Get-TargetEditions	Lists the Windows editions that the operating system can be upgraded to.

## Understanding Windows Imaging

When you update Windows 8 by adding or removing features, applying hotfixes, or installing service packs, you are simply modifying the set of modules available. And because these modules are independent, you can make these changes without affecting the system as a whole. Because language packs are separate modules as well, you can easily implement different language configurations without needing separate installations for each language.

Microsoft distributes Windows 8 on media with WIM disk images. WIM uses compression and single-instance storage to dramatically reduce the size of image files. Compression reduces the size of the image in much the same way that zip compression reduces the size of files. Using single-instance storage reduces the size of the image because only one physical copy of a file is stored for each instance of that file in the disk image. Because WIM is hardware independent, Microsoft can ship one binary for 32-bit architectures and one binary for 64-bit architectures. A separate binary is available for Windows 8 RT.

Windows 8 can be installed through either automated or interactive setup. You can automate the installation of Windows 8 in several ways. You can:

- Create an unattended installation answer file** Windows 8 uses a standards-based single-format answer file. This file, called `Unattend.xml`, is written in XML, making it easier to process using standard tools. By creating a custom answer file and then running Setup using this answer file, you can perform unattended installations of Windows 8. The Setup program can then install the operating system from a distribution share or from media.
- Use Sysprep image-based installation** Requires running the System Preparation command-line tool (`Sysprep.exe`) on a computer that you want to use as the master deployment computer, and then creating a disk image of this computer's configuration. Sysprep is stored in the `%SystemRoot%\System32\Sysprep` folder. The Windows Automated Installation Kit (Windows AIK) includes Windows System Image Manager and ImageX to help you use Sysprep for deployments. You use Windows System Image Manager to create answer files for unattended installations. You use ImageX to create and manage disk images.

By using WIM as its disk-imaging format and taking advantage of the modular design of Windows 8, ImageX significantly reduces the number of disk images that

must be maintained. You don't need to maintain multiple hardware-dependent disk images or multiple language-dependent disk images. Instead, you typically need only a single disk image for each chip architecture used in your organization. You can then use different installation scripts to customize the operating system installation as necessary.

WIM has other advantages over earlier disk image formats as well. WIM enables you to modify and maintain disk images offline, which means you can add or remove optional components and drivers or perform updates without having to create a new disk image. To do this, you mount the disk image as a folder and then use File Explorer or other tools to update, manage, or remove files as necessary.

Windows System Image Manager, ImageX, and Sysprep provide several different ways to automate deployment. Here are the basic steps:

1. Set up and configure Windows 8 on a computer not being used for normal operations, and then install and configure any necessary components and applications.
2. Run Sysprep to prepare the computer for capture. Sysprep removes unique identifiers from the computer and designates it as a master deployment computer. At the end of this process, the computer no longer has identifying information that allows it to be logged on to and used within a domain or workgroup.
3. Use the ImageX /Capture option to capture the disk image and store this image on media or in a distribution share. The image can be maintained offline by using the ImageX /Mountrw option to mount the image in read/write mode so that you can make any necessary changes. Use the ImageX /Unmount command to unmount the image when you are finished making changes.

You also can mount images using DISM /Mount-WIM and unmount images using DISM /Unmount-WIM. DISM provides functionality for manipulating images. You can set product keys, perform upgrades, add or remove drivers, set language and locale information, add or remove packages and features, and clean up images.

4. Use Windows System Image Manager to create your unattended installation answer files. You can then create deployment scripts that configure the computer, run Setup using the answer file, and apply the disk image you've previously created.
5. Run your deployment script to configure the computer and install the operating system.

## Managing Access and Prestaging Computers

You can manage images using DISM. To prevent unauthorized users from installing images, you can:

- Prestage computers and allow only known computers to be deployed.
- Modify the security settings of image files so that only appropriate personnel can access them.

- Enable administrator approval for client installation.

## Prestaging Computers

Prestaging computers involves creating computer accounts in Active Directory prior to their use. By prestaging a computer, you control exactly which clients and servers can communicate with each other. Before you prestage computers, you should be sure that Windows Deployment Services is configured to accept requests only from known computers. To do this, follow these steps:

1. In the Windows Deployment Services console, expand the Servers node. Press and hold or right-click the server you want to work with, and then select Properties.
2. On the PXE Response Settings tab, tap or click Respond Only To Known Client Computers, and then tap or click OK.

To prestage a computer, you need to know the computer's globally unique identifier (GUID). A computer's GUID comes from the active network adapter on the computer and must be entered in the format {*dddddddd-dddd-dddd-dddd-dddddddddd*}, where *d* is a hexadecimal digit, such as {AEFED345-BC13-22CD-ABCD-11BB11342112}.

You can obtain the required identifier in several ways. In some cases, manufacturers print a label with the GUID and attach the label to the computer. However, don't forget that the GUID is valid only for the network adapter that shipped with the computer. If you replace the adapter, the new adapter will have a new GUID.

To obtain the GUID for the installed network adapter, you can check the computer's firmware. If a remote computer is started, you can enter the following command at a Windows PowerShell prompt:

```
get-wmiobject win32_networkadapter | format-list guid
```

Write down or copy the GUID associated with the network adapter connected to the local area network.

To prestage computers, follow these steps:

1. In Active Directory Users And Computers, press and hold or right-click the OU or container where the computer will be staged, tap or click New, and then tap or click Computer.
2. Type a name for the computer, and then tap or click Next. Alternatively, tap or click Change to choose the user or group with permission to join this computer to the domain, and then tap or click Next.
3. On the Managed page, select This Is A Managed Computer, type the computer's GUID, and then tap or click Next. The GUID can be found in the system firmware or it might be posted on the computer case.
4. On the Host Server page, choose the Windows Deployment Services server that will service this client. Tap or click Next, and then tap or click Finish.

## Modifying Image File Security

To modify the security settings on an image file, open File Explorer. Press and hold or right-click the image file, and then click Properties. In the Properties dialog box, use the options on the Security tab to configure the security settings you want to use. Alternatively, you can configure security settings on the Image Group folder in which the image file is stored. These settings will then be inherited by the images in the Image Group folder.

## Requiring Administrator Approval

Instead of prestaging computers or using image file security, you can require administrator approval before allowing computers to be installed from images. To require administrator approval rather than modify security settings on image files, you can do the following:

1. In the Windows Deployment Services console, expand the Servers node. Press and hold or right-click the server you want to work with, and then tap or click Properties.
2. On the PXE Response Settings tab, select Respond To All (Known And Unknown) Client Computers.
3. Select For Unknown Clients, Notify Administrator And Respond After Approval, and then tap or click OK.

Now computers that are booted from the network will enter a pending state. Before the installation can proceed, an administrator can approve or reject the request.

To approve a request, complete the following steps:

1. In the Windows Deployment Services console, select the server you want to work with. Next, tap or click the server's Pending Devices folder to select it and display a list of computers waiting for approval.
2. Press and hold or right-click the computer, and then tap or click Approve.

To reject a request, complete the following steps:

1. In the Windows Deployment Services console, select the server you want to work with. Next, tap or click the server's Pending Devices folder to select it and display a list of computers waiting for approval.
2. Press and hold or right-click the computer, and then tap or click Reject.

## Customizing Windows Images

You can customize a mounted boot or install an image using the DISM utility. Available options for DISM are summarized in Table 1-2. All components in an image are managed via the component store.

**TABLE 1-2** Key Options for the DISM Utility

COMMAND TYPE/COMMAND	DESCRIPTION
<b>GENERAL COMMANDS</b>	
/Cleanup-Wim	Deletes resources associated with mounted Windows images that are corrupt
/Commit-Wim	Saves changes to a mounted Windows image
/Get-MountedWimInfo	Displays information about mounted Windows images
/Get-WimInfo	Displays information about images in a Windows image file
/Image	Specifies the path to the root directory of an offline Windows image
/Mount-Wim	Mounts an image from a Windows image file
/Online	Targets the running operating system
/Remount-Wim	Recovers an orphaned Windows mount directory
/Unmount-Wim	Unmounts a mounted Windows image
<b>ADDITIONAL OPTIONS</b>	
/English	Displays command-line output in English
/Format	Specifies the report output format
/LogLevel	Specifies the output level shown in the log (1–4)
/LogPath	Specifies the log file path
/NoRestart	Suppresses automatic reboots and reboot prompts
/Quiet	Suppresses all output except for error messages
/ScratchDir	Specifies the path to a scratch directory
/SysDriveDir	Specifies the path to the system loader file named BootMgr
/WinDir	Specifies the path to the Windows directory

Once you mount an image, you are able to work with the mounted image using the Dism /Image subcommands listed in Table 1-3. These subcommands allow you to upgrade the image to a higher edition, add and remove device drivers, specify time zones and language user interface (UI) options, display patches and installed message signaled interrupt (MSI) applications, add and remove packages, and more.

**TABLE 1-3** Important Subcommands for Mounted and Offline Images

SUBCOMMANDS	DESCRIPTION
/Add-Driver	Adds driver packages to an offline image
/Add-Package	Adds packages to the image
/Apply-Unattend	Applies an AnswerFile.xml file to an image
/Check-AppPatch	Displays information if the multiple customization patches (MSP files) are applicable to the mounted image
/Cleanup-Image	Performs cleanup and recovery operations on the image
/Disable-Feature	Disables a specific feature in the image
/Enable-Feature	Enables a specific feature in the image
/Gen-LangIni	Generates a new Lang.ini file
/Get-AppInfo	Displays information about a specific installed MSI application
/Get-AppPatches	Displays information about all applied MSP patches for all installed applications
/Get-AppPatchInfo	Displays information about installed MSP patches
/Get-Apps	Displays information about all installed MSI applications
/Get-CurrentEdition	Displays the edition of the specified image
/Get-DriverInfo	Displays information about a specific driver in an offline image or a running operating system
/Get-Drivers	Displays information about all drivers in an offline image or a running operating system
/Get-FeatureInfo	Displays information about a specific feature
/Get-Features	Displays information about all features in a package
/Get-Intl	Displays information about the international settings and languages
/Get-PackageInfo	Displays information about a specific package
/Get-Packages	Displays information about all packages in the image
/Get-TargetEditions	Displays a list of Windows editions that an image can be upgraded to
/Remove-Driver	Removes driver packages from an offline image
/Remove-Package	Removes packages from the image
/Set-AllIntl	Sets all international settings in the mounted offline image
/Set-Edition	Upgrades the Windows image to a higher edition

SUBCOMMANDS	DESCRIPTION
/Set-InputLocale	Sets the input locales and keyboard layouts to use in the mounted offline image
/Set-LayeredDriver	Sets the keyboard layered driver
/Set-ProductKey	Populates the product key into the offline image
/Set-SetupUILang	Defines the default language that will be used by Setup
/Set-SKUIntlDefaults	Sets all international settings to the default values for the specified SKU language in the mounted offline image
/Set-SysLocale	Sets the language for non-Unicode programs (also called <i>system locale</i> ) and font settings in the mounted offline image
/Set-TimeZone	Sets the default time zone in the mounted offline image
/Set-UILang	Sets the default system UI language that is used in the mounted offline image
/Set-UILangFallback	Sets the fallback default language for the system UI in the mounted offline image
/Set-UserLocale	Sets the user locale in the mounted offline image

The Deployment Image Servicing and Management tool provides commands for working with WIM images. The syntax for mounting images is

```
dism /mount-wim /wimfile:Path /index:Index /mountdir:MountPath
```

where *Path* is the full path to the WIM image, *Index* is the index position of the image number of the image within the .wim file to apply, and *MountPath* is the directory location where you'd like to mount the image, such as

```
dism /mount-wim /wimfile:c:\winpe_x86\iso\sources\boot.wim /index:1 /mountdir:C:\Win8
```

You can then modify the image as necessary. To commit your changes at any time, you can use Dism /Commit-Wim, as shown in the following example:

```
dism /commit-wim /mountdir:C:\Win8
```

where you commit changes to the WIM images mounted in the C:\Win8 directory.

To unmount a WIM file, you can use Dism /Unmount-Wim, as shown in the following example:

```
dism /unmount-wim /mountdir:C:\Win8
```

Here, you unmount the WIM image that was mounted and committed in the C:\Win8 directory. If there are uncommitted changes, you must commit or discard changes when you unmount a WIM image. Add /Commit to commit changes or /Discard to discard changes. This affects only the changes you haven't previously committed.

## Installing Windows 8

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Windows 8 Pro and Enterprise are the main editions intended for use in Active Directory domains. When you install Windows 8 on a computer with an existing operating system, you can perform a clean installation or an upgrade. The major differences between a clean installation and an upgrade are the following:

- **Clean installation** With a clean installation, the Windows Setup program completely replaces the original operating system on the computer, and all user and application settings are lost. You should use a clean installation when the operating system cannot be upgraded, the system must boot to multiple operating systems, a standardized configuration is required, or when no operating system is currently installed.
- **Upgrade installation** During an upgrade, user accounts, user files, and user settings are retained, existing applications and their settings are kept, and basic system configuration is not required. An upgrade installation should be used when you have computers running the Windows operating system that support upgrading to Windows 8 and you want to minimize disruption by maintaining the existing settings, user information, and application configurations.

The way an upgrade works depends on the operating system being upgraded. When you are upgrading from Windows 7, Windows Setup performs an in-place upgrade that ensures the upgrade works as described previously. With Windows Vista and Windows XP, an in-place upgrade works differently. With Windows Vista, you can retain user accounts, user files, and user settings, as well as basic system configuration, but Windows Setup will not retain applications and their settings. With Windows XP, you can retain user accounts, user files, and user settings, but Windows Setup will not retain applications and their settings or basic system configuration.

## Preparing for Windows 8 Installation

To install Windows 8, you can boot from the Windows distribution media, run Setup from your current Windows operating system, perform a command-line installation, or use one of the automated installation options.

There are two basic approaches to setting up Windows 8—interactively or as an automated process. An interactive installation is what many people regard as the regular Windows installation—the kind where you walk through the setup process and enter a lot of information. It can be performed from distribution media (by booting from the distribution media or running Windows Setup from a command line).

The default Windows setup process when booting from the retail Windows 8 DVD is interactive, prompting you for configuration information throughout the process.

There are several types of automated setup, which actually have administrator-configurable amounts of user interaction. The most basic form of unattended setup you can perform is an unattended installation using only answer files. An answer file contains all or part of the configuration information usually prompted for during a standard installation process. You can create unattended answer files using Windows System Image Manager, which is provided in the Windows Assessment and Deployment Kit (ADK). To take unattended setup a step further, you can use Windows Deployment Services.

The standard setup program for Windows 8 is Setup.exe. You can run Setup.exe from the currently running Windows operating system to perform an upgrade or you can boot from the distribution media to perform a new installation of Windows 8. When you are working with Windows 8 on x86-based systems, you should be aware of the special types of drive sections used by the operating system:

- **Active** The active partition or volume is the drive section for system cache and startup. Some removable media devices may be listed as having an active partition.
- **Boot** The boot partition or volume contains the operating system and its support files. The system and boot partition or volume can be the same.
- **System** The system partition or volume contains the hardware-specific files needed to load the operating system. As part of software configuration, the system partition or volume can't be part of a striped or spanned volume.

Partitions and volumes are essentially the same thing. Two different terms are used at times, however, because you create partitions on basic disks and you create volumes on dynamic disks. On an x86-based computer, you can mark a partition as active by using the Disk Management snap-in.

Although the active, boot, and system volumes or partitions can be the same, each is required nonetheless. When you install Windows 8, the Setup program assesses all the hard disk drive resources available. Typically, Windows 8 puts boot and system files on the same drive and partition and marks this partition as the active partition. The advantage of this configuration is that you don't need multiple drives for the operating system and can use an additional drive as a mirror of the operating system partitions.

There are a number of differences when installing to EFI-based hardware. The EFI starts up by loading a firmware-based boot menu. Normally, EFI disks have a partition structure, called a *GUID partition table* (GPT). This partition structure differs substantially from the 32-bit platform MBR-based partitions.

GPT-based disks have two required partitions and one or more optional (OEM or data) partitions (up to 128 total):

- EFI system partition (ESP)
- Microsoft reserved partition (MSR)
- At least one data partition

The EFI boot menu presents a set of options, one of which is the EFI shell. The EFI shell provides an operating environment supporting the FAT and FAT32 file systems, as well as configuration and file management commands. To view a list of partitions on an EFI-based computer, use the Map command. In the output of the Map command, blk designates partition blocks and fs# designates readable file systems. You can change to a partition by entering the partition block number followed by a colon. Type **dir** to view files in the partition. EFI has a boot maintenance manager that allows you to configure the boot menu.

When you install Windows 8, the Setup program will automatically create a Windows Recovery Environment (Windows RE) partition and install additional components that can be used for recovery and troubleshooting in that partition. As a result, the Windows recovery tools are always available on computers running Windows 8. For more information, see the “Recovering from a Failed Start” section in Chapter 10, “Handling Maintenance and Support Tasks.”

As an administrator, you can use these tools to recover computers. If a remote user can't start Windows, you can talk the user through the process of starting Windows RE and initiating recovery. You do this by having the user access the Advanced Repair Options menu, as discussed in the “Recovering from a Failed Start” section in Chapter 10.

## Performing a Windows 8 Installation

Before you install Windows 8 on a computer, you should determine whether the underlying hardware meets the requirements for physical memory, processing power, and graphics capabilities. Microsoft provides both minimum requirements and recommended requirements. Requirements for memory and graphics are measured in megabytes and gigabytes; requirements for processors are measured in gigahertz.

Windows 8 requires:

- A 1-GHz or faster 32-bit (x86) or 64-bit (x64) processor
- At least 1 GB RAM (32-bit) or 2 GB RAM (64-bit)
- A DirectX 9 graphics processor with a Windows Display Drive Model (WDDM) 1.0 or later driver
- Touch UI requires a tablet or a monitor that supports multitouch.

**NOTE** Microsoft recommends that a computer have available disk space of at least 16 GB (32-bit) or 20 GB (64-bit). Various features in Windows 8, such as protection points, which include previous versions of files and folders that have been modified, can quickly increase the size requirements. For optimal performance of the hard disk, you need at least 15 percent free space at all times and adequate space for the paging file, which might be up to twice the size of the system's RAM. Also, if you are doing an in-place upgrade, the Windows.old folder will contain folders and files from the previous installation.

Any computer that meets or exceeds these hardware requirements can run Windows 8. You can perform a new installation of Windows 8 by completing these steps:

1. Power on the computer and insert the Windows 8 distribution media into the computer's DVD-ROM drive. Press a key to start the Setup program from the DVD when prompted. If you're not prompted to boot from DVD, you may need to modify the computer's boot or startup options in firmware.
2. You are prompted to choose your language, time, currency format, and keyboard layout, and then tap or click Next. Click Install Now.
3. With retail versions of Windows 8, you typically have to provide a product key. If prompted for a product key, enter the product key. Tap the onscreen keyboard button if you are working on a device without a keyboard and then use the onscreen keyboard to enter the product key. Tap or click Next.

**NOTE** If Setup determines the product key is invalid, make sure that you entered each letter and number correctly. You don't need to enter dashes. Sometimes, it's easier to reenter the product key than to find the incorrect value in the key sequence.

4. Read the license terms. If you agree, tap or click I Accept The License Terms, and then tap or click Next.
5. The Which Type Of Installation Do You Want? page is displayed to ensure that you really want to perform a new installation rather than an upgrade. To continue with the new installation, select Custom: Install Windows Only (Advanced).
6. When prompted for an installation location, choose the drive partition on which you want to install the operating system, and then tap or click Next.

**TIP** During installation, on the Where Do You Want To Install Windows? page, you can access a command prompt by pressing Shift+F10. This puts you in the MinWinPC environment used by Setup to install the operating system, and you have access to many of the same command-line tools that are available in a standard installation of Windows 8.

7. If the drive partition you've selected contains a previous Windows installation, you'll see a prompt telling you that existing user and application settings will be moved to a folder named Windows.old and that you must copy these settings to the new installation to use them. Tap or click OK.
8. Setup will then start the installation. During this process, Setup copies the full disk image of Windows 8 to the disk you've selected and then expands it. Afterward, Setup installs features based on the computer's configuration and any hardware that Setup detects. When Setup finishes the installation and restarts the computer, the operating system will be loaded and the system will be set up for first use. After the system is prepared, Setup will restart the computer again.

9. On the Personalize page, pick a background color for the Start page and desktop. Type a computer name, and then tap or click Next.
10. When prompted, choose your country or region, your time and currency format, and your keyboard layout. Tap or click Next.
11. With wireless connections, you'll need to select the wireless connection to use. When you tap or click Connect, you'll be able to enter the password for the wireless network. Then you'll need to tap or click Connect again. If the computer has a wired connection to the Internet, you shouldn't need to do this.
12. On the Settings page, you can tap or click Use Express Settings to accept the express settings or tap or click Customize to customize the settings. Express settings configure the computer and standard defaults:
  - Turn on sharing and connect devices, which may be suitable for home and work networks, though not necessarily domain environments.
  - Automatically install important and recommended updates, as well as updates for devices.
  - Help protect the PC from unsafe content, files, and websites by enabling the SmartScreen Filter for Internet Explorer and Windows.
  - Use Windows Error Reporting to check for solutions to problems.
  - Use Internet Explorer compatibility lists to help resolve website compatibility issues.
  - Let desktop apps use your name and account picture.
  - Enable Windows Location Platform so desktop apps can ask users for their location.
13. If the computer has an Internet connection, the Sign In To Your PC page allows you to set up either a Microsoft account or a local computer account. Otherwise, only a local computer account can be created. As you'll typically want to use a local account for a computer in a domain or workgroup, tap or click Sign In Without A Microsoft Account and then confirm by tapping or clicking Local Account again. Next, type a user name. Type and then confirm a password. Enter a password hint. Finally, tap or click Finish.

**NOTE** Chapter 7, "Managing User Access and Security," discusses Microsoft accounts and provides details on how they can be created and used.

14. Afterward, Windows 8 will prepare the computer's desktop.

You can upgrade a computer to Windows 8 by completing these steps:

  1. Start the computer and log on using an account with administrator privileges. Insert the Windows 8 distribution media into the computer's DVD-ROM drive. The Windows 8 Setup program should start automatically. If Setup doesn't start automatically, use File Explorer to access the distribution media and then double-tap or double-click Setup.exe.

**NOTE** Only the current operating system's keyboard layout is available during installation. This also means that if your keyboard language and the language of the edition of Windows 8 you are installing are different, you might see unexpected characters as you type.

2. Setup will copy temporary files and then start. If your computer is connected to the Internet, choose whether to get required updates during the installation. Either tap or click Go Online To Install Updates Now or tap or click No, Thanks. Tap or click Next.

**TIP** You don't have to get updates during the installation. If you decide not to get required updates, you can update the computer later using the Windows Update feature. I prefer to install updates as part of the installation to ensure the computer is ready to go when I finish setting up the operating system.

3. With retail versions of Windows 8, you typically have to provide a product key. If prompted for a product key, enter the product key. Tap the onscreen keyboard button if you are working on a device without a keyboard and then use the onscreen keyboard to enter the product key. By default, the computer will automatically activate Windows the next time you connect to the Internet. Tap or click Next.

**NOTE** If Setup determines the product key is invalid, make sure you entered each letter and number correctly. You don't need to enter dashes. Sometimes, it's easier to reenter the product key than to find the incorrect value in the key sequence.

4. Read the license terms. If you agree, tap or click I Accept The License Terms, and then tap or click Accept.
5. The options you see on the Choose What To Keep page depend on the version of Windows currently running on your computer. Upgrade options you may see include:
  - **Windows Settings** If available and selected, Setup attempts to keep basic settings, including settings for your desktop background, display, Internet favorites, Internet history, and Ease of Access. Not all settings will be moved and available in Windows 8.
  - **Personal Files** If available and selected, Setup saves personal files from the Users folder. This means the personal files stored in each user's Documents, Music, Pictures, Videos and other folders are moved and made available in Windows 8.
  - **Apps** If available and selected, Setup saves settings for desktop apps and makes them available after upgrade. Desktop programs, and some desktop apps, will need to be re-installed.
  - **Nothing** If selected, Setup moves folders and files for the previous installation to a folder named Windows.old, and the previous installation will no longer run.

**SECURITY ALERT** If you are upgrading and normally login using a fingerprint reader or other biometric device, you'll need to write down your password. You'll need to enter the user name and password the first time you sign in to Windows 8.

6. Tap or click Next and then tap or click Install. Continue with steps 8 to 14 of the previous procedure.

You may have trouble installing Windows 8 for a variety of reasons. Possible solutions to common problems follow in problem/solution format.

- **You can't boot from the Windows 8 installation media** Although most computers can boot from DVD, sometimes this capability is disabled in firmware. Set the boot order in firmware so that the DVD drive appears ahead of hard disk drives and other bootable media. For more information, see Chapter 4.
- **You can't select a hard disk during setup** Although the Windows 8 installation media contains drivers for most disk controllers, you may have a disk controller for which a default driver isn't available. Insert media containing the required drivers and then tap or click Load Drivers on the Where Do You Want To Install Windows? page. If the driver is on an internal hard drive, press Shift+F10 to access a command prompt and then use Xcopy to copy the driver files to a USB flash device or other removable media. You can then tap or click Load Drivers to load the drivers from the media.
- **You forgot to modify the hard disk configuration prior to starting the installation** On the Where Do You Want To Install Windows? page, tap or click Drive Options (Advanced). You can then use the options provided to create, delete, and format partitions as necessary. If you need to shrink or extend a partition (even during an upgrade), press Shift+F10 to access a command prompt and then use Disk Part to work with the partition. You can extend and shrink partitions without having to delete them. You also can use Disk Part to change the disk type and partition style. For more information on Disk Part, see Chapters 10, 11, and 12 in *Windows Command-Line Administrator's Pocket Consultant, Second Edition* (Microsoft Press, 2008).

## Running Windows 8

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When the operating system starts after installation, you can log on and access the desktop. By default, Windows 8 stores user profile data under %SystemDrive%\Users\%UserName%. Within the user profile folder, each user who logs on to the system has a personal folder, and that personal folder contains additional folders. These folders are the default locations for storing specific types of data and files:

- **AppData** User-specific application data (in a hidden folder)
- **Contacts** Contacts and contact groups
- **Desktop** The user's desktop
- **Downloads** Programs and data downloaded from the Internet
- **Favorites** The user's Internet favorites

- **Links** The user's Internet links
- **My Documents** The user's document files
- **My Music** The user's music files
- **My Pictures** The user's pictures
- **My Videos** The user's video files
- **Saved Games** The user's saved game data
- **Searches** The user's saved searches

**NOTE** %SystemDrive% and %UserName% refer to the *SystemDrive* and *UserName* environment variables, respectively. The Windows operating system has many environment variables, which are used to refer to user-specific and system-specific values. Often, I'll refer to environment variables by using this syntax: %VariableName%. If you've upgraded to Windows 8 from an earlier version of Windows, the user's personal folder may also contain symbolic links (which look like shortcuts) to the folders and settings used by that earlier version. A *symbolic link* is a pointer to a file or folder that often is created for backward compatibility with applications that look for a folder or file in a location that has been moved. You can create symbolic links by using the `Mklink` command-line utility. At a command prompt, enter `mklink /?` to learn the available options.

In addition to personal folders, Windows 8 uses personal libraries. A library is simply a collection of files and folders that are grouped together and presented through a common view. Standard libraries include:

- **Documents** Collects a user's My Documents data and Public Documents data.
- **Music** Collects a user's My Music data and Public Music data.
- **Pictures** Collects a user's My Pictures data and Public Pictures data.
- **Videos** Collects a user's My Videos data and Public Videos data.

You can create new libraries to act as views to various collections of data by pressing and holding or right-clicking the Libraries node in File Explorer, pointing to New, and then tapping or clicking Library.

**IMPORTANT** When you work with libraries, it is important to remember that they are only representations of collected data. Windows 8 creates merged views of files and folders that you add to libraries. The libraries do not contain any actual data, and any action that you take on a file or folder within a library is performed on the source file or folder.

Windows 8 provides themes that allow you to easily customize the appearance of menus, windows, and the desktop. In Control Panel, tap or click the Change The Theme link under Appearance And Personalization, and then choose the theme you want to use. Windows Aero themes add improved visual design and enhanced dynamic effects to the interface. If you want to use fewer advanced features, choose the Windows Basic theme.

It is important to point out, however, that the interface enhancements that can be used on a computer depend on which Windows 8 edition is installed and the computer's hardware.

## Using Action Center and Activating Windows

By default, when you log on, the operating system displays an Action Center summary icon in the desktop notification area. This icon has a white flag on it. Action Center is a program that monitors the status of important security and maintenance areas. If the status of a monitored item changes, Action Center updates the notification icon as appropriate for the severity of the alert. If you tap or click this icon, Windows displays a dialog box with a summary listing of each alert or action item that needs your attention. Tap or click an action item link to run the related solution. Tap or click the Open Action Center link to display the Action Center.

If you've disabled Action Center notifications on the taskbar, you can start Action Center by following these steps:

1. In Control Panel, tap or click the System And Security category heading link.
2. Tap or click Action Center.

Action Center, shown in Figure 1-1, provides an overview of the computer's status and lists any issues that need to be resolved. After installing Windows 8, action alerts in Action Center may let you know that device drivers are available and need to be installed. Simply tap or click the action item to begin the driver installation process. For detailed information on working with Action Center, see the "Using Automated Help and Support" section in Chapter 9, "Managing Hardware Devices and Drivers."

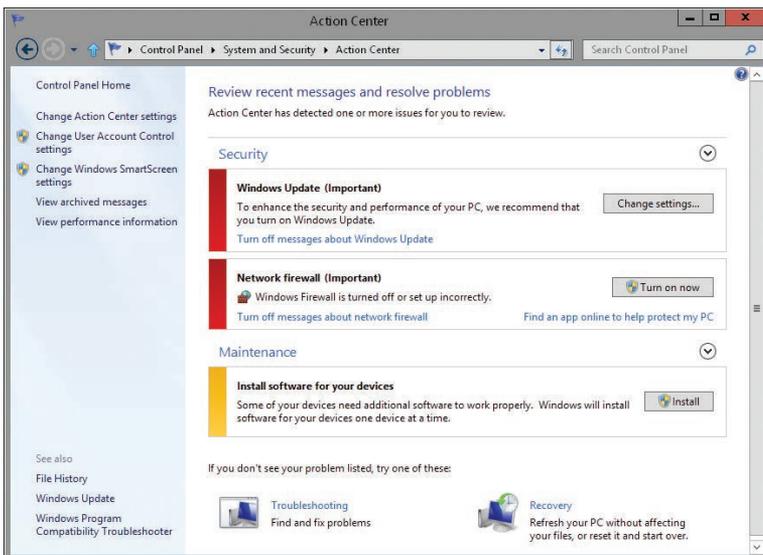


FIGURE 1-1 The Action Center window.

Windows 8 Pro and Enterprise editions support volume licensing. Although volume-licensed versions of Windows 8 might not require activation or product keys, retail versions of Windows 8 require both activation and product keys. You can determine whether Windows 8 has been activated in Control Panel. In Control Panel, tap or click System And Security, and then tap or click System. On the System page, read the Windows Activation entry. This entry specifies whether you have activated the operating system. If Windows 8 has not been activated and you are connected to the Internet, select View Details In Windows Activation and then tap or click Activate.

## Running Windows 8 in Groups and Domains

Computers running Windows 8 can be members of a homegroup, a workgroup, or a domain. A *homegroup* is a loose association of computers on a home network. Computers in a homegroup share data that can be accessed using a password common to the users in the homegroup. You set the homegroup password when you set up the homegroup and can modify the password as necessary at any time.

A *workgroup* is a loose association of computers in which each computer is managed separately. A *domain* is a collection of computers that you can manage collectively by means of domain controllers, which are servers running Windows that manage access to the network, to the directory database, and to shared resources.

Homegroups are available only when a computer running Windows 8 is connected to a home network. Workgroups and domains are available only when a computer running Windows 8 is connected to a work network. You'll learn how to manage networking and network connections in Chapter 15, "Configuring and Troubleshooting TCP/IP Networking."

Some aspects of Windows 8 vary depending on whether a computer is a member of a homegroup, workgroup, or domain. The sections that follow discuss these differences as they pertain to UAC, logon, fast user switching, and password management.

## Understanding UAC in Windows 8

In a homegroup or workgroup, a computer running Windows 8 has only local machine accounts. In a domain, a computer running Windows 8 has both local machine accounts and domain accounts. Windows 8 has two primary types of local user accounts:

- **Standard** Standard user accounts can use most software and can change system settings that do not affect other users or the security of the computer.
- **Administrator** Administrator user accounts have complete access to the computer and can make any necessary changes.

Windows 8 adds a special type of local user account called a *Microsoft account*, which is not available on earlier releases of Windows. Microsoft accounts can be thought of as synchronized local accounts and are discussed in detail in the "Understanding User and Group Accounts" section in Chapter 7.

Windows 8 includes UAC as a way to enhance computer security by ensuring true separation of standard user and administrator user accounts. Because of the UAC feature in Windows 8, all applications run using either standard user or administrator user privileges. Whether you log on as a standard user or as an administrator user, you see a security prompt by default whenever you run an application that requires administrator privileges. The way the security prompt works depends on Group Policy settings (as discussed in the “Optimizing User Account Control and Admin Approval Mode” section in Chapter 7) and whether you are logged on with a standard user account or an administrator user account.

When you are logged on using a standard user account, you are asked to provide a password for an administrator account, as shown in Figure 1-2. In a homegroup or workgroup, each local computer administrator account is listed by name. To proceed, you must tap or click an account, type the account’s password, and then tap or click Yes.



**FIGURE 1-2** Prompting for administrator privileges.

In a domain, the User Account Control dialog box does not list any administrator accounts, so you must know the user name and password of an administrator account in the default (logon) domain or a trusted domain to continue. When Windows prompts you, type the account name, type the account’s password, and then tap or click Yes. If the account is in the default domain, you don’t have to specify the domain name. If the account is in another domain, you must specify the domain and the account name by using the format *domain\username*, such as **cpandl\williams**.

When you are logged on using an administrator user account, you are asked to confirm that you want to continue, as shown in Figure 1-3. You can tap or click Yes to allow the task to be performed, or tap or click No to stop the task from being performed. Tapping or clicking Show Details shows the full path to the program being executed.



**FIGURE 1-3** Prompting for confirmation to continue.

Elevation of privileges allows a standard user application to run with administrator privileges. You can run applications with elevated privileges by following these steps:

1. Press and hold or right-click the application's tile or shortcut, and then tap or click Run As Administrator.
2. When you see the User Account Control prompt, proceed as you normally would to allow the application to run with administrator privileges.

**NOTE** You must run the command prompt with elevated privileges to perform administration at the command line. If you do not do this, you will see an error when you try to run an administrator utility or perform a task that requires administrator privileges.

## Logging on to, Shutting Down, and Restarting Windows 8

Windows 8 displays a Lock screen at startup. When you click the Lock screen, you see the Welcome screen. The behavior of the Welcome screen depends on Group Policy settings and the computer's homegroup, workgroup, or domain membership. Keep the following in mind:

- In a homegroup or workgroup, the Welcome screen shows a list of accounts on the computer. To log on with one of these accounts, tap or click the account and enter a password if required.
- In a domain, the name of the last user to log on is displayed by default on the Welcome screen. You can log on with this account by entering the required password. You can log on as another user as well. To do this, click the Switch User button, select one of the alternative accounts listed, and then provide the password for that account or click Other User to enter the user name and password for the account to use. Note that the Switch User button has a left arrow in a circle and is to the left of the account picture.

By default, the last account to log on to the computer is listed in *computer\username* or *domain\username* format. To log on to this account, you type the account password and then tap or click the Submit button. The Submit button is

part of the Password box, and shows a right arrow. To log on to a different account, tap or click Switch User, press Ctrl+Alt+Del, and then tap or click Other User. The logon information that you must provide depends on what type of account you are using:

- If the account is in the current/default domain, type the user name and password and then tap or click the arrow button.
- If the account is in another domain, you must specify the domain and the account name by using the format *domain\username*, such as **cpand\williams**.
- If you want to log on to the local machine, type **.\username**, where *username* is the name of the local account, such as **.\williams**.

When you are logged on, you can display the Windows Logon screen by pressing Ctrl+Alt+Del. This screen allows you to lock the computer, switch users, sign out, change a password, or start Task Manager. The Power button is in the lower-right corner of the screen. Tapping or clicking the Power button displays Sleep, Shut Down, and Restart options.

Because Shut down and Restart are options of the Power settings, you also can shut down or restart a computer by following these steps:

1. Slide in from the right side of the screen or press Windows key + C.
2. Tap or click Settings and then tap or click Power.
3. Tap or click Shut Down or Restart as appropriate.

**NOTE** Windows 8 supports fast user switching in domain, homegroup, and workgroup configurations. When a user is logged on to a computer running Windows 8, you can use fast user switching to allow another user to log on without requiring the current user to log off. To switch users, press Ctrl+Alt+Del, and then tap or click Switch User.

## Managing User Account Passwords with Windows 8

Windows 8 provides fast and easy ways to manage user account passwords. You can easily perform the following tasks:

- Change the current user's password.
- Change the password for another domain or local computer account.
- Create a password reset disk.
- Reset a user's password.

These tasks are discussed in the sections that follow.

### CHANGING THE CURRENT USER'S PASSWORD

You can change the current user's password by completing the following steps:

1. Press Ctrl+Alt+Del, and then tap or click the Change A Password option.

**NOTE** In a domain, the current user's domain account name is listed in *domain\username* format. In a homegroup or workgroup, the current user's local account name is listed.

2. Type the current password for the account in the Old Password text box.
3. Type and confirm the new password for the account in the New Password and the Confirm Password text boxes.
4. Tap or click the arrow button to confirm the change.

## CHANGING OTHER ACCOUNT PASSWORDS

You can change the password for a domain or a local account other than the current user's account by completing these steps:

1. Press Ctrl+Alt+Del, and then tap or click the Change A Password option.
2. Tap or click in the User Name text box, and then type the name of the account.

**NOTE** For a domain account, specify the domain and the account name using the format *domain\username*, such as **cpandl\williams**. For a local computer account, type *.\username*, where *username* is the name of the local account, such as **.\williams**.

3. Type the current password for the account in the Old Password text box.
4. Type and confirm the new password for the account in the New Password and the Confirm Password text boxes.
5. Tap or click the arrow button to confirm the change.

## CREATING AND USING A PASSWORD RESET DISK

Passwords for domain users and local users are managed in different ways. In domains, passwords for domain user accounts are managed by administrators. Administrators can reset forgotten passwords using the Active Directory Users And Computers console.

In homegroups and workgroups, passwords for local machine accounts can be stored in a secure, encrypted file on a password reset disk, which is a USB flash drive that contains the information needed to reset your password. You can create a password reset disk for the current user by completing these steps:

1. Press Ctrl+Alt+Del, and then tap or click the Change A Password option.
2. Tap or click Create A Password Reset Disk to start the Forgotten Password Wizard.
3. In the Forgotten Password Wizard, read the introductory message. Insert the USB flash drive you want to use and then tap or click Next.
4. Select the USB flash drive you want to use in the drive list. Tap or click Next.
5. Type the current password for the logged on user in the text box provided, and then tap or click Next.
6. After the wizard creates the password reset disk, tap or click Next, remove the disk, and then tap or click Finish.

Be sure to store the password reset disk in a secure location because anyone with access to the disk can use it to gain access to the user's data. If a user is unable to log on because he or she has forgotten the password, you can use the password reset disk to create a new password and log on to the account using this password.

**REAL WORLD** You can use BitLocker To Go to protect and encrypt USB flash devices and other removable media drives. When a user is logged on, protected media can be unlocked using a password or a smart card with a smart card PIN. However, when a user isn't logged on, the protected drive cannot be accessed. Because of this, you shouldn't protect password reset disks with BitLocker To Go. For more information, see Chapter 11, "Using TPM and BitLocker Drive Encryption."

## RESETTING A USER'S PASSWORD

Administrators can reset forgotten passwords using the Active Directory Users And Computers console. In homegroups and workgroups, you can reset a password by following these steps:

1. On the Log On screen, tap or click the arrow button without entering a password, and then tap or click OK. The Reset Password option should be displayed. If the user has already entered the wrong password, the Reset Password option might already be displayed.
2. Insert the disk or USB flash device containing the password recovery file, and then tap or click Reset Password to start the Reset Password Wizard.
3. In the Reset Password Wizard, read the introductory message and then tap or click Next.
4. Select the device you want to use in the drive list, and then tap or click Next.
5. On the Reset The User Account Password page, type and confirm a new password for the user.
6. Type a password hint, and then tap or click Next. Tap or click Finish.

## Power Plans, Sleep Modes, and Shutdown

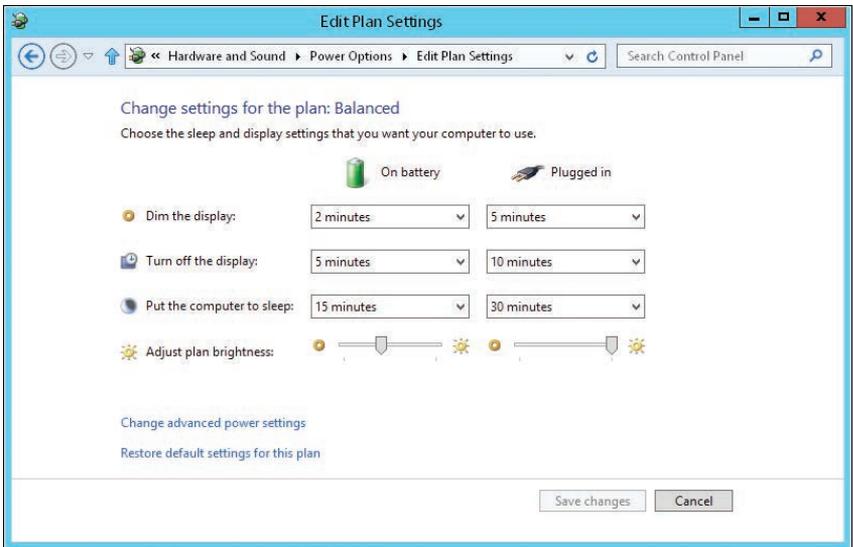
Normally, computers running Windows 8 use the Balanced power plan, and this power plan turns off the display and puts the computer in sleep mode automatically after a specified period of time passes with no user activity.

When entering the sleep state, the operating system automatically saves all work, turns off the display, and puts the computer in sleep mode. Sleep mode is a low-power consumption mode in which the state of the computer is maintained in the computer's memory, and the computer's fans and hard disks are turned off.

Windows 8 saves the computer state before entering sleep mode, and you don't need to exit programs before you do this. Because the computer uses very little energy in the sleep state, you don't have to worry about wasting energy.

**TIP** Sleep mode works in slightly different ways depending on the type of computing device. Often you can turn off and turn on mobile computers by closing or opening the lid. When you close the lid, the laptop enters the sleep state. When you open the lid, the laptop wakes up from the sleep state. If the laptop is in the sleep state for an extended amount of time, or the laptop's battery runs low on power, the state of the computer is saved to the hard disk and then the computer shuts down completely. This final state is similar to the hibernate state used in early releases of Windows.

To view or modify the default power options, open Control Panel. In Control Panel, tap or click System And Security, and then, under Power Options, tap or click Change When The Computer Sleeps. The options available depend on the type of computing device. With mobile computers and tablets, as shown in Figure 1-4, you may be able to set On Battery and Plugged In options for dimming the display, turning off the display, putting the computer to sleep, and adjusting the display brightness. With desktop computers, you can only specify when the display is turned off and when the computer goes to sleep. Tap or click Save Changes to save your changes.



**FIGURE 1-4** Configure power options to meet the needs of your users.

You can cause most computers to enter the sleep state by tapping or clicking the Settings charm button, tapping or clicking Power, and then tapping or clicking Sleep. To wake the computer from the sleep state, you can press and hold somewhere on the touch screen, move the mouse, or press any key on the keyboard. Note that some computers have separate power and sleep buttons on their case. The way these buttons work can be set through the power plan options.

There are instances in which a computer can't use the sleep state. The system hardware, state, and configuration can affect the way the power and sleep buttons work. Some computer hardware doesn't support the sleep state. In this case, the computer can't use the sleep state. This is also the case when the computer has updates installed that require a restart or you've installed programs that require a restart. Additionally, if an administrator has reconfigured the power options on the computer and set the power button, the sleep button, or both to alternative actions, the computer will use those actions instead of the default shutdown and sleep actions.

**CAUTION** When working with computers in the sleep state, keep in mind that the computer is still drawing power. You should never install hardware inside the computer when it is in the sleep state. To avoid possible confusion regarding the sleep state and the power off state, be sure to unplug desktop computers running Windows 8 before installing internal devices. External devices are exceptions. You can connect USB, FireWire, and eSATA devices without shutting down the computer.

To change the default setting for the power button, open Control Panel. In Control Panel, tap or click System And Security, and then, under Power Options, tap or click Choose What The Power Buttons Do. As before, the options available depend on the type of computing device. With mobile computers, as shown in Figure 1-5, you may be able to set On Battery and Plugged In options that specify what happens when you press the power button, what happens when you press the sleep button, and what happens when you close the lid. Optionally, you can tap or click Change Settings That Are Currently Unavailable, and then do any of the following:

- Select Require A Password to require a password to log on after waking the computer from sleep.
- Select Turn On Fast Startup to save system information to a file on the system disk when you shut down the computer. This file is then read during boot to enable faster startup. When you restart a computer, Fast Startup is not used.
- Select the Power options you want displayed when you click Power.

Save your changes by tapping or clicking Save Changes.

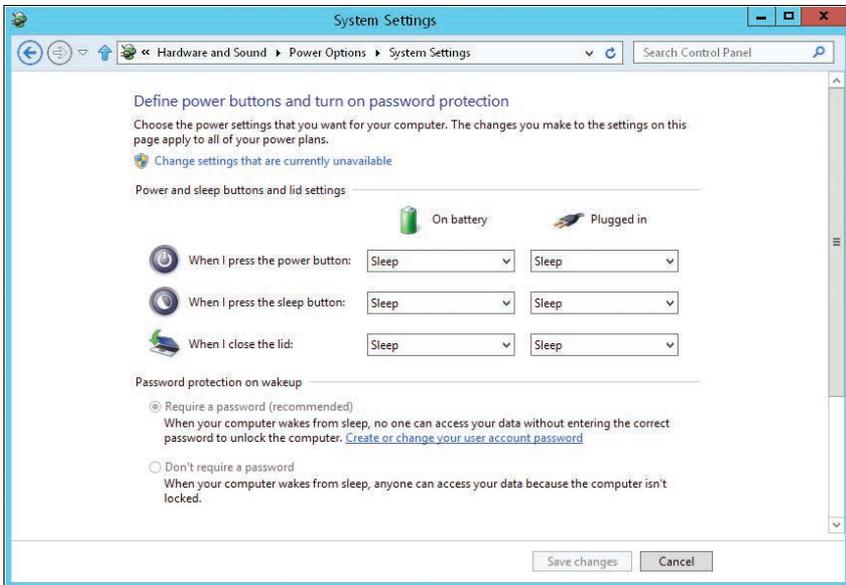


FIGURE 1-5 Configure power button options.

## Windows 8 Architecture

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If you want to truly know how Windows 8 works and what makes it tick, you need to dig under the hood. Windows 8 doesn't boot from an initialization file. Instead, the operating system uses the Windows Boot Manager to initialize and start the operating system.

The boot environment dramatically changes the way the operating system starts. The boot environment was created by Microsoft to resolve several prickly problems related to boot integrity, operating system integrity, and firmware abstraction. The boot environment is loaded prior to the operating system, making it a pre-operating system environment. As such, the boot environment can be used to validate the integrity of the startup process and the operating system itself before actually starting the operating system.

The boot environment is an extensible abstraction layer that allows the operating system to work with multiple types of firmware interfaces without requiring the operating system to be specifically written to work with these firmware interfaces. Rather than updating the operating system each time a new firmware interface is developed, firmware interface developers can use the standard programming interfaces of the boot environment to allow the operating system to communicate as necessary through the firmware interfaces.

Firmware interface abstraction is the first secret ingredient that makes it possible for Windows 8 to work with BIOS-based and EFI-based computers in exactly the same way, and this is one of the primary reasons Windows 8 achieves hardware independence. You'll learn more about the boot environment in Chapters 2 and 4.

The next secret ingredient for Windows 8 hardware independence is Windows Imaging Format (WIM). Microsoft distributes Windows 8 on media using WIM disk images. WIM uses compression and single-instance storage to dramatically reduce the size of image files. Using compression reduces the size of the image in much the same way that zip compression reduces the size of files. Using single-instance storage reduces the size of the image because only one physical copy of a file is stored for each instance of that file in the disk image.

The final secret ingredient for Windows 8 hardware independence is modularization. Windows 8 uses modular component design so that each component of the operating system is defined as a separate independent unit or module. Because modules can contain other modules, various major features of the operating system can be grouped together and described independently of other major features. Because modules are independent from each other, modules can be swapped in or out to customize the operating system environment.

Windows 8 includes extensive support architecture. At the heart of this architecture is built-in diagnostics and troubleshooting. Microsoft designed built-in diagnostics and troubleshooting to be self-correcting and self-diagnosing or, failing that, to provide guidance while you are diagnosing problems.

Windows 8 includes network awareness and network discovery features. Network awareness tracks changes in network configuration and connectivity. Network discovery controls a computer's ability to detect other computers and devices on a network.

Network awareness allows Windows 8 to detect the current network configuration and connectivity status, which is important because many networking and security settings depend on the type of network to which a computer running Windows 8 is connected. Windows 8 has separate network configurations for domain networks, private networks, and public networks and is able to detect

- When you change a network connection
- Whether the computer has a connection to the Internet
- Whether the computer can connect to the corporate network over the Internet

Windows Firewall in Windows 8 supports connectivity to multiple networks simultaneously and multiple active firewall profiles. Because of this, the active firewall profile for a connection depends on the type of connection.

If you disconnect a computer from one network switch or hub and plug it into a new network switch or hub, you might inadvertently cause the computer to think it is on a different network, and depending on Group Policy configuration, this could cause the computer to enter a lockdown state in which additional network security settings are applied. As shown in Figure 1-6, you can view the network connection status in the Network And Sharing Center. In Control Panel, under Network And Internet, tap or click View Network Status And Tasks to access this management console.

**TIP** Through the DirectAccess feature, computers running Windows 8 can directly access corporate networks wherever they are as long as they have access to the Internet, and best of all, users don't need to initiate VPN connections. The feature relies on DirectAccess servers being configured on the corporate network and DirectAccess being enabled in Group Policy. For more information, see Chapter 16, "Managing Mobile Networking and Remote Access."

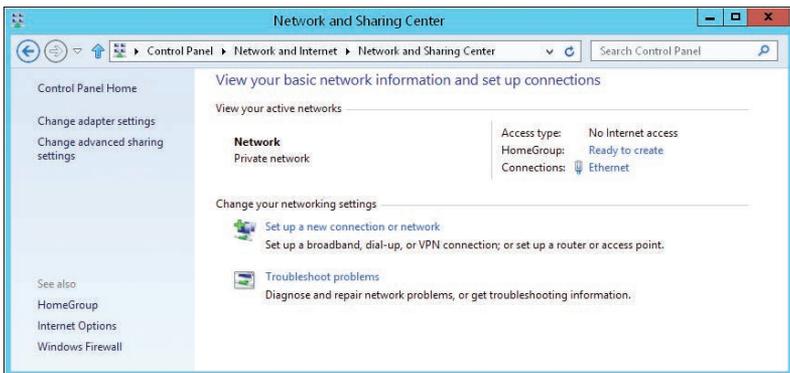


FIGURE 1-6 Determine the network state.

Windows 8 tracks the identification status of all networks to which the computer has been connected. When Windows 8 is in the process of identifying a network, the Network And Sharing Center shows the Identifying Networks state. This is a temporary state for a network that is being identified. After Windows 8 identifies a network, the network becomes an Identified Network and is listed by its network or domain name in the Network And Sharing Center.

If Windows 8 is unable to identify the network, the network is listed with the Unidentified Network status in the Network And Sharing Center. In Group Policy, you can set default location types and user permissions for each network state, as well as for all networks, by using the policies for Computer Configuration under Windows Settings\Security Settings\Network List Manager Policies.

When you are working with the Network And Sharing Center, you can attempt to diagnose a warning status by using Windows Network Diagnostics—another key component of the diagnostics and troubleshooting framework. To start diagnostics, tap or click Troubleshoot Problems, tap or click Internet Connections, and then tap or click Next. Windows Network Diagnostics then attempts to identify the network problem and provide a possible solution.

The Windows diagnostics and troubleshooting infrastructure offers improved diagnostics guidance, additional error reporting details, expanded event logging, and extensive recovery policies. Although early versions of Windows include some help and diagnostics features, those features are, for the most part, not self-correcting or self-diagnosing. Windows now can detect many types of hardware, memory, and performance issues and resolve them automatically or help users through the process of resolving them. For more information, see the “Working with the Automated Help System” section in Chapter 9.

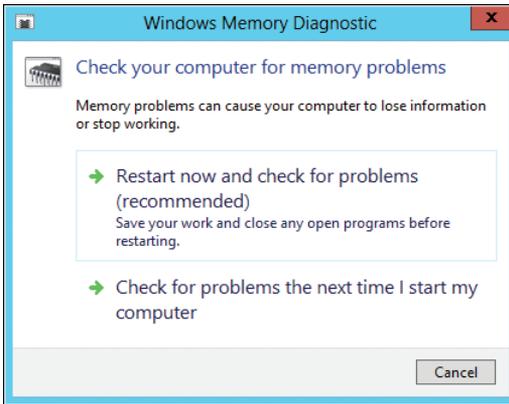
Error detection for devices and failure detection for disk drives also are automated. If a device is having problems, hardware diagnostics can detect error conditions and either repair the problem automatically or guide the user through a recovery process. With disk drives, hardware diagnostics can use fault reports provided by disk drives to detect potential failure and alert you before this happens. Hardware diagnostics can also help guide you through the backup process after alerting you that a disk might be failing.

Windows 8 can automatically detect performance issues, which include slow application startup, slow boot, slow standby/resume, and slow shutdown. If a computer is experiencing degraded performance, Windows diagnostics can detect the problem and provide possible solutions. For advanced performance issues, you can track related performance and reliability data in the Performance Monitor console, which is an administrative tool.

Windows 8 can also detect issues related to memory leaks and failing memory. If you suspect that a computer has a memory problem that is not being automatically detected, you can run Windows Memory Diagnostic manually by completing the following steps:

1. From Start, type **mdsched.exe**, and then press Enter. Normally, text that you type on Start is entered into the Apps Search box by default.

2. Choose whether to restart the computer and run the tool immediately or schedule the tool to run at the next restart, as shown in Figure 1-7.



**FIGURE 1-7** Test memory for problems.

3. Windows Memory Diagnostic runs automatically after the computer restarts and performs a standard memory test. If you want to perform fewer or more tests, press F1, use the up and down arrow keys to set the Test Mix as Basic, Standard, or Extended, and then press F10 to apply the desired settings and resume testing.
4. When testing is complete, the computer restarts. You'll see the test results when you log on.

If a computer crashes because of failing memory and Memory Diagnostic detects this, you are prompted to schedule a memory test the next time the computer is started.

# Customizing the Desktop and the User Interface

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As an administrator, you'll often be asked to help users customize their desktops and user profile data. Windows 8 provides many desktop and screen customization options. Although these options are useful, they can cause problems that you might be asked to help resolve. You might also see users struggling to fix these issues on their own, so you might want to lend a hand. This chapter focuses on the configuration and troubleshooting of the following areas:

- PC settings, the taskbar, and toolbars
- Desktop themes and backgrounds
- Custom desktop content
- Screen savers
- Display appearance and settings

## Optimizing PC Settings

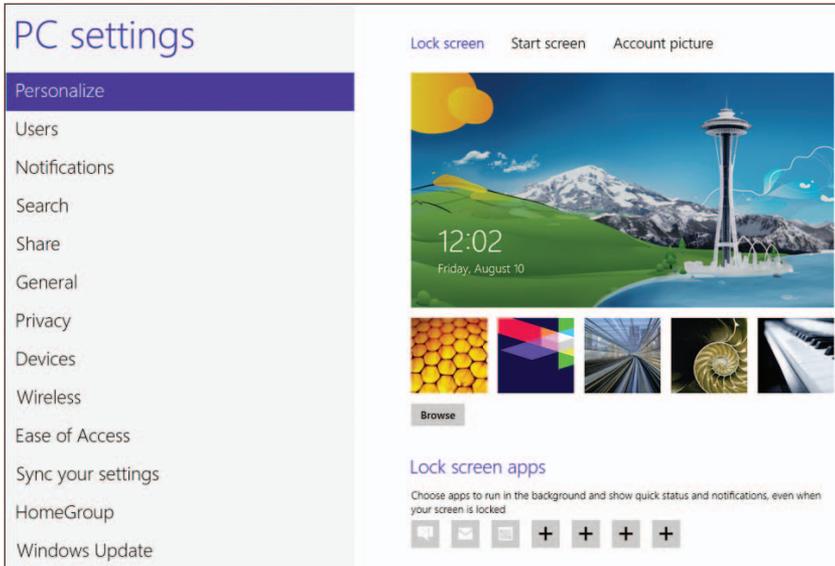
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The PC Settings screen and its related pages are designed to provide easy access to settings commonly used for customizing the user interface and the way that apps can be used. You can display the PC Settings screen using one of the following techniques:

- With touch UI, slide in from the right, tap Settings, and then tap Change PC Settings.

- With the mouse and keyboard, press Windows key + I, and then click Change PC Settings.

Figure 3-1 shows PC Settings on my laptop. You navigate between pages by tapping or clicking the name of the page. Each user who logs on to a computer has separate settings.



**FIGURE 3-1** Use PC Settings pages and options to customize the user interface.

The sections that follow examine key areas of the operating system that can be configured using these pages and options. Keep in mind that the pages and options you see may be slightly different depending on your computing device.

**NOTE** Throughout this section, I use the term *apps* to refer to desktop apps, as opposed to traditional desktop programs. For more information about apps, see Chapter 8, “Installing and Maintaining Applications.”

## The Personalize Page

You use the Personalize page to configure the Lock screen, Start screen, and account picture. Change between the configuration areas by tapping or clicking Lock Screen, Start Screen, or Account Picture as appropriate.

### Personalizing the Lock Screen

With the Lock screen, you can choose a picture to display in the background by tapping or clicking the picture you want to use. If you want to use a picture from somewhere else on your computer, tap or click Browse, and then use the options provided to navigate to and choose the picture you want to use.

Some apps, referred to as Lock Screen Apps, can run in the background and show quick status and notifications even when the screen is locked. Typically, the messaging, mail, and calendar apps are configured to do this by default. Other apps installed on the computer may be able to show quick status and notifications on the Lock screen as well. If so, tap or click the Add option (which shows a plus sign) and then tap or click the app to add it. To remove a Lock Screen app, tap or click the app and then tap or click Don't Show Quick Status Here.

Some apps, like Calendar and Weather, can display a detailed status on the lock screen, but normally, only one can actively display detailed status at a time. It's listed under Choose An App To Display Detailed Status. If no detailed status app has been added, tap or click the Add option (which shows a plus sign) and then tap or click the app to add. To remove the detailed status app, tap or click the app and then tap or click Don't Show Detailed Status On The Lock Screen.

## Personalizing the Start Screen and Account Picture

With the Start screen, you can choose a background style to display by tapping or clicking the style you want to use. You also can choose a color for the background.

Any picture can be added as an account picture. A silhouette graphic is used by default. If you want to use a picture from somewhere else on your computer, tap or click Browse, and then use the options provided to navigate to and choose the picture you want to use.

If your computer has a camera, you can create an account picture by clicking Camera and following the prompts.

## The Users Page

You use the Users page primarily to manage the logged-on account. If the logged-on account is using a Microsoft account, you can use the options provided to switch to a local account. If the logged-on account is using a local account, you can use the options provided to switch to a Microsoft account.

The Sign-In Options allow you to create or change a picture password for the logged-on user (if allowed in Group Policy). You also can control whether a user must enter a password when waking the computer.

In a workgroup or home group, you have two additional sign-in options. You can change the password of the logged-on user. You also can create or change a PIN for the logged-on user. For more information on working with user accounts, see Chapter 7, "Managing User Access and Security."

## The Notifications Page

Many apps can display notifications, and the Notifications page is where you go to control those notifications. Top-level notification controls include:

- **Show App Notifications** Controls whether apps can display notifications on Start and the desktop

- **Show App Notifications On The Lock Screen** Controls whether apps can display notifications on the lock screen
- **Play Notification Sounds** Controls whether apps can play notification sounds

Tap or click the control to turn the related notifications on or off. You also can turn notifications on or off for individual apps.

## The Search, Share, and Privacy Pages

The Search page allows you to personalize the way search works. Windows 8 tracks a history of your searches and can use this to show the apps that you search most often at the top of your searches and to save searches for future suggestions. Use the Search History options to modify the way this works or to delete the current search history.

When you perform app searches, Windows searches data stored within apps as well as for the apps themselves. Certain apps, such as Mail, Music, Photos, and News are configured to search, and options are provided to turn search on or off for each app individually. Simply tap or click the related button to toggle search on or off.

Similarly, certain apps are configured for quick sharing, allowing you to quickly share photos, documents, or other items. The Share page allows you to personalize the way sharing works. Windows 8 tracks a history of the apps that you use for sharing and can display the apps that you use for sharing in a prioritized list. Up to five apps are in the list by default. Tap or click Items In List to select a different number of apps. Tap or click Clear List to clear and reset the list.

Certain apps, such as Mail and People, are configured for sharing automatically. Options are provided to turn sharing on or off for each app individually. Simply tap or click the related button to toggle sharing on or off.

Apps also can use your location, name, and account picture, and you configure related settings on the Privacy page. Simply tap or click the related button to specify whether you want this information to be available with apps.

**TIP** On the General page under App Switching, you can specify whether a user can switch between recent apps. When app switching is allowed, Windows 8 tracks recently used apps in a history, and you can clear this history by tapping or clicking Delete History.

## The Sync Your Settings Page

When the currently logged-on user has a Microsoft account, you can control the way settings are synchronized between devices on the Sync Your Settings page. Settings that can be synchronized include:

- The user's settings from the Personalize page
- Desktop personalization settings for themes, the taskbar, and more
- Sign-in passwords for some apps, websites, networks, and HomeGroups
- Ease of Access options and language preferences

- Browser settings, browser history, and browser favorites
- Other Windows settings for File Explorer, the mouse, and more

The Sync Settings On This PC option is the top-level control. If you don't want settings to be synchronized between devices, turn this setting off. If you want some or all settings to be synchronized between devices, turn this setting on.

When synchronization is allowed, use the options under Settings To Sync to control the type of settings that are synchronized. As Windows 8 also can recognize when a computer is on a metered connection, such as a cellular network, you can turn syncing on or off over metered connections and specify whether syncing is ever allowed when the metered connection is roaming.

## Working with Desktops and Startup Applications

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In the Windows operating system, items on the desktop and startup applications are configured with shortcuts, and it is the location of the shortcut that determines how the shortcut is used. For example, if you want to configure startup applications for all users, you can add shortcuts to the %SystemDrive%\ProgramData\Microsoft\Windows\Start Menu\Programs\Startup folder. These applications then automatically start when a user logs on to the system locally. If you want to configure startup applications for a particular user, you can add shortcuts to the %UserProfile%\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup folder.

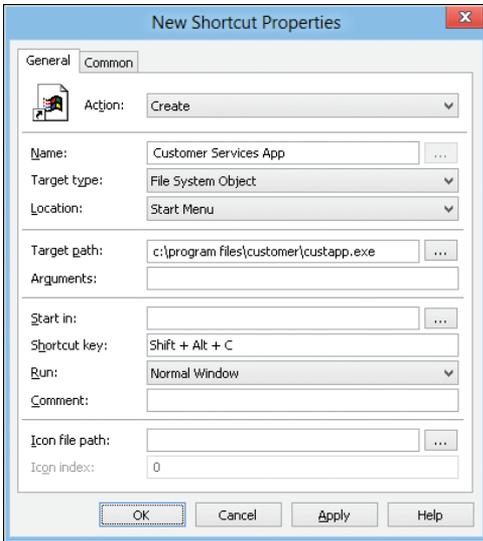
## Creating Shortcuts for Desktops, Startup, and More

In File Explorer, you can create shortcuts for the desktop, folders, and startup applications by logging on to a user's computer and creating shortcuts in the appropriate locations. In Group Policy, you can create shortcuts for desktops, startup applications, and more by using Shortcuts preferences, and these preference items are applied automatically to all users and computers that process the related Group Policy Object.

To configure Shortcuts preferences, follow these steps:

1. Open a Group Policy Object for editing in the Group Policy Management Editor. To configure preferences for computers, expand Computer Configuration\Preferences\Windows Settings, and then select Shortcuts. To configure preferences for users, expand User Configuration\Preferences\Windows Settings, and then select Shortcuts.
2. Press and hold or right-click the Shortcuts node, point to New, and then select Shortcut. This opens the New Shortcut Properties dialog box, as shown in Figure 3-2.
3. In the Action list, select Create, Update, or Replace as appropriate. Then complete the other options as discussed in this section.
4. Use the options on the Common tab to control how the preference is applied. Often, you'll want to apply a shortcut only once. If so, select Apply Once And Do Not Reapply.

5. Tap or click OK. The next time policy is refreshed, the preference item will be applied as appropriate for the Group Policy Object in which you defined the preference item.



**FIGURE 3-2** Create a shortcut using a preference item.

In the Location list, you'll see a list of special folders that you can use with shortcuts. Table 3-1 provides a summary of these folders.

**TABLE 3-1** Special Folders for Use with Shortcuts

SPECIAL FOLDER	USAGE
AllUsersDesktop	Desktop shortcuts for all users
AllUsersExplorerFavorites	Explorer favorites for all users
AllUsersPrograms	Programs menu options for all users
AllUsersStartMenu	Start menu options for all users
AllUsersStartup	Startup applications for all users
Desktop	Desktop shortcuts for a specific user
Explorer Favorites	Favorites for a specific user
Explorer Links	Favorite links for a specific user
MyNetworkPlaces	Network shortcuts for a specific user
Programs	Programs menu options for a specific user
QuickLaunchToolbar	Toolbar folder with shortcuts for a specific user
Recent	Recently used document shortcuts for a specific user

SPECIAL FOLDER	USAGE
SendTo	SendTo menu shortcuts for a specific user
StartMenu	Start menu shortcuts for a specific user
Startup	Startup applications for a specific user

Shortcuts can point to local and network files, as well as to remote Internet resources. Shortcuts for working with local or network files are referred to as *link shortcuts*. Shortcuts for working with remote Internet resources are referred to as *URL shortcuts*.

Link shortcuts are usually used to start applications or open documents rather than access a URL in a browser. Because of this, link shortcuts have different properties than URL shortcuts. The properties are summarized in Table 3-2. If you set any property incorrectly or set a property that isn't supported by a linked application, the shortcut may not be created or may not work as expected. In this case, you need to correct the problem and try to create the shortcut again.

One of the most valuable options is the Arguments property. You can use this property to set arguments to pass in to an application that you are starting. Using this property, you can create a shortcut that starts Microsoft Word and opens a document by setting the target path for Word and the argument for the document to open.

When you add shortcuts to the desktop or menu, you can set a hotkey sequence that activates the shortcut. The hotkey sequence must be specified with at least one modifier key and a key designator. The following modifier keys are available:

- **ALT** The Alt key
- **CTRL** The Ctrl key
- **SHIFT** The Shift key

**TABLE 3-2** Link Shortcut Properties

PROPERTY	DESCRIPTION	SAMPLE VALUE
Arguments	Arguments to pass to an application started through the shortcut.	C:\Gettingstarted.doc
Comment	Sets a descriptive comment for the shortcut.	Opens the Getting Started Document
Icon File Path	Sets the location of an icon for the shortcut. If not set, a default icon is used.	C:\Program Files\Internet Explorer\iexplore.exe
Icon Index	Sets the index position of the icon for the shortcut. Few applications have multiple icons indexed, so the index is almost always 0.	0

PROPERTY	DESCRIPTION	SAMPLE VALUE
Location	Specifies where the shortcut should be created.	Desktop
Name	Sets the name of the shortcut.	Getting Started
Run	Sets the window style of the application started by the shortcut. The available styles are Normal Window, Minimized, and Maximized.	Normal Window
Shortcut Key	Sets a hotkey sequence that activates the shortcut. This property can be used only with desktop shortcuts and Start menu options.	Alt+Shift+Z
Start In	Sets the working directory of the application started by the shortcut.	C:\Working
Target Path	Sets the path of the file to execute.	%WinDir%\Notepad.exe
Target Type	Specifies the type of shortcut you are creating. Choose File System Object for link shortcuts, URL for URL shortcuts, and Shell Object for Explorer shell shortcuts.	File System Object

Modifier keys can be combined in any combination, such as Alt+Ctrl or Shift+Ctrl, but the combination shouldn't duplicate key combinations used by other shortcuts. Key designators include the alphabetic characters (A–Z) and numeric characters (0–9), as well as End, Home, Page Up, and Page Down. For example, you could create a shortcut that uses the hotkey sequence Shift+Alt+G.

When you create shortcuts for applications, the applications normally have a default icon that is displayed with the shortcut. For example, if you create a shortcut for Windows Internet Explorer, the default icon is a large E. When you create shortcuts to document files, the Windows default icon is used in most cases.

If you want to use an icon other than the default icon, you can use the Icon Location property. Normally, the icon location equates to an application name, such as `explore.exe` or `Notepad.exe`, and the icon index is set to 0. Windows has to be able to find the executable. If the executable can't be found in the path, the icon can't be set. Because of this, be sure to enter the full path to the executable.

The working directory sets the default directory for an application. This directory is used the first time that a user opens or saves files.

URL shortcuts open Internet documents in an appropriate application. For example, webpages are opened in the default browser, such as Internet Explorer. With URL shortcuts, you can't use the Arguments, Start In, Run, or Comment properties.

## Adding and Removing Startup Applications

Administrator-installed or user-installed applications that run in the background can be managed through the Startup folder. Startup programs that are made available only to the currently logged-on user are placed in the Startup folder that is located within the profile data for that user (%UserProfile%\AppData\Roaming\Microsoft\Windows\Start Menu\Programs), and startup programs that are available to any user that logs on to the computer are placed in the Startup folder for all users (%SystemDrive%\ProgramData\Microsoft\Windows\Start Menu\Programs).

To add or remove startup programs for all users, follow these steps:

1. In File Explorer, browse to the hidden %SystemDrive%\ProgramData\Microsoft\Windows\Start Menu folder. If hidden items aren't being displayed, tap or click View, and then select Hidden Items.
2. In the left pane, tap or click the Programs folder under Start Menu, and then tap or click Startup.
3. You can now add or remove startup programs for all users. To add startup programs, create a shortcut to the program that you want to run. To remove a startup program, delete its shortcut from the Startup folder.

To add or remove startup programs for a specific user, follow these steps:

1. Log on as the user whose startup applications you want to manage. In File Explorer, browse to the hidden %UserProfile%\AppData\Roaming\Microsoft\Windows\Start Menu folder.
2. In the left pane, tap or click the Programs folder under Start Menu, and then tap or click Startup.
3. You can now add or remove startup programs for this user. To add startup programs, create a shortcut to the program that you want to run. To remove a startup program, delete its shortcut from the Startup folder.

**NOTE** Technically, you don't need to log on as the user to manage that user's startup applications—it's just easier if you do. If you can't log on as the user, access the Users folder on the system drive and work your way down through the user profile data folders. These are listed by account name.

Using Group Policy preferences, you specify applications that should be started after a user logs on by creating shortcuts in the AllUsersStartup and Startup folders. The AllUsersStartup folder sets startup applications for all users that log on to a system. The Startup folder sets startup applications for the current user.

When you create a shortcut for startup applications, the only options you need to set in most cases are Name, Target Type, Location, and Target Path. Occasionally you may also want to set a working directory for an application or specify startup arguments.

If you later want to remove a startup application, you delete it by creating a preference with the action set to Delete.

# Customizing the Taskbar

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The taskbar provides quick access to frequently needed information and active applications. You can change the taskbar's behavior and properties in many ways. This section explores key techniques you can use to do this.

## Understanding the Taskbar

The taskbar is one of the least appreciated areas of the Windows desktop. Users and administrators tend to pay very little attention to its configuration, yet we use it day in and day out, relying on it for quick access to just about everything we do with the Windows operating system. If you find that users are having frequent problems accessing Windows features or running applications, you can help them by tailoring the taskbar to their needs. The Windows taskbar can contain several toolbars that can assist the user in different ways.

Sometimes you can provide tremendous productivity increases simply by adding a frequently used item to the taskbar. For example, most people spend a lot of time finding and reading documents. They browse the web or their corporate intranet to find the latest information. They open documents in Microsoft Word, Excel, PowerPoint, or other applications, finding documents individually or starting applications to read those documents as well. By adding an Address bar to the taskbar, users can access documents directly and start the appropriate application automatically. They just need to type the document path and press Enter. As time passes, the history feature of the Address bar tracks more and more of the user's previously accessed documents, making it easier to find the information the user needs.

## Pinning Shortcuts to the Taskbar

Windows 8 does not have a Quick Launch toolbar. Instead, Windows 8 allows you to pin commonly used programs directly to the taskbar. You can do this whenever you are working with the Start screen. Simply press and hold or right-click an item you want to add to the taskbar, and then tap or click Pin To Taskbar. Once you pin an item to the taskbar, you can change the item's position on the taskbar by tapping or clicking and dragging the program's icon. To unpin an item, press and hold or right-click the item on the taskbar, and then tap or click Unpin This Program From Taskbar.

## Changing the Taskbar's Size and Position

By default, the taskbar appears at the bottom of the screen and is sized so that one row of options is visible. As long as the taskbar's position isn't locked, you can dock it at any edge of the Windows desktop and resize it as necessary. To move the taskbar, simply tap or click it and drag it to a different edge of the desktop. As you drag the taskbar, you'll see the taskbar at the edge of the Windows desktop, and when you release the mouse button, the taskbar will appear in the new location. To resize the taskbar, move the mouse pointer over the taskbar's edge, and then drag it up or down.

## Auto Hiding, Locking, and Controlling Taskbar Visibility

When you want to control the visibility of the taskbar, you have several options. You can enable the Auto Hide feature to hide the taskbar from view when it is not in use. You can lock the taskbar so that it can't be resized or repositioned. You can also make the taskbar appear in a specific location and with a specific appearance. Once the taskbar is positioned and sized the way a user wants it, you should lock it. In this way, the taskbar has a fixed location, and users don't have to hunt for it.

To configure the taskbar, follow these steps:

1. Press and hold or right-click the taskbar, and then tap or click Properties.
2. On the Taskbar tab, select the appropriate Taskbar appearance options. You can lock the taskbar, auto-hide the taskbar, and use small icons.
3. Use the Taskbar Location On Screen list to select the location for the taskbar on the desktop. You can select Bottom, Left, Right, or Top.
4. Use the Taskbar Buttons list to specify whether taskbar buttons are combined and labels are hidden. Choose Always Combine, Hide Labels to always combine buttons of the same type and hide their labels. Choose Combine When Taskbar Is Full to combine buttons only when the taskbar is full. Choose Never Combine to never combine buttons.
5. Tap or click OK.

**TIP** Locking the taskbar is one of the most useful taskbar options. If you lock the taskbar once it is optimized, users will have fewer problems caused by accidentally altering taskbar options. Locking the taskbar doesn't prevent users from changing the taskbar on purpose. If users really want to change the taskbar, all they need to do is press and hold or right-click the taskbar and then clear Lock The Taskbar.

## Controlling Programs in the Notification Area

The notification area or system tray is the area on the far right of the taskbar that shows the system clock and notification icons from applications. The two standard notification icons are for Action Center and the Network console. When you point to icons in the notification area, a tooltip provides information about the state of the application. To control an application in this area, press and hold or right-click the application icon to display a menu of available options. Each application has a different menu of options, most of which provide quick access to routine tasks.

You can optimize the notification area by setting properties that control whether system icons—such as for the clock, volume, and network—are displayed and whether application icons are displayed or hidden.

## Controlling Icon Display in the Notification Area

The notification area can display both application and system icons. Icons for applications appear in the notification area for several reasons. Some programs, such as Action Center, are managed by Windows itself, and their icons appear periodically when notifications are pending. Other types of programs, such

as an antivirus program, are configured to load at startup and then run in the background. You can often enable or disable the display of icons through setup options for the related applications, but Windows 8 provides a common interface for controlling icon display in the notification area. You can specify whether and how icons are displayed on a per-application basis.

To control the display of icons in the notification area, follow these steps:

1. Press and hold or right-click the taskbar, and then tap or click Properties.
2. On the Taskbar tab, for the Notification Area setting, tap or click Customize to display the Notification Area Icons page, as shown in Figure 3-3.

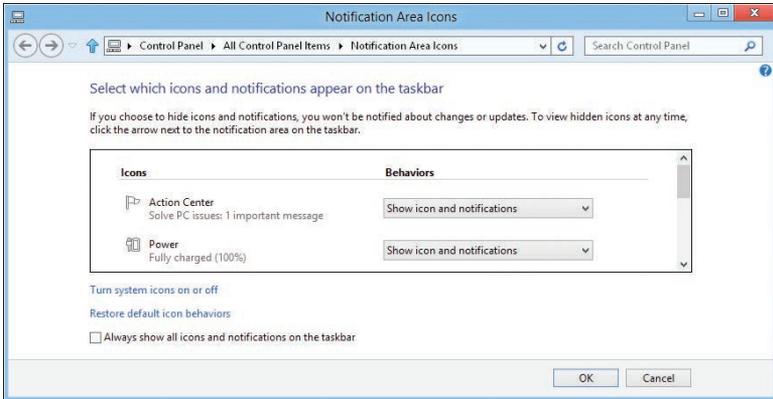


FIGURE 3-3 Configure notification icons.

3. If you want all icons to be displayed, select Always Show All Icons And Notifications On The Taskbar, and then tap or click OK. Skip the remaining steps.
4. If you want to customize the appearance of icons, clear Always Show All Icons And Notifications On The Taskbar. You can now optimize the notification behavior. Each entry in the left column has a selection menu in the right column with the following options:
  - **Hide Icon And Notifications** Never displays the icon and notifications
  - **Only Show Notifications** Displays only notifications
  - **Show Icon And Notifications** Always displays the icon and notifications
5. When you have finished updating the notification entries, tap or click OK twice.

## Optimizing Toolbars

Several toolbars are available for the taskbar. The toolbar that most users are familiar with is the Quick Launch toolbar—available in prior versions of Windows but not in Windows 8—that provided quick access to commonly used programs and

the Windows desktop. The taskbar can display any of several toolbars that come with Windows 8, and users can create their own toolbars as well.

## Displaying Toolbars

Toolbars available for the taskbar include:

- **Address** Provides an Address box into which you can type a URL or other address that you want to access, either on the web, on the local network, or on the local computer. When full file paths are specified, the default application for the file is started to display the specified file.
- **Links** Provides access to the Links folder on the Favorites menu for Internet Explorer. To add links to files, webpages, or other resources, drag shortcuts onto the Links toolbar. To remove links, press and hold or right-click the link and tap or click Delete. When prompted, confirm the action by tapping or clicking Yes.
- **Desktop** Provides access to all the shortcuts on the local desktop so that you don't have to minimize application windows or tap or click the Show Desktop button on the right end of the taskbar to access them.
- **Touch Keyboard** Provides quick access to the touch keyboard.

To display or hide individual toolbars, follow these steps:

1. Press and hold or right-click the taskbar to display the shortcut menu.
2. Point to Toolbars, and then select the toolbar name in the list provided. This toggles the toolbar on and off.

**TIP** By default, a name label is displayed for most toolbars. You can turn off the name label by pressing and holding or right-clicking the toolbar and then choosing Show Title to clear that command. If the taskbar is locked, you must first unlock it by clearing Lock The Taskbar on the shortcut menu.

## Creating Personal Toolbars

You can create personal toolbars for users as well. Personal toolbars are based on existing folders, and their buttons are based on a folder's contents. The toolbars that you might create most often are ones that point to shared folders on the network. For example, if all users have access to CorpData, a shared folder in which corporate information is stored, and UserData, a folder in which personal information is stored, you can add toolbars to the taskbar that point to these resources. When users want to access one of these folders, they can simply tap or click the corresponding toolbar button.

You can create personal toolbars by completing these steps:

1. Press and hold or right-click the taskbar to display the shortcut menu. Point to Toolbars, and then tap or click New Toolbar. This displays the New Toolbar—Choose A Folder dialog box, which is similar to the Open dialog box.

2. Use the options provided to navigate to and select the folder you want to use as a basis for a toolbar.
3. When you tap or click Select Folder, the folder is displayed as a new toolbar on the taskbar. If you add shortcuts to the toolbar view, the shortcuts are added to the folder. Similarly, if you delete items from the toolbar view, the items are removed from the folder.

**NOTE** When it comes to personal toolbars, there's good news and bad news. The good news is that most users find them valuable. The bad news is that if a user decides to close a toolbar, it must be re-created before it can be viewed on the taskbar again.

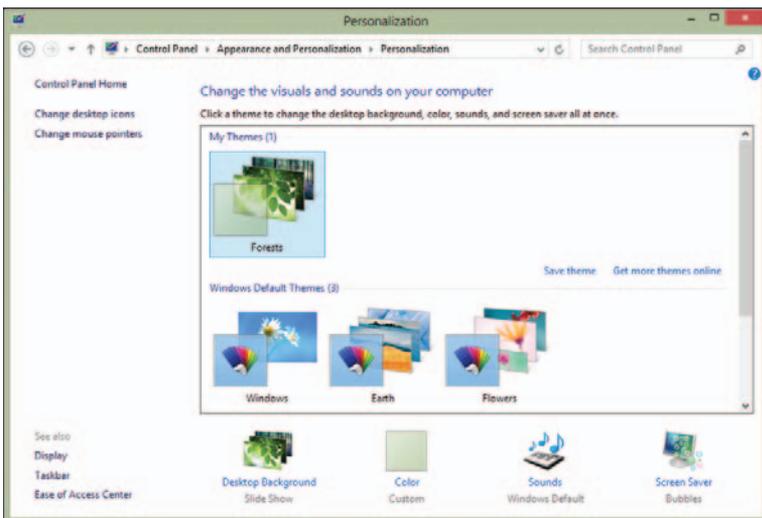
## Working with Desktop Themes

Desktop themes are combinations of backgrounds plus sets of sounds, icons, and other elements that help personalize the desktop and the operating environment. Administrators tend to hate themes; users tend to love them. In this section, you'll learn how to apply themes, how to tailor individual theme options, and how to delete themes.

### Applying and Removing Themes

Several types of themes are available. Some themes are installed with the operating system. To apply a theme, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize. This opens the Personalization console in Control Panel, shown in Figure 3-4.



**FIGURE 3-4** Use the Personalization console to access dialog boxes for configuring themes, display settings, and more.

2. Use the theme list to select the theme you want to use. If you want to use a theme from the Microsoft website, tap or click Get More Themes Online to open the Microsoft website in your default browser. To use an online theme, select it, and then tap or click Save. When prompted, select a save location. When the download is complete, tap or click Open in the Download Complete dialog box. The theme is now available for use and applied.
3. The lower portion of the Personalization console provides appearance options for the selected theme. To change one of these items, tap or click it.

To restore the original desktop theme, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize.
2. Select Windows as the theme.

**TIP** Because the display of themes is controlled by the Themes service, you can stop this service if you need to quickly turn off themes without changing their configuration, such as when you are troubleshooting or trying to resolve an issue. To stop the Themes service, type the following command at an elevated command prompt: **net stop themes**. To restart the Themes service, type the following command at an elevated command prompt: **net start themes**.

## Tailoring and Saving Themes

When you apply a theme to the Windows desktop, many different system settings can be affected. Typically, users might like a theme but dislike a specific aspect of it, such as the sounds. To fix this, you can change the system setting that the user doesn't like and then save the updated theme so that he or she can restore it in the future.

You manage themes using the Personalization console, which you open by pressing and holding or right-clicking an area of the desktop and then tapping or clicking Personalize. In the Personalization console, the primary settings that themes affect are as follows:

- **Screen savers** To change the screen saver, tap or click Screen Saver. In the Screen Saver Settings dialog box, select a screen saver, or select None to remove the screen saver, and then tap or click OK.
- **Sounds** To change sounds, tap or click Sounds. In the Sound dialog box, use the Sound Scheme list box to select a different set of program event sounds. To restore the default, select Windows Default. To turn off program event sounds, select No Sounds. Tap or click OK. If you are turning off sounds, you might also want to clear the Play Windows Startup Sound check box.
- **Mouse pointers** To change mouse pointers, tap or click Change Mouse Pointers in the left pane. In the Mouse Properties dialog box, use the Scheme list box on the Pointers tab to select a different set of pointers. Tap or click OK.

- **Desktop background** To change the desktop background, tap or click Desktop Background. Use the Picture Location list to select the location of the pictures to use for a background. Tap or click Browse to display the Browse For Folder dialog box. You can also choose Windows wallpapers to use as backgrounds from the %SystemRoot%\Web\Wallpaper folder, which is where standard backgrounds included with Windows 8 are stored by default. Tap or click the background you want to use, set the picture position, and then tap or click Save Changes.
- **Color schemes** To change color schemes, tap or click Color. Tap or click the color you want to use, and then tap or click Save Changes.

## Deleting Custom Themes

Themes that users install from other locations can take up a lot of space on the hard disk. To delete a theme and remove the theme-related files, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize.
2. Under My Themes, press and hold or right-click the theme to be deleted, and then tap or click Delete Theme. Windows removes that theme's definition file and the theme-related media files.

**TIP** By default, definition files for themes installed by Windows are located in the %WinDir%\Resources\Themes folder, and themes created by users are stored in their user profiles. If you want to determine the total space used by themes, check the space used by these folders and their subdirectories. You shouldn't delete files from these folders manually. Instead, use the technique just described.

## Optimizing the Desktop Environment

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When you open programs or folders, they appear on the desktop. You can arrange open programs and folders on the desktop by pressing and holding or right-clicking an empty area of the taskbar and then selecting Cascade Windows, Show Windows Stacked, or Show Windows Side By Side. If you tap or click Show The Desktop, Windows minimizes all open windows and displays the desktop. Tapping or clicking Show Open Windows restores the minimized windows to their previous states.

You can put files, folders, and shortcuts on the desktop. Any file or folder that you save on the desktop appears on the desktop. Any file or folder that you drag from a File Explorer window to the desktop stays on the desktop. To add a shortcut to a file or folder to the desktop, press and hold or right-click the file or folder, point to Send To, and then tap or click Desktop (Create Shortcut).

Beyond these basic techniques, Windows 8 provides many additional ways to optimize the desktop environment. One technique is to add a background containing a corporate logo or other symbol to the standard desktop build. This is particularly useful with loaner laptops; for example, you can create a logo with

a message such as “Technology Department Loaner.” Another technique is to use Windows gadgets to add custom content directly to the desktop.

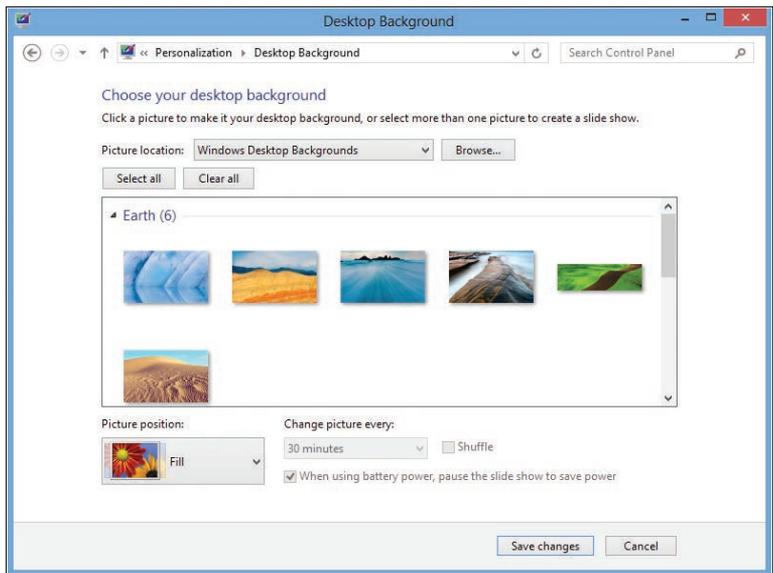
## Setting the Desktop Background

Windows 8 provides multiple sets of background images and groups these images into named sets according to the folders in which the image files are stored. On the computer’s hard disk, background images are stored in subfolders of the %WinDir%\Web\Wallpaper folder. Each folder represents a named set. For example, images in the Landscapes folder are displayed in the Landscapes set of background images.

Background images can be created as .bmp, .gif, .jpg, .jpeg, .dib, and .png files. If you add an image in one of these formats to any of the subfolders in the %WinDir%\Web\Wallpaper folder, the image will be available as part of that set. If you want to create a new set, simply create a folder under the %WinDir%\Web\Wallpaper folder and add the appropriate images to this folder.

To set the background for the desktop, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize. In the Personalization console, tap or click Desktop Background. This displays the Desktop Background page, as shown in Figure 3-5.



**FIGURE 3-5** Select which desktop background to use.

2. When you select Windows Desktop Backgrounds as the Picture Location, Windows 8 organizes desktop backgrounds into sets of similar images. Use the scroll bar to navigate between sets, such as Nature or Windows.

3. Tap or click the image you want to use as the background. If you can't find a background that you want to use, tap or click Browse to search for a background on the file system or network.
4. Use the Picture Position options to select a display option for the background. Picture Position options include:
  - **Center** Centers the image on the desktop background. Any area that the image doesn't fill uses the current desktop color.
  - **Fill** Fills the desktop background with the image. The sides of the image may be cropped.
  - **Fit** Fits the image to the desktop background. Current proportions are maintained. This is a good option for photos and large images that you want to see without stretching or expanding.
  - **Stretch** Stretches the image to fill the desktop background. The current proportions are maintained as best as possible, but the height is stretched to fill any remaining gaps.
  - **Tile** Repeats the image so that it covers the entire screen. This is a good option for small images and icons.
5. When you are finished updating the background, tap or click Save Changes.

## Working with the Default Desktop Icons

By default, only the Recycle Bin is added to the desktop. Double-tapping or double-clicking the Recycle Bin icon opens a window where you can view files and folders that you've marked for deletion. By tapping or clicking Manage and then selecting Empty The Recycle Bin, you permanently delete all the items in the Recycle Bin. By tapping or clicking Manage and then selecting Recycle Bin Properties, you can control how the Recycle Bin is used. Each volume on an internal disk has a Recycle Bin folder. If you tap or click the related folder, you can set the maximum size of the Recycle Bin on that volume or specify that files should be removed immediately when deleted.

Other common desktop icons you can add to the desktop are as follows:

- **Computer** Double-tapping or double-clicking the Computer icon opens a window where you can access hard disk drives and devices with removable storage. Right-clicking the Computer icon and tapping or clicking Manage opens the Computer Management console. Pressing and holding or right-clicking the Computer icon and tapping or clicking Map Network Drive enables you to connect to shared network folders. Pressing and holding or right-clicking the Computer icon and tapping or clicking Disconnect Network Drive enable you to remove a connection to a shared network folder.
- **Control Panel** Double-tapping or double-clicking the Control Panel icon opens Control Panel, which provides access to system configuration and management tools.
- **Network** Double-tapping or double-clicking the Network icon opens a window where you can access the computers and devices on your network. Pressing and holding or right-clicking the Network icon and tapping or

clicking Map Network Drive enable you to connect to shared network folders. Pressing and holding or right-clicking the Network icon and tapping or clicking Disconnect Network Drive enable you to remove a connection to a shared network folder.

- **User's Files** Double-tapping or double-clicking the User's Files icon opens your personal folder.

You can add or remove common desktop icons by following these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize. This displays the Personalization console.
2. In the left pane, tap or click Change Desktop Icons. This displays the Desktop Icon Settings dialog box, as shown in Figure 3-6.



**FIGURE 3-6** Use the Desktop Icon Settings dialog box to select the desktop icons to display and set their appearance.

3. The Desktop Icon Settings dialog box has check boxes for each of the default icons. Clear the corresponding check box to remove an icon. Select the check box to add an icon.
4. Tap or click OK.

You can hide all desktop icons by pressing and holding or right-clicking an open area of the desktop, pointing to View, and selecting Show Desktop Icons. If you repeat this procedure and select Show Desktop Icons a second time, all the hidden desktop icons are restored.

If you no longer want an icon or a shortcut on the desktop, press and hold or right-click it and then tap or click Delete. When prompted, confirm the action by tapping or clicking Yes. Note that if you remove an icon representing a file or folder from the desktop, the file or folder (and its contents) is deleted.

# Screen Saver Dos and Don'ts

Screen savers are designed to turn on when a computer has been idle for a specified period of time. The original job of the screen saver was to prevent image burn-in on CRT monitors by displaying a continuously changing image. With today's monitors, burn-in is no longer a problem, but screen savers are still around. The primary benefit that they offer today is the ability to password-lock computers automatically when the screen saver turns on.

## Configuring Screen Savers with Password Protection

Password-protecting a screen saver deters unauthorized users from accessing a computer, which can protect both the personal data of the user and the intellectual property of an organization. As an administrator, you should ensure that the computers you deploy have password-protected screen savers enabled.

You can password-protect a screen saver by performing the following steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize.
2. Tap or click the Screen Saver link to display the Screen Saver Settings dialog box, as shown in Figure 3-7.



**FIGURE 3-7** Set a screen saver with password protection for user and organization security.

3. Use the Screen Saver list box to select a screen saver. To disable the screen saver, select None and skip the remaining steps.

**REAL WORLD** Unfortunately, screen savers use a computer's resources, increasing both the energy usage of the computer (which otherwise would be idle) and its memory and processor usage. Some screen savers can cause the processor to run at a higher utilization percentage as well. The reason for this is that some designs are very complex and the computer must make a lot of computations to maintain and update the screen saver image. For tips on reducing resource usage when screen savers turn on, see the following sections, "Reducing Screen Saver Resource Usage" and "Setting Energy-Saving Settings for Monitors."

4. Select On Resume, Display Logon Screen.
5. Use the Wait box to specify how long the computer must be idle before the screen saver is activated. A reasonable value is between 10 and 15 minutes.
6. Tap or click OK.

**NOTE** One of the best screen savers is the Photos screen saver, which displays a slideshow of photos from the Pictures library by default, but you can select any other folder. By editing the settings, you can set the slideshow speed and choose to shuffle the pictures rather than display them in sequence.

## Reducing Screen Saver Resource Usage

A computer that is running Windows 8 and that performs background tasks or network duties such as print services should not be configured to use a complex screen saver, such as 3D Text. Instead, the computer should be configured with a basic screen saver, such as the Blank screen saver. You can also modify the settings for advanced screen savers to reduce resource usage. Typically, you do this by reducing the redraw and refresh rates of the advanced screen saver.

To reduce screen saver resource usage, follow these steps:

1. Press and hold or right-click an open area of the desktop. and then tap or click Personalize.
2. Tap or click the Screen Saver link to display the Screen Saver Settings dialog box.
3. If you want to use a screen saver that uses fewer resources without making configuration changes, use the Screen Saver list box to select a basic screen saver, such as Blank.
4. If you want to use 3D Text or another advanced screen saver but reduce its resource usage, select that screen saver and then tap or click Settings. Use the Settings dialog box to reduce the values for Resolution, Size, Rotational Speed, or similar settings that affect the drawing or refreshing of the screen saver.
5. Tap or click OK to close each of the open dialog boxes.

## Setting Energy-Saving Settings for Monitors

Many newer monitors have energy-saving features that cause them to shut off after a certain period of inactivity. Enabling this feature can reduce the organization's electricity bill because monitors typically use a lot of electricity to stay powered up. On some systems, this feature might have been automatically enabled by the operating system during installation. This depends, however, on the operating system properly detecting the monitor and installing any necessary drivers.

On a portable laptop computer running on batteries, saving energy is especially important. By configuring the monitor to shut off when the computer is idle, you can save the battery life and extend the available battery time for when the laptop is unplugged.

To manage a monitor's energy settings, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize.
2. Tap or click the Screen Saver link to display the Screen Saver Settings dialog box.
3. Tap or click Change Power Settings. The Power Options console in Control Panel is displayed.
4. In the left pane, tap or click Choose When To Turn Off Display.
5. Use the selection list provided to specify when the monitor should be turned off to save energy. Mobile computer devices may have separate on-battery and plugged-in options.
6. Tap or click Save Changes.

**NOTE** If the computer is connected to a monitor that doesn't support energy-saving settings, some power options might be unavailable. If you are configuring the computer in a build area and are using a different monitor than the one the user will have, you might want to obtain the user's monitor or a similar monitor and repeat this process.

**REAL WORLD** Typically, you'll want to turn off the monitor after 15 to 20 minutes of idle time. On my office computer, I turn on the screen saver after 7 minutes and then turn off the monitor after 15 minutes of idle time. On my laptop, I use settings of 5 minutes and 10 minutes, respectively.

## Modifying Display Appearance and Video Settings

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The display appearance and video settings have a major impact on the look and feel of the Windows 8 desktop and its graphical elements. Appearance options control window, button, color, and font settings. Video settings control screen resolution, color quality, refresh frequency, hardware acceleration, and color management.

## Configuring Window Color and Appearance

Windows Aero is an enhanced interface that provides features such as the transparent taskbar background, live previews, smoother window dragging, animated window closing and opening, and more. As part of the setup process, Windows 8 runs a performance test and checks the computer to see whether it meets the basic requirements for Windows Aero, which include:

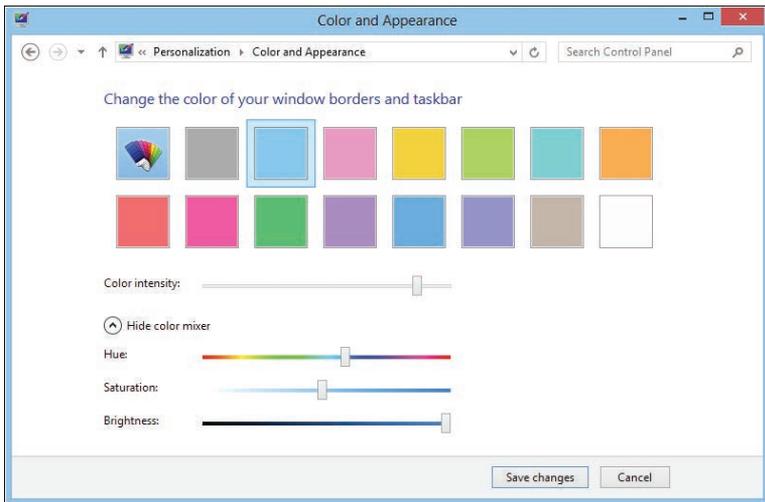
- Support for Windows Display Driver Model (WDDM). WDDM 1.0 was introduced with Windows Vista. In Windows 7 or later versions of Windows, display drivers that support WDDM 1.1 will offer improved performance while also reducing the per-window memory usage by up to 50 percent.
- Support for DirectX implemented in a graphics processing unit (GPU) with at least 128 MB of graphics memory. WDDM 1.1 supports DirectX 11. DirectX 11 offers enhancements and performance improvements over its predecessors.

**REAL WORLD** You can quickly determine how much graphics memory is available and whether a computer's display adapter supports WDDM by using Performance Information And Tools. In Control Panel, in the View By options, tap or click either Small Icons or Large Icons to open All Control Panel Items, tap or click Performance Information And Tools, and then tap or click the View And Print Detailed Performance And System Information link. In the Component list, under Graphics, you'll see the display adapter type and the level of WDDM support. In the expanded list under Graphics, you'll see additional details, including the amount of dedicated graphics memory and the DirectX version supported.

On compliant systems, Windows 8 uses the Aero desktop by default to enable advanced display features and options, including Snap, which allows you to arrange windows side by side, and Shake, which allows you to temporarily hide all open windows except the one you are working with. To snap an active window to the side of the desktop using the keyboard, press either the Windows key + Left Arrow or Windows key + Right Arrow. To shake, drag the title bar of the window you want to keep open back and forth quickly and then to restore the minimized windows, shake the open window again.

To configure color options for the display, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize.
2. Tap or click the Color link to display the Color And Appearance page, as shown in Figure 3-8.
3. Change the color of windows by tapping or clicking one of the available colors. To make your own color, tap or click Show Color Mixer, and then use the Hue, Saturation, and Brightness sliders to create a custom color.



**FIGURE 3-8** Configure the visual appearance of the display using the options on the Color And Appearance page.

4. Use the Color Intensity slider to set the strength of the color and the level of transparency. Increase the intensity to make the color stronger and to reduce the transparency. Reduce the intensity to make the color dimmer and the transparency greater.
5. Tap or click Save Changes.

To better support the visually impaired, Windows 8 includes several Ease Of Access themes, including High Contrast #1, High Contrast #2, High Contrast White, and High Contrast Black. When you use these themes, the options of the Color And Appearance page change, and you can override the default color settings for individual graphical elements, such as the window background color, text color, and active window color. To do this, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Personalize.
2. Tap or click the Color link and then set the color to use for interface elements. For example, with active windows titles, you can set foreground and background colors.
3. Tap or click OK, and then tap or click Save Changes.

## Optimizing Display Readability

Regardless of whether users have 27-inch widescreens or 19-inch displays, you may find that users have difficulty reading text on the screen. Often, the readability of text on the screen decreases when you increase the display resolution, which results in the text on the screen becoming smaller. To understand why this happens, you need to understand how DPI works.

When you print documents on a printer, the number of dots per inch (DPI) determines the print quality. Generally, the higher the DPI, the better the quality of

the printed document because images and text look crisper as you use more dots per inch. For example, a high-resolution picture printed at its normal size using 1,200 × 600 DPI generally looks much better than the same picture printed at 300 × 300 DPI. However, if you use scaling to print a 2 × 3-inch picture at 6 × 9 inches, you often get a poor result because the scaled image looks grainy.

For Windows computers, 96 DPI is the default for most monitors, and Windows 8 displays all user interface (UI) elements, including text, at 96 DPI by default. When you change the display resolution, you change the scaling at which UI elements are displayed. For example, if a monitor has an optimal resolution of 1,920 × 1,200 and you use a display resolution of 800 × 600, the UI elements will seem large and grainy because you've caused the display to scale 800 × 600 pixels into a space optimized for 1,920 × 1,200 pixels.

Generally, you can determine the optimal resolution by multiplying a monitor's screen width by 96 and a monitor's screen height by 96. For example, a 24-inch widescreen monitor may have a screen that is 20 inches wide and 12.5 inches high. If so, the optimal display resolution is 1,920 × 1,200. However, at that size, text and UI elements on the screen may seem small, and you may need to make adjustments to improve readability. One way to do this is in an application. For example, in Word, users can use the Zoom combo box to scale text to a readable size.

Windows allows you to change the size of text for specific UI elements, including the text for title bars in dialog boxes, menus, message boxes, palette titles, icons, and tooltips. As you increase or decrease the size of text in a specific part of the UI, you can improve readability. Each account on a computer has a separate setting for text size. You can specify text size for UI elements by completing the following steps:

1. In Control Panel, tap or click Appearance And Personalization. Under the Display heading, tap or click Make Text And Other Items Larger Or Smaller.
2. Tap or click the selection list under Change Only The Text Size and choose the UI element you want to work with, such as Menus.
3. Use the Font Size list to set the desired size for the text on the previously selected UI element. Optionally, select Bold to display bold text.
4. Repeat steps 2 and 3 to set the text size of additional UI elements. When you are finished, tap or click Apply.
5. You need to log off the user and then log on the user again for the changes to take effect.

Windows also allows you to use scaling to increase the size of text and other items on the screen. When you use scaling in this way, Windows magnifies the size of text and UI elements to the scale you choose. Each account on a computer has a separate setting for scaling. You can specify the scaling to use for text and UI elements by following these steps:

1. In Control Panel, tap or click Appearance And Personalization. Under the Display heading, tap or click Make Text And Other Items Larger Or Smaller.
2. The default scaling options allow you to choose a 100 percent scale (the default), a 125 percent scale, or a 150 percent scale. To use one of these scaling options, make a selection, and then tap or click Apply.

3. To choose a custom setting of between 100 percent and 500 percent, tap or click Custom Sizing Options, and then use the Scale combo box to select or specify a scale.
4. You need to log off the user and then log on the user again for the changes to take effect.

**IMPORTANT** If you choose a setting higher than 200 percent, UI elements and text may be scaled so large that you cannot work with the computer. You may even be unable to get back into Control Panel to restore the original scaling. If you have a scaling issue, enter **dpiscaling** at a command prompt or in the Apps Search box. This will open the Display page directly, and you can then reset the scaling.

**REAL WORLD** If you've enabled scaling and the text in an application is blurred or unreadable, you may want to disable display scaling for that application. To do this, press and hold or right-click the application shortcut, and then tap or click Properties. On the Compatibility tab, select Disable Display Scaling On High DPI Settings, and then tap or click OK.

## Configuring Video Settings

Video settings control screen resolution, color quality, refresh rate, hardware acceleration, and color management. This section focuses on making sure that Windows 8 has correctly identified the video card and monitor, and on optimizing various video settings.

### Checking the Current Video Adapter and Monitor

Every computer has a monitor driver and a video adapter driver. The monitor driver tells Windows about the capabilities of the monitor. The video adapter (or display) driver tells Windows about the capabilities of the graphics card.

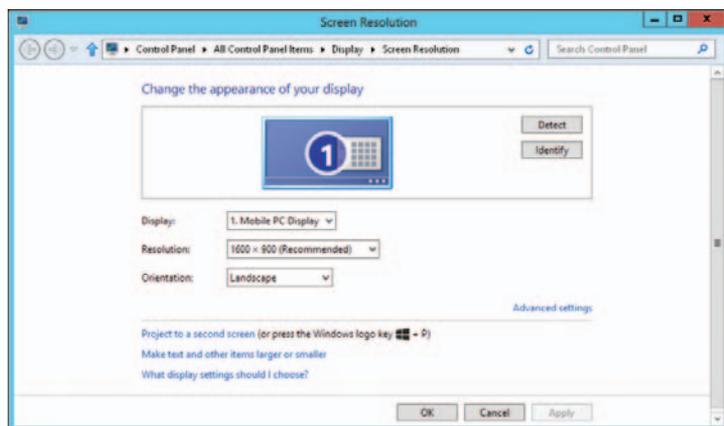
Proper display is dependent on the computer using accurate information about the video adapter and the monitor. Different driver files are installed depending on which video adapter and monitor models Windows 8 detects on a system. These drivers are extremely important in determining which display resolutions, color depths, and refresh rates are available and appropriate for the system. If the adapter and monitor aren't detected and configured properly, Windows 8 won't be able to take advantage of their capabilities.

Current settings for the video adapter or monitor can be wrong for many reasons. Sometimes Plug and Play doesn't detect the device, and a generic device driver is used. At other times, Windows 8 detects the wrong type of device, such as a different model. In this case, the device will probably work, but some features won't be available.

To check the current video adapter and monitor configured for a computer, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Screen Resolution.
2. On the Screen Resolution page, shown in Figure 3-9, the currently identified monitors are listed in the Display list. The resolution and orientation are listed in the Resolution and Orientation lists. If the correct monitor isn't

displayed or you want to examine the monitor settings further, see the “Changing the Monitor” section later in this chapter.



**FIGURE 3-9** Check the monitor and video adapter configuration.

3. Select a monitor in the Display list, and then tap or click the Advanced Settings link. The video adapter for the monitor is listed. If the correct video adapter isn't displayed or you want to examine the driver settings further, see the next section, “Changing the Video Driver.”
4. Tap or click OK twice.

## Changing the Video Driver

If you followed the previous instructions and the video driver shown does not match the make and model installed on the computer, you might want to try to install a different driver. For example, if the computer has a generic S3 video driver configured and you are sure the computer has an NVIDIA GeForce video adapter, you should change the video driver.

To determine whether the video card make and model are correct, you need to know how the system is configured. The system documentation can tell you which video adapter is installed. Other administrators are also useful resources. Typically, someone else on the technology team will know immediately what video adapter is installed on a particular type of computer. If you can't figure out the make and model of the video adapter, you have several options. If the current settings are working, you can leave the display settings alone. You can also try the following techniques to determine the video adapter's make and model:

- Shut down the computer, and then turn it back on (but don't use the Restart option to do this because some computers may not fully initialize when you select Restart). Watch the screen when the computer first turns on. The name of the video card might appear briefly before Windows 8 begins loading.
- Shut down the computer, and then remove the computer cover. Locate the name and model number on the video adapter itself. If the monitor is still

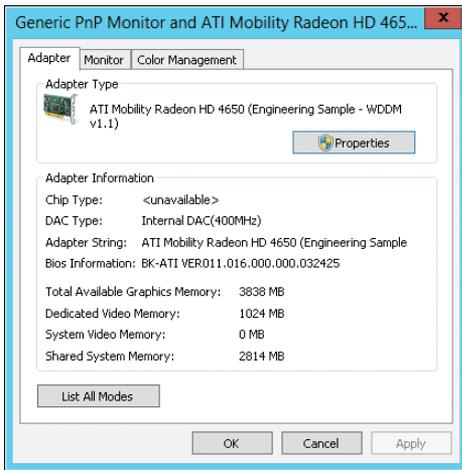
attached to the rear of the computer, the video adapter is the card to which the monitor cable is connected.

- If the video adapter is built into the computer's motherboard (meaning that there isn't a separate card), check the motherboard to see whether you can find a chip that lists the video information on it, or write down the motherboard model number and visit the manufacturer's website to see whether the information is available.

Once you determine the video adapter's make and model, see whether you can locate the necessary drivers on the manufacturer's website. Some video adapters come with installation discs. On the disc, you might find a setup program. Run this program to install the video driver. If the installation disc contains the drivers but no setup program, you need to install the drivers manually.

When you are ready to install the video adapter driver, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Screen Resolution.
2. On a system with multiple monitors or video cards, use the Display list to select the monitor with which you want to work.
3. Tap or click Advanced Settings. On the Adapter tab, shown in Figure 3-10, note the current information in the Adapter Type and Adapter Information panels. Tap or click Properties.



**FIGURE 3-10** Note the current adapter information.

4. On the Driver tab, tap or click Update Driver. This starts the Update Driver Software Wizard.
5. Specify whether you want to search for the driver automatically or browse for the driver.
6. If you elect to search for the driver automatically, Windows 8 looks for a more recent version of the device driver and installs the driver if it is found.

- If a more recent version of the driver is not found, Windows 8 keeps the current driver. In either case, tap or click Close to complete the process, and then skip the remaining steps.
7. If you choose to browse for the driver, you can do so in either of the following ways:
    - **Search for the driver** If you want to search for the driver, tap or click Browse to select a search location. Use the Browse For Folder dialog box to select the start folder for the search, and then tap or click OK. Because all subfolders of the selected folder are searched automatically by default, you can select the drive root path, such as C, to search an entire drive. If you don't want to search all subfolders, clear the Search All Subfolders option.
    - **Choose the driver to install** If you want to choose the driver to install, tap or click Let Me Pick From A List Of Device Drivers On My Computer. The wizard then displays a list of compatible hardware. Tap or click the device that matches your video card. To view a wider array of choices, clear the Show Compatible Hardware check box. You'll then see a list of all video card manufacturers. Scroll through the list of manufacturers to find the manufacturer of the device, and then choose the appropriate device in the right pane.
  8. After selecting a device driver, continue through the installation process by tapping or clicking Next. Tap or click Close when the driver installation is complete. If the wizard can't find an appropriate driver, you need to obtain one and then repeat this procedure. Keep in mind that in some cases, you need to restart the system to activate the newly installed or updated device driver.

## Changing the Monitor Driver

The overall display quality is controlled by the combined capabilities of a computer's monitor and video adapter. Most computers have at least one monitor connection available. The type of connections supported may include the following:

- High-Definition Multimedia Interface (HDMI) is the current digital standard for connecting video devices. HDMI can be used for computer displays, but it is better suited to other high-end video devices. Although HDMI can be adapted to a Digital Video Interface (DVI) connection, most computers that have an HDMI connector also have at least one DVI connector.
- Digital Video Interface (DVI) is the digital standard for computer-generated text and graphics. There are several formats for DVI. DVI-I and DVI-A can be adapted to VGA. However, DVI-D cannot be adapted to Video Graphics Array (VGA). Dual-Link DVI supports high-resolution monitors and is required on some very large displays for optimum picture quality. Because DVI cables can support one or more of these types at the same time, you should check your cables carefully to be sure you're using the correct ones.
- The 15-pin Video Graphics Array (VGA) is the analog standard for connecting monitors to computers. There are 9-pin VGA cables, and they are compatible with the 15-pin connector. It is still very common for monitors to have this connector, but newer connections like DVI and HDMI are recommended if available.

**NOTE** A computer's monitor may have shipped with a VGA cable connected to it. If it is not the optimal connection type and the cable is designed to be removed, remove the VGA cable.

**TIP** Many computers have inputs for DisplayPort adapters. A DisplayPort adapter supports automatic adaptation to VGA, DVI, or HDMI depending on what type of display is connected to the port and what type of adapter is used between the display connector and the input connector on the back of the computer.

If a computer has a Plug and Play monitor, Windows 8 might have detected it and installed it properly, or it might have installed a similar driver, but not the one that matches the monitor's make and model. For the best quality, Windows 8 should use the driver designed for the applicable monitor. Otherwise, the display mode, color depth, refresh rate, and color-matching options might not be appropriate for the monitor.

To change the monitor setup, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Screen Resolution.
2. On a system with multiple monitors or video cards, use the Display list to select the monitor with which you want to work.
3. Tap or click Advanced Settings. On the Monitor tab, tap or click Properties.
4. On the Driver tab, tap or click Update Driver. This starts the Update Driver Software Wizard.
5. Continue with the driver update, as described in steps 5–8 of the previous procedure.

## Configuring Multiple Monitor Support

Most modern computers come with a video adapter that supports two monitors. You'll know this because the adapter will have multiple monitor connection ports. On these computers, you can connect multiple monitors and then extend a user's desktop across those monitors so that the user can see more information at one time. If you've connected multiple monitors to a computer, the Screen Resolution page will show one box for each monitor. The first monitor is labeled 1, the second is labeled 2, and so on. If you tap or click the monitor box, you can work with the monitor in the same way you would if you had selected the monitor from the Display list.

If a monitor you've connected doesn't have its own box, check the monitor connection and then turn the monitor on. Then, when you tap or click Detect, Windows should automatically detect the monitor.

If you've connected multiple monitors and are unsure which monitor is which, you can tap or click Identify to display the numeric identifier of each monitor on the monitor's screen. The numeric identifier appears as a large white numeral. If you find that the screens are represented in a different position than they are configured, you can drag the monitor boxes on the Screen Resolution page so that their position matches the physical layout of the monitors.

After you configure the monitors, you may want to extend the display across their screens. To do this, tap or click the box representing the second monitor (or select the second monitor in the Display list), and then select Extend These Displays from the Multiple Displays list. Generally, you will want screen 1 to be marked This Is Currently Your Main Display.

After you've configured your monitors, you'll find that pressing the Windows logo key + P is a convenient way to change the monitor configuration quickly. After pressing the Windows log key + P, you can use any of the following options:

- Select PC Screen Only, to use only the main computer monitor or the built-in screen on a laptop
- Select Duplicate, to display the main computer monitor or the built-in screen on a laptop to a second monitor
- Select Extend, to extend the display across two monitors
- Select Second Screen Only, to display only on an external monitor or projector

With touch UI, you can access similar options by sliding in from the right, tapping devices, and then tapping Second Screen.

## Customizing Display Appearance

Screen resolution, color quality, and refresh rate are key factors that affect display appearance. *Screen resolution* is the number of pixels that make up the display. *Color quality* is the number of colors that can be displayed simultaneously on the screen. *Refresh rate* is the rate at which the screen is repainted.

Windows 8 automatically optimizes display settings for each of your monitors by selecting a screen resolution, color quality, and refresh rate that seem most appropriate based on its testing. Normally, the settings that Windows selects work well, but they might not be the optimal settings for your computer.

The best resolution to use depends on the size of the monitor and what the user plans to do with the computer. Designers and developers who need a large screen area will appreciate a higher resolution, such as 1,920 × 1,200. They can then see more of what they're working with on the screen. Users who spend most of their time reading email or working with Word documents might prefer a lower resolution, such as 1,280 × 1,024. At that resolution, screen elements are easier to see, and users will have less eyestrain. On a widescreen monitor, be sure to select a resolution that is appropriate for widescreen viewing.

Color quality depends greatly on screen resolution settings. Even though most current video cards display 32-bit color at a variety of screen resolutions, some video cards might not be capable of displaying 32-bit color at their maximum screen resolution. Video cards may display fewer colors when you set the screen resolution higher. In most cases, the higher the color quality that you can set, the better. Keep in mind that the amount of video memory required to maintain the video display is determined by multiplying the number of pixels on the screen (based on screen resolution) by the number of bits per pixel (determined by color quality). Furthermore, the maximum combination of resolution and color quality allowed is a function of the video memory on the video adapter.

You can set the screen resolution and color quality by completing the following steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Screen Resolution.
2. On a system with multiple monitors or video cards, use the Display list to select the monitor with which you want to work.
3. Tap or click Resolution, and then use the Resolution slider to set the display size, such as 1,024 × 768 pixels. Note that if the Resolution option is dimmed, you cannot change the resolution.
4. To view the display modes available for 32-bit color, tap or click Advanced Settings. On the Adapter tab, tap or click List All Modes. Note the screen resolutions that support 32-bit color.
5. Tap or click OK twice.

Your eyes can't perceive the display refresh, but a low refresh rate (under 72 Hz) can sometimes make your eyes tired if you look at the display too long. To view or set the refresh rate for a video card, follow these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Screen Resolution.
2. On a system with multiple monitors or video cards, use the Display list to select the monitor with which you want to work.
3. Tap or click Advanced Settings. On the Adapter tab, tap or click List All Modes. The resolution sizes and refresh rates supported by the monitor are listed.
4. On the Monitor tab, use the Screen Refresh Rate list box to set the refresh rate.

**CAUTION** In many cases, the Hide Modes That This Monitor Cannot Display check box is disabled so that it cannot be selected. If you are able to clear this check box, keep in mind that if the refresh rate exceeds the capabilities of the monitor or the video card, the screen can become distorted. Additionally, running the computer at a higher refresh rate than it supports can damage the monitor and video adapter.

Color profiles allow you to get truer colors for specific uses. For example, you might need to more accurately match on-screen colors to print colors, and a color profile designed for this purpose can help you do that. After you obtain the color profile, you must install it on each monitor separately by following these steps:

1. Press and hold or right-click an open area of the desktop, and then tap or click Screen Resolution. Display 1 is selected by default. Tap or click 2 to configure settings for the second monitor.
2. Tap or click Advanced Settings. On the Color Management tab, tap or click Color Management.
3. In the Color Management dialog box, select the All Profiles tab to get information about currently installed color profiles. Tap or click Add.

4. In the Install Profile dialog box, find the color profile that you want to use and then tap or click Add.
5. In the Color Management dialog box, select the Devices tab. Tap or click the new profile, and then tap or click Set As Default Profile.

If you don't have a color profile and still would like the benefits of one, use the Display Color Calibration tool to fine-tune display colors to your liking. You can access this tool by typing **Dccw.exe** in the Apps Search box and pressing Enter.

## Troubleshooting Display Problems

As I stated previously, every computer has a monitor driver and a video adapter driver. The monitor driver tells Windows about the capabilities of the monitor. The video adapter (or display) driver tells Windows about the capabilities of the graphics card.

Clearly, the monitor driver and video adapter driver have important roles on a computer. When you are installing video components or updating a computer, you should be sure that the computer has drivers that have been tested in your environment and proven to be reliable. If you suspect a problem with the drivers, update the drivers if possible. If you suspect the problem is due to the configuration of the computer, start the computer in safe mode and then modify the default settings.

Before you start detailed diagnostics and troubleshooting, determine what programs the user has been running. Programs created for versions of Windows prior to Windows XP may cause compatibility issues. Close all running programs and check questionable programs to see what display mode they are using. If a program requires an alternative display mode and switching into and out of this display mode is causing problems, you may be able to configure compatibility settings to resolve the problem. Press and hold or right-click the application shortcut, and then tap or click Properties. In the Properties dialog box, select the Compatibility tab. On the Settings panel, choose the appropriate option, such as Run In 640 x 480 Screen Resolution. If you are unsure which compatibility settings to use, press and hold or right-click the application shortcut, tap or click Troubleshoot Compatibility, and then follow the prompts in the Program Compatibility Wizard.

Many problems with monitors have to do with the connection between the monitor and the computer. If the monitor displays blotches, color spots, diagonal lines, or horizontal bars, or has other similar display problems, you'll want to check the monitor connection first. After you are sure the connections are all right, turn the monitor off for at least 10 seconds, and then turn the monitor back on. If you still are experiencing a problem and think that the problem has to do with the monitor itself, you can try to resolve it through additional troubleshooting.

Monitor flicker or jitter or a shaky image can be caused by configuration issues as well as positional issues. If the monitor refresh rate is causing the problem, you can resolve it by changing the refresh rate settings, as discussed in the "Changing the Display Refresh Rate" section earlier in this chapter. If a positional issue is causing the problem, you can resolve the problem by moving the cables and devices that

may be causing electromagnetic interference, including power cables for other devices, large speakers, or desk lamps. If the problem persists, make sure the monitor has a shielded cable and that it is positioned away from air-conditioning units, large fluorescent lights, and so on.

If the monitor has built-in controls, check for an auto-tuning setting. Often, this will be a separate button, and when you push this button, the monitor will automatically adjust itself.

If blotches of color, color spots, or lines are the problem and resetting the connections doesn't work, you might need to perform a monitor degauss. This operation removes the buildup of stray magnetic fields around the monitor, which can distort the video image. Some monitors autodegauss by turning the monitor off and then on, some have a manual control only, and some combine both of these features. You may find a control labeled Degauss, or there may be a menu option within the monitor's software controls. While the monitor is degaussing, the screen may become distorted temporarily. This is normal behavior during the degauss process. If you manually degauss, wait 15 to 20 minutes before attempting a second degauss.

If problems persist, connect the monitor directly to the computer. Remove any extension cables connected between the monitor and the video adapter. Also, remove any antiglare screens or other similar devices that cover the monitor's screen. Check the video data cable for bent, broken, or missing pins. Although some pins are missing as part of the design, other pins that are missing or bent will cause display problems. If there are bent pins and the pins are repairable, turn the monitor off, unplug the monitor from the power source, and use tweezers or pliers to straighten the pins.

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# About the Author

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