

CHAPTER 21

Troubleshooting and Recovering from Problems

If it was so, it might be; and if it were so, it would be; but as it isn't, it ain't. That's logic.

—Lewis Carroll

A long time ago, somebody proved mathematically that it was impossible to make any reasonably complex software program problem-free. As the number of variables increase, as the interactions of subroutines and objects become more complex, and as the underlying logic of a program grows beyond the ability of a single person to grasp all at once, errors inevitably creep into the code. Given Windows 7's status as possibly the most complex software ever created, the bad news is that there are certainly problems lurking in the weeds. However, the good news is that the overwhelming majority of these problems are extremely obscure and appear only under the rarest circumstances.

This doesn't mean that you're guaranteed a glitch-free computing experience—far from it. Third-party programs and devices cause the majority of computer woes, either because they have inherent problems themselves or because they don't get along well with Windows 7. Using software, devices, and device drivers designed for Windows 7 can help tremendously, as can the maintenance program I outlined in Chapter 7, "Maintaining Your Windows 7 System." But computer problems, like the proverbial death and taxes, are certainties in life, so you need to know how to troubleshoot and resolve the problems that will inevitably come your way. In this chapter, I help you do just that by showing you my favorite techniques for determining problem sources, and by taking you through all of Windows 7's recovery tools.

IN THIS CHAPTER

- ▶ Troubleshooting Strategies: Determining the Source of a Problem
- ▶ General Troubleshooting Tips
- ▶ More Troubleshooting Tools
- ▶ Troubleshooting Using Online Resources
- ▶ Recovering from a Problem

The Origins of the Word *Bug*

Software glitches are traditionally called *bugs*, although many developers shun the term because it comes with too much negative baggage these days. Microsoft, for example, prefers the euphemistic term *issues*. There's a popular and appealing tale of how this sense of the word *bug* came about. As the story goes, in 1947 an early computer pioneer named Grace Hopper was working on a system called the Mark II. While investigating a problem, she found a moth among the machine's vacuum tubes, so from then on glitches were called bugs. A great story, to be sure, but this tale was *not* the source of the "computer glitch" sense of "bug." In fact, engineers had already been referring to mechanical defects as "bugs" for at least 60 years before Ms. Hopper's discovery. As proof, the *Oxford English Dictionary* offers the following quotation from an 1889 edition of the *Pall Mall Gazette*:

"Mr. Edison, I was informed, had been up the two previous nights discovering 'a bug' in his phonograph—an expression for solving a difficulty, and implying that some imaginary insect has secreted itself inside and is causing all the trouble."

Troubleshooting Strategies: Determining the Source of a Problem

One of the ongoing mysteries that all Windows users experience at one time or another is what might be called the "now you see it, now you don't" problem. This is a glitch that plagues you for a while and then mysteriously vanishes without any intervention on your part. (This also tends to occur when you ask a nearby user or someone from the IT department to look at the problem. Like the automotive problem that goes away when you take the car to a mechanic, computer problems will often resolve themselves as soon as a knowledgeable user sits down at the keyboard.) When this happens, most people just shake their heads and resume working, grateful to no longer have to deal with the problem.

Unfortunately, most computer ills aren't resolved so easily. For these more intractable problems, your first order of business is to track down the source of the glitch. This is, at best, a black art, but it can be done if you take a systematic approach. Over the years, I've found that the best approach is to ask a series of questions designed to gather the required information or to narrow down what might be the culprit. The next few sections take you through these questions.

Did You Get an Error Message?

Unfortunately, most computer error messages are obscure and do little to help you resolve a problem directly. However, error codes and error text can help you down the road, either by giving you something to search for in an online database (see "Troubleshooting Using Online Resources," later in this chapter) or by providing information to a tech support

person. Therefore, you should always write down the full text of any error message that appears.

TIP

If the error message is lengthy and you can still use other programs on your computer, don't bother writing down the full message. Instead, while the message is displayed, press Print Screen to place an image of the current screen on the clipboard. Then open Paint or some other graphics program, paste the screen into a new image, and save the image. If you think you'll be sending the image via email to a tech support employee or someone else that can help with the problem, consider saving the image as a monochrome or 16-color bitmap or, if possible, a JPEG file, to keep the image size small.

TIP

If the error message appears before Windows 7 starts, but you don't have time to write it down, press the Pause Break key to pause the startup. After you record the error, press Ctrl+Pause Break to resume the startup.

Does an Error or Warning Appear in the Event Viewer Logs?

Launch the Event Viewer, open the Windows Logs branch, and then examine the Application and System logs. (Refer to Chapter 7 for more information on the Event Viewer.) In particular, look in the Level column for Error or Warning events. If you see any, double-click each one to read the event description. Figure 21.1 shows an example.

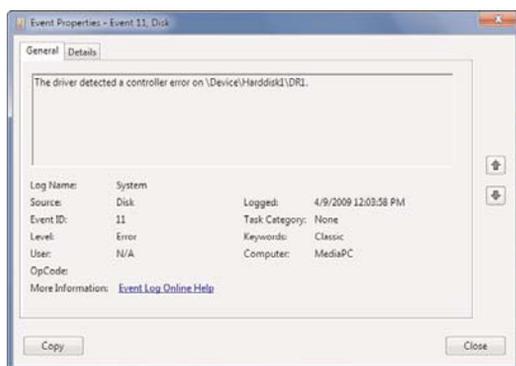


FIGURE 21.1 In the Event Viewer, look for Error and Warning events in the Application and System logs.

► See “Reviewing Event Viewer Logs,” p. 160.

Does an Error Appear in System Information?

Select Start, type `msinfo32`, and press Enter to launch the System Information utility. In the Hardware Resources branch, check the Conflicts/Sharing sub-branch for device conflicts. Also, see whether the Components\Problem Devices category lists any devices, as shown in Figure 21.2.

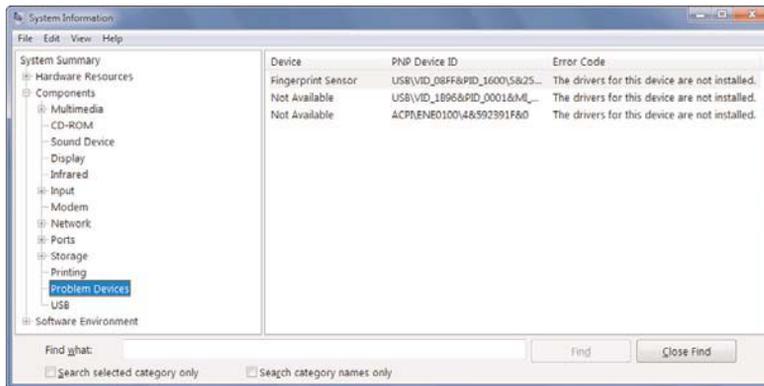


FIGURE 21.2 You can use the System Information utility to look for device conflicts and problems.

Did You Recently Edit the Registry?

Improper Registry modifications can cause all kinds of mischief. If the problem occurred after editing the Registry, try restoring the changed key or setting. Ideally, if you exported a backup of the offending key, you should import the backup. I showed you how to back up the Registry in Chapter 12, “Tweaking the Windows 7 Registry.”

- ▶ See “Keeping the Registry Safe,” p. 233.

Did You Recently Change Any Windows Settings?

If the problem started after you changed your Windows configuration, try reversing the change. Even something as seemingly innocent as activating a screensaver can cause problems, so don’t rule anything out. If you’ve made a number of recent changes and you’re not sure about everything you did, or if it would take too long to reverse all the changes individually, use System Restore to revert your system to the most recent checkpoint before you made the changes. See “Recovering Using System Restore,” later in this chapter.

Did Windows 7 “Spontaneously” Reboot?

When certain errors occur, Windows 7 will reboot itself. This apparently random behavior is actually built in to the system in the event of a system failure (also called a *stop error* or a *blue screen of death*—BSOD). By default, Windows 7 writes an error event to the system

log, dumps the contents of memory into a file, and then reboots the system. So, if your system reboots, check the Event Viewer to see what happened.

You can control how Windows 7 handles system failures by following these steps:

1. Select Start, type **systempropertiesadvanced**, and press Enter to open the System Properties dialog box with the Advanced tab displayed.
2. In the Startup and Recovery group, click Settings. Figure 21.3 shows the Startup and Recovery dialog box that appears.

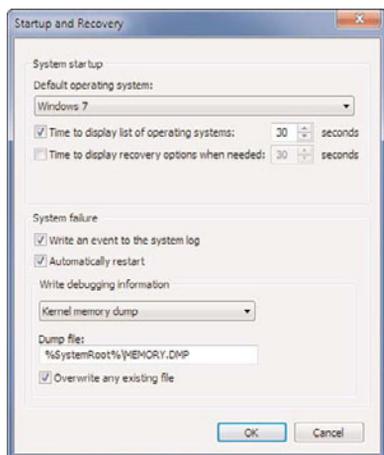


FIGURE 21.3 Use the Startup and Recovery dialog box to configure how Windows 7 handles system failures.

3. Configure how Windows 7 handles system failures using the following controls in the System Failure group:
 - ▶ **Write an Event to the System Log**—Leave this check box activated to have the system failure recorded in the system log. This enables you to view the event in the Event Viewer.
 - ▶ **Automatically Restart**—This is the option that, when activated, causes your system to reboot when a stop error occurs. Deactivate this check box if you want to avoid the reboot. This is useful if an error message appears briefly before Windows 7 reboots. By disabling the automatic restart, you give yourself time to read and write down the error message.

TIP

If the BSOD problem occurs during startup, your computer winds up in an endless loop: You reboot, the problem occurs, the BSOD appears, and then your computer reboots. Unfortunately, the BSOD appears only fleetingly, so you never have enough time to read (much less record) the error message. If this happens, display the Windows Boot Manager menu (refer to Chapter 4, Customizing Startup and Shutdown”), press F8 to display the Advanced Boot Options menu, and then select the Disable Automatic Restart on System Failure item. This tells Windows 7 not to reboot after the BSOD appears, so you can then write down the error message and, hopefully, successfully troubleshoot the problem.

- ▶ **Write Debugging Information**—This list determines what information Windows 7 saves to disk (in the folder specified in the text box below the list) when a system failure occurs. This information—it’s called a *memory dump*—contains data that can help a tech support employee determine the cause of the problem. You have four choices:

None—No debugging information is written.

Small Memory Dump (128 KB)—This option writes the minimum amount of useful information that could be used to identify what caused the stop error. This 128KB file includes the stop error number and its description, the list of running device drivers, and the processor state.

Kernel Memory Dump—This option writes the contents of the kernel memory to the disk. (The *kernel* is the Windows 7 component that manages low-level functions for processor-related activities such as scheduling and dispatching threads, handling interrupts and exceptions, and synchronizing multiple processors.) This dump includes memory allocated to the kernel, the hardware abstraction layer, and the drivers and programs used by the kernel. Unallocated memory and memory allocated to user programs are not included in the dump. This information is the most useful for troubleshooting, so I recommend using this option.

Complete Memory Dump—This option writes the entire contents of RAM to the disk.

CAUTION

Windows 7 first writes the debugging information to the paging file—`Pagefile.sys` in the root folder of the `%SystemDrive%`. When you restart the computer, Windows 7 then transfers the information to the dump file. Therefore, you must have a large enough paging file to handle the memory dump. This is particularly true for the Complete Memory Dump option, which requires the paging file to be as large as the physical RAM, plus 1 megabyte. The file size of the Kernel Memory Dump is typically about a third of physical RAM, although it may be as large as 800MB. If the paging file isn’t large enough to handle the dump, Windows 7 writes only as much information as can fit into the paging file. I showed you how to check and adjust the size of the paging file in Chapter 6, “Tuning Windows 7’s Performance.”

- ▶ **See** “Changing the Paging File’s Location and Size,” p. 132.
 - ▶ **Overwrite Any Existing File**—When this option is activated, Windows 7 overwrites any existing dump file with the new dump information. If you deactivate this check box, Windows 7 creates a new dump file with each system failure. Note that this option is enabled only for the Kernel Memory Dump and the Complete Memory Dump (which by default write to the same file: %SystemRoot%\Memory.dmp).
4. Click OK in all the open dialog boxes to put the new settings into effect.

Did You Recently Change Any Application Settings?

If so, try reversing the change to see whether doing so solves the problem. If that doesn’t help, here are three other things to try:

- ▶ Check the developer’s website to see whether an upgrade or patch is available.
- ▶ Run the application’s Repair option (if it has one), which is often useful for fixing corrupted or missing files. To see whether a program has a Repair option, select Start, type **programs**, and then click Programs and Features to display a list of your installed applications. Click the problematic application, and then look for a Repair item in the taskbar (see Figure 21.4).
- ▶ Reinstall the program.



FIGURE 21.4 In the Programs and Features window, click the program and look for a Repair option in the taskbar.

NOTE

If a program freezes, you won't be able to shut it down using conventional methods. If you try, you might see a dialog box warning you that the program is not responding. If so, click End Now to force the program to close. If that doesn't work, right-click the taskbar, and then click Task Manager. When you display the Applications tab, you should see your stuck application listed, and the Status column will likely say Not responding. Click the program, and then click End Task.

Did You Recently Install a New Program?

If you suspect a new program is causing system instability, restart Windows 7 and try operating the system for a while without using the new program. (If the program has any components that load at startup, be sure to deactivate them, as I described in Chapter 4.) If the problem doesn't reoccur, the new program is likely the culprit. Try using the program without any other programs running.

- ▶ See "Custom Startups Using the Boot Configuration Data," p. 63.

You should also examine the program's readme file (if it has one) to look for known problems and possible workarounds. It's also a good idea to check for a Windows 7-compatible version of the program. Again, you can also try the program's Repair option or you can reinstall the program.

Similarly, if you recently upgraded an existing program, try uninstalling the upgrade.

TIP

One common cause of program errors is having one or more program files corrupted because of bad hard disk sectors. Before you reinstall a program, run a surface check on your hard disk to identify and block off bad sectors. I showed you how to do a hard disk surface scan in Chapter 7.

- ▶ See "Checking Your Hard Disk for Errors," p. 135.

TIP

When a program crashes, Windows 7 displays a dialog box asking if you want to see whether a solution to the problem is available. You can control the behavior of this prompt. See "Checking for Solutions to Problems," later in this chapter.

Did You Recently Install a New Device?

If you recently installed a new device or if you recently updated an existing device driver, the new device or driver might be causing the problem. Check Device Manager to see whether there's a problem with the device. Follow my troubleshooting suggestions in Chapter 22, "Troubleshooting Devices."

- ▶ See "Troubleshooting Device Problems," p. 472.

Did You Recently Install an Incompatible Device Driver?

As you see in Chapter 22, Windows 7 allows you to install drivers that aren't Windows 7 certified, but it also warns you that this is a bad idea. Incompatible drivers are one of the most common sources of system instability, so whenever possible, you should uninstall the driver and install one designed for Windows 7. If you can't uninstall the driver, Windows 7 automatically set a system restore point before it installed the driver, so you should use that to restore the system to its previous state. (See "Recovering Using System Restore," later in this chapter.)

Did You Recently Apply an Update from Windows Update?

It's an unfortunate fact of life that occasionally updates designed to fix one problem end up causing another problem. Fortunately, Windows 7 offers a couple of solutions for problems caused by updates:

- ▶ Select Start, type **updates**, and then click View Installed Updates. In the Installed Updates window, click the update you want to remove, and then click Uninstall.
- ▶ Before you install an update from the Windows Update site, Windows 7 creates a system restore point—usually named *Install: Windows Update*. If your system becomes unstable after installing the update, use System Restore to revert to the pre-update configuration.

TIP

If you have Windows 7 set up to perform automatic updating, you can keep tabs on the changes made to your system by select Start, type **updates**, and then click Windows Update. Click the View Update History link to see a list of the installed updates, which includes the update Name, Status (such as Successful), Type (such as Important or Optional), and Date Installed.

General Troubleshooting Tips

Figuring out the cause of a problem is often the hardest part of troubleshooting, but by itself it doesn't do you much good. When you know the source, you need to parlay that information into a fix for the problem. I discussed a few solutions in the previous section, but here are a few other general fixes you need to keep in mind:

- ▶ **Close all programs**—You can often fix flaky behavior by shutting down all your open programs and starting again. This is a particularly useful fix for problems caused by low memory or low system resources.
- ▶ **Log off Windows 7**—Logging off clears the RAM and so gives you a slightly cleaner slate than merely closing all your programs.
- ▶ **Reboot the computer**—If there are problems with some system files and devices, logging off won't help because these objects remain loaded. By rebooting the

system, you reload the entire system, which is often enough to solve many computer problems.

- ▶ **Turn off the computer and restart**—You can often solve a hardware problem by first shutting your machine off. Wait for 30 seconds to give all devices time to spin down, and then restart.
- ▶ **Check connections, power switches, and so on**—Some of the most common (and some of the most embarrassing) causes of hardware problems are the simple physical things. So, make sure that a device is turned on, check that cable connections are secure, and ensure that insertable devices are properly inserted.

More Troubleshooting Tools

Windows 7 comes with diagnostic tools—together, they're called the *Windows Diagnostic Infrastructure (WDI)*—that not only do a better job of finding the source of many common disk, memory, and network problems, but can detect impending failures and alert you to take corrective or mitigating action (such as backing up your files). The next few sections describe these tools.

Running the Windows 7 Troubleshooters

NEW TO 7 Windows Vista introduced the idea of the *troubleshooter*, a Help system component that offered a series of solutions that led you deeper into a problem in an attempt to fix it. In Windows 7, the troubleshooters have been beefed up and given their own home within the Control Panel interface. To see the Windows 7 troubleshooters, select Start, type **trouble**, and then choose Troubleshooting in the search results. The Troubleshooting window (see Figure 21.5) is divided into several categories (Programs, Hardware and Sound, and so on), each of which offers a few links to general troubleshooting tasks.

Note, too, the Get the Most Up-to-Date Troubleshooters check box at the bottom of the window. If you leave that option activated, and then click a category, Windows 7 queries the Windows Online Troubleshooting service for the latest troubleshooting packs, and then displays the complete list for that category. For example, Figure 21.6 shows the troubleshooters that were available for the Programs category as I wrote this.

TIP

If you want to see all the available troubleshooters, click the View All link in the Troubleshooting window.

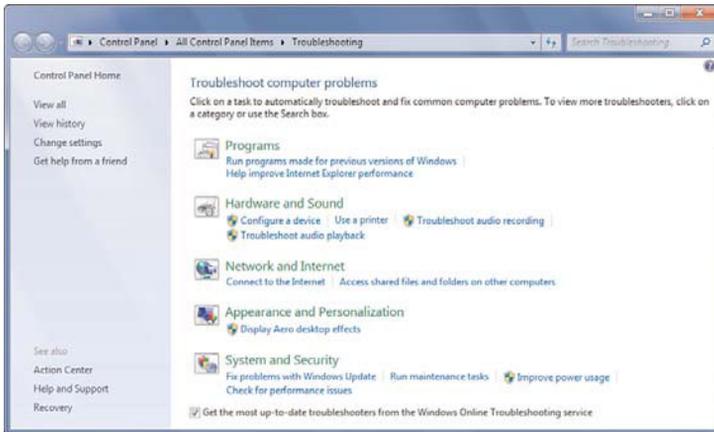


FIGURE 21.5 Windows 7's new Troubleshooting window offers links to various troubleshooting categories and tasks.

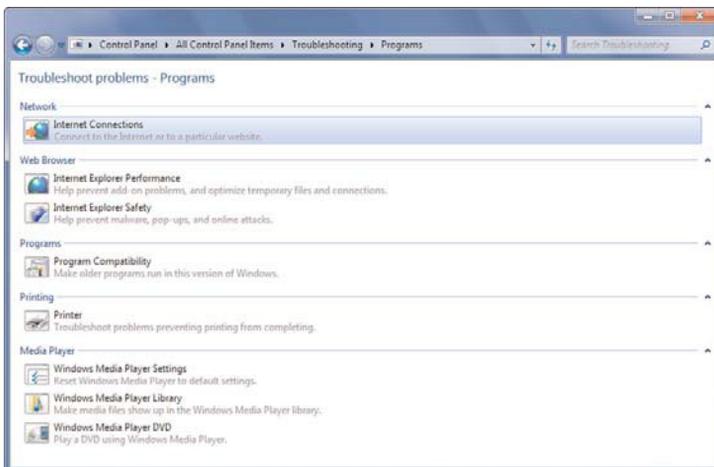


FIGURE 21.6 Click a category to see its available troubleshooters.

Understanding Disk Diagnostics

A hard disk can suddenly bite the dust thanks to a lightning strike, an accidental drop from a decent height, or an electronic component shorting out. However, most of the time hard disks die a slow death. Along the way, hard disks almost always show some signs of decay, such as the following:

- ▶ Spin-up time gradually slows.

- ▶ Drive temperature increases.
- ▶ The seek error rate increases.
- ▶ The read error rate increases.
- ▶ The write error rate increases.
- ▶ The number of reallocated sectors increases.
- ▶ The number of bad sectors increases.
- ▶ The cyclic redundancy check (CRC) produces an increasing number of errors.

Other factors that might indicate a potential failure are the number of times that the hard drive has been powered up, the number of hours in use, and the number of times the drive has started and stopped spinning.

Since about 1996, almost all hard disk manufacturers have built in to their drives a system called *Self-Monitoring, Analysis, and Reporting Technology*, or *SMART*. This system monitors the parameters just listed (and usually quite a few more highly technical hard disk attributes) and uses a sophisticated algorithm to combine these attributes into a value that represents the overall health of the disk. When that value goes beyond some predetermined threshold, SMART issues an alert that hard disk failure might be imminent.

Although SMART has been around for a while and is now standard, taking advantage of SMART diagnostics has, until now, required third-party programs. However, Windows 7 comes with a Diagnostic Policy Service (DPS) that includes a Disk Diagnostics component that can monitor SMART. If the SMART system reports an error, Windows 7 displays a message that your hard disk is at risk. It also guides you through a backup session to ensure that you don't lose any data before you can have the disk replaced.

Understanding Resource Exhaustion Detection

Your system can become unstable if it runs low on virtual memory, and there's a pretty good chance it will hang if it runs out of virtual memory. Older versions of Windows displayed one warning when they detected low virtual memory and another warning when the system ran out of virtual memory. However, in both cases, users were simply told to shut down some or all of their running programs. That often solved the problem, but shutting *everything* down is usually overkill because it's often the case that just one running program or process is causing the virtual memory shortage.

Windows 7 takes this more subtle point of view into account with its Windows Resource Exhaustion Detection and Resolution tool (RADAR), which is part of the Diagnostic Policy Service. This tool also monitors virtual memory and issues a warning when resources run low. However, RADAR also identifies which programs or processes are using the most virtual memory, and it includes a list of these resource hogs as part of the warning. This enables you to shut down just one or more of these offending processes to get your system in a more stable state.

Microsoft is also providing developers with programmatic access to the RADAR tool, thus enabling vendors to build resource exhaustion detection into their applications. When

such a program detects that it is using excessive resources, or if it detects that the system as a whole is low on virtual memory, the program can free resources to improve overall system stability.

NOTE

The Resource Exhaustion Detection and Recovery tool divides the current amount of committed virtual memory by the *commit limit*, the maximum size of the virtual memory paging file. If this percentage approaches 100, RADAR issues its warning. If you want to track this yourself, run the Performance Monitor (see Chapter 6), and add the % Committed Bytes in Use counter in the Memory object. If you want to see the exact commit numbers, add the Committed Bytes and Commit Limit counters (also in the Memory object).

- ▶ See “Using the Performance Monitor,” p. 119.

Running the Memory Diagnostics Tool

Few computer problems are as maddening as those related to physical memory defects because they tend to be intermittent and they tend to cause problems in secondary systems, forcing you to waste time on wild goose chases all over your system.

Therefore, it is welcome news that Windows 7 ships with a Windows Memory Diagnostics tool that works with Microsoft Online Crash Analysis to determine whether defective physical memory is the cause of program crashes. If so, Windows Memory Diagnostics lets you know about the problem and schedules a memory test for the next time you start your computer. If it detects actual problems, the system also marks the affected memory area as unusable to avoid future crashes.

Windows 7 also comes with a Memory Leak Diagnosis tool that's part of the Diagnostic Policy Service. If a program is leaking memory (using up increasing amounts of memory over time), this tool will diagnose the problem and take steps to fix it.

To run the Memory Diagnostics tool yourself, follow these steps:

1. Select Start, type **memory**, and then click Windows Memory Diagnostic in the search results. The Windows Memory Diagnostics Tool window appears, as shown in Figure 21.7.
2. Click one of the following options:
 - ▶ **Restart Now and Check for Problems**—Click this option to force an immediate restart and schedule a memory test during startup. Be sure to save your work before clicking this option.
 - ▶ **Check for Problems the Next Time I Start My Computer**—Click this option to schedule a memory test to run the next time you boot.

After the test runs (it takes 10 or 15 minutes, depending on how much RAM is in your system), Windows 7 restarts and you see (for a short time) the Windows Memory Diagnostic Tool icon in the taskbar's notification area. This icon displays the results of the memory text.

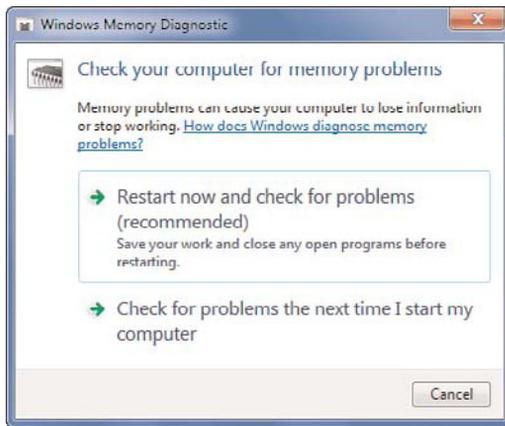


FIGURE 21.7 Use the Windows Memory Diagnostic tool to check for memory problems.

TIP

If you're having trouble starting Windows 7 and you suspect memory errors might be the culprit, boot your machine to the Windows Boot Manager menu (refer to Chapter 4). When the menu appears, press Tab to select the Windows Memory Diagnostic item, and then press Enter. If you can't get to the Windows Boot Manager, you can also run the Memory Diagnostic tool using Windows 7's System Recovery Options. See "Recovering Using the System Recovery Options" in Chapter 23, "Troubleshooting Startup."

Checking for Solutions to Problems

NEW TO 7 Microsoft constantly collects information about Windows 7 from users. When a problem occurs, Windows 7 usually asks whether you want to send information about the problem to Microsoft and, if you do, it stores these tidbits in a massive database. Engineers then tackle the "issues" (as they euphemistically call them) and hopefully come up with solutions.

One of Windows 7's most promising features is called Problem Reporting (it was called Problem Reports and Solutions in Vista), and it's designed to make solutions available to anyone who goes looking for them. Windows 7 keeps a list of problems your computer is having, so you can tell it to go online and see whether a solution is available. If there's a solution waiting, Windows 7 will download it, install it, and fix your system.

Here are the steps to follow to check for solutions to problems:

1. Select Start, type **action**, and then click Action Center in the results. (You can also click the Action Center icon in the taskbar's notification area, and then click Open Action Center.) The Action Center window appears.
2. Click Maintenance to view the maintenance-related tools and messages.
3. Click the Check for Solutions link. Windows 7 begins checking for solutions.

4. If you see a dialog box asking whether you want to send more information about your problems, you can click View Problem Details to see information about the problems, as shown in Figure 21.8. When you're ready to move on, click Send Information.

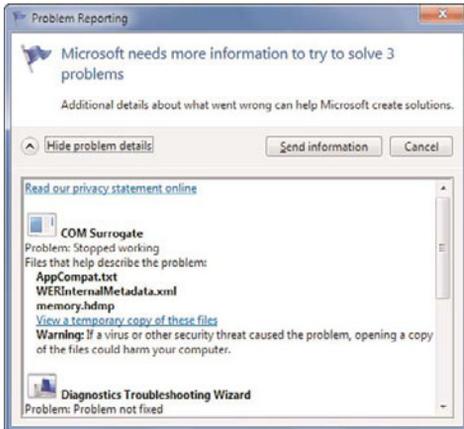


FIGURE 21.8 If Windows 7 tells you it need more information, click View Problem Details to see the problems.

5. If a solution exists for your computer, you see it listed in the Maintenance section of the Action Center window. Click the solution to install it.

By default, when a problem occurs, Windows 7 does two things:

- ▶ It automatically checks for a solution to the problem.
- ▶ It asks whether you want to send more information about the problem to Microsoft.

You can control this behavior by configuring a few settings:

1. Select Start, type **action**, and then click Action Center in the results. (You can also click the Action Center icon in the taskbar's notification area, and then click Open Action Center.) The Action Center window appears.
2. Click Maintenance to view the maintenance-related tools and messages.
3. Click Settings. The Problem Reporting Settings window appears.
4. In the Choose How to Check for Solutions to Computer Problems window, click Advanced Settings to display the Advanced Settings for Problem Reporting window shown in Figure 21.9.

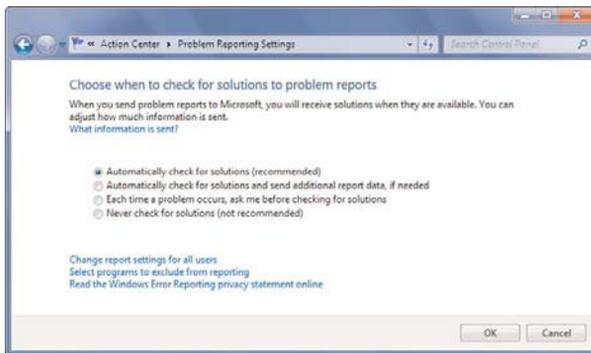


FIGURE 21.9 Use the Advanced Settings for Problem Reporting window to configure the Problem Reporting feature.

5. To configure problem reporting, click one of the following options:
 - ▶ **Automatically Check for Solutions**—Activate this option (it's the default) to have Windows 7 automatically check online for an existing solution to a problem.
 - ▶ **Automatically Check for Solutions and Send Additional Report Data, If Needed**—Activate this option to have Windows 7 automatically check online for an existing solution to a problem and to automatically send extra information about the problem.
 - ▶ **Each Time a Problem Occurs, Ask Me Before Checking for Solutions**—Activate this option to have Windows 7 prompt you to check for solutions and to send additional information about the problem.
 - ▶ **Never Check for Solutions**—Activate this option if you don't want to report problems at all.
6. By default, Windows 7 applies the setting from step 5 only to the current user. If you want to configure the same problem reporting option for every user, click the Change Report Settings for All Users link to open the Problem Reporting dialog box, choose the reporting option you want everyone to use, and then click OK.

NOTE

If you change your mind and prefer each user to choose his or her own reporting option, click the Change Report Settings for All Users link, activate the Allow Each User to Choose Settings option, and then click OK.

7. If you don't want Windows 7 to send information about a specific program, click the Select Programs to Exclude from Reporting link to open the Advanced Problem

Reporting Settings window. Click Add, locate and select the program's executable file, click Open, and then click OK.

8. Click OK to put the new settings into effect.

Troubleshooting Using Online Resources

The Internet is home to an astonishingly wide range of information, but its forte has always been computer knowledge. Whatever problem you have, there's a good chance that someone out there has run into the same thing, knows how to fix it, and has posted the solution on a website or newsgroup, or would be willing to share it with you if asked. True, finding what you need is sometimes difficult, and you often can't be sure how accurate some of the solutions are. However, if you stick to the more reputable sites and if you get second opinions on solutions offered by complete strangers, you'll find the online world an excellent troubleshooting resource. Here's my list of favorite online resources:

- ▶ **Microsoft Product Support Services**—This is Microsoft's main online technical support site. Through this site, you can access frequently asked questions about Windows 7, see a list of known problems, download files, and send questions to Microsoft support personnel: support.microsoft.com/.
- ▶ **Microsoft Knowledge Base**—The Microsoft Product Support Services site has links that enable you to search the Microsoft Knowledge Base, which is a database of articles related to all Microsoft products including, of course, Windows 7. These articles provide you with information about Windows 7 and instructions on using Windows 7 features. But the most useful aspect of the Knowledge Base is for troubleshooting problems. Many of the articles were written by Microsoft support personnel after helping customers overcome problems. By searching for error codes or keywords, you can often get specific solutions to your problems.
- ▶ **Microsoft TechNet**—This Microsoft site is designed for IT professionals and power users. It contains a huge number of articles on all Microsoft products. These articles give you technical content, program instructions, tips, scripts, downloads, and troubleshooting ideas: www.microsoft.com/technet/.
- ▶ **Windows Update**—Check this site for the latest device drivers, security patches, service packs, and other updates: windowsupdate.microsoft.com/.
- ▶ **Microsoft Security**—Check this site for the latest information on Microsoft security and privacy initiatives, particularly security patches: www.microsoft.com/security/.
- ▶ **Vendor websites**—All but the tiniest hardware and software vendors maintain websites with customer support sections that you can peruse for upgrades, patches, workarounds, frequently asked questions, and sometimes chat or bulletin board features.
- ▶ **Newsgroups**—There are computer-related newsgroups for hundreds of topics and products. Microsoft maintains its own newsgroups via the msnews.microsoft.com server (an account for which is automatically set up in Windows Mail), and Usenet

has a huge list of groups in the alt and comp hierarchies. Before asking a question in a newsgroup, be sure to search Google Groups to see whether your question has been answered in the past: groups.google.com/.

TIP

You can also access Microsoft's Windows 7 newsgroups via the Web:

<http://answers.microsoft.com/en-us/windows/default.aspx>.

Recovering from a Problem

Ideally, solving a problem will require a specific tweak to the system: a Registry setting change, a driver upgrade, a program uninstall. But sometimes you need to take more of a “big picture” approach to revert your system to some previous state in the hope that you’ll leap past the problem and get your system working again. Windows 7 offers three ways to try such an approach: last known good configuration, System Restore, and System Recovery Options (which you should use in that order). The next two sections discuss the first two tools, and I talk about the System Recovery Options in Chapter 23.

- ▶ See “Recovering Using the System Recovery Options,” p. 485.

Booting Using the Last Known Good Configuration

Each time Windows 7 starts successfully in Normal mode, the system makes a note of which *control set*—the system’s drivers and hardware configuration—was used. Specifically, it enters a value in the following Registry key:

```
HKLM\SYSTEM\Select\LastKnownGood
```

For example, if this value is 1, it means that control set 1 was used to start Windows 7 successfully:

```
HKLM\SYSTEM\ControlSet001
```

If you make driver or hardware changes and then find that the system won’t start, you can tell Windows 7 to load using the control set that worked the last time. (That is, the control set that doesn’t include your most recent hardware changes.) This is the *last known good configuration*, and the theory is that by using the previous working configuration, your system should start because it’s bypassing the changes that caused the problem. Here’s how to start Windows 7 using the last known good configuration:

1. Restart your computer.
2. At the Windows Boot Manager menu (refer to Chapter 4), press F8 to display the Advanced Boot Options menu.
3. Select the Last Known Good Configuration option.

Recovering Using System Restore

The Last Known Good Configuration option is most useful when your computer won't start and you suspect that a hardware change is causing the problem. You might think that you can also use the last known good configuration if Windows 7 starts but is unstable, and you suspect a hardware change is causing the glitch. Unfortunately, that won't work because when you start Windows 7 successfully in Normal mode, the hardware change is added to the last known good configuration. To revert the system to a previous configuration when you can start Windows 7 successfully, you need to use the System Restore feature.

I showed you how to use System Restore to set restore points in Chapter 7. Remember, too, that Windows 7 creates automatic restore points each day and when you perform certain actions (such as installing an uncertified device driver).

- ▶ See “Setting System Restore Points,” p. 149.

To revert your system to a restore point, follow these steps:

1. Select Start, type **restore**, and then select System Restore in the search results. Windows 7 displays the System Restore dialog box.
2. The first System Restore dialog box (see Figure 21.10) offers two options:
 - ▶ **Recommended Restore**—Activate this option to restore Windows 7 to the restore point shown (which is usually the most recent restore point). Skip to step 5.
 - ▶ **Choose a Different Restore Point**—Activate this option to select from a list of restore points. Click Next and continue with step 3.

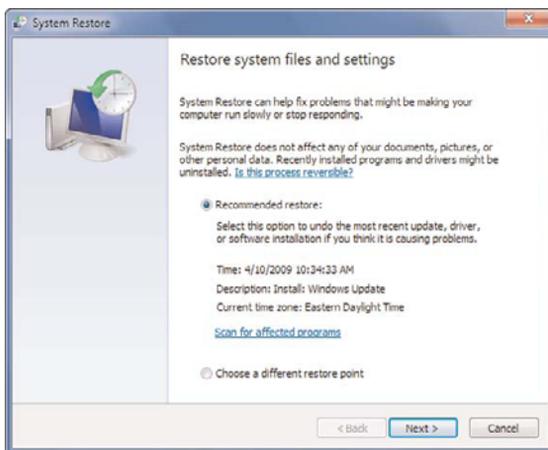


FIGURE 21.10 The initial System Restore window offers two restore options

3. If you don't see the restore point you want to use, click to activate the Show More Restore Points check box, which tells Windows 7 to display all the available restore points, as shown in Figure 21.11.

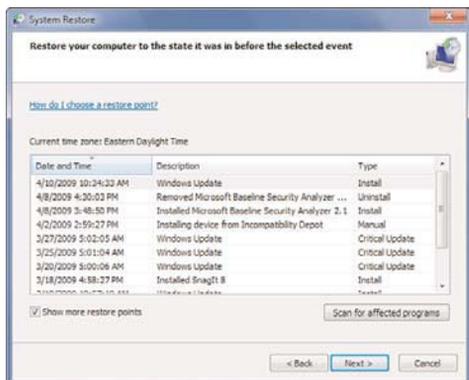


FIGURE 21.11 Use this dialog box to choose the restore point you want to revert to.

NOTE

By default, Windows 7 displays only the restore points from the previous 5 days. When you activate the Show More Restore Points check box, you tell Windows 7 to also show the restore points that are more than 5 days old.

4. Click the restore point you want to use. There are seven common types of restore points:
 - ▶ **System**—A restore point that Windows 7 creates automatically. For example, the System Checkpoint is the restore point that Windows 7 creates each day or when you boot your computer.
 - ▶ **Critical Update**—A restore point set prior to installing an important update.
 - ▶ **Install**—A restore point set prior to installing a program or optional update.
 - ▶ **Uninstall**—A restore point set prior to uninstalling a program or update.
 - ▶ **Manual**—A restore point you create yourself.
 - ▶ **Undo**—A restore point set prior to a previous use of System Restore to revert the system to an earlier state.
 - ▶ **Unknown**—Any restore point that doesn't fit in the above categories.
5. Click Next. If other hard disks are available in the restore point, Windows 7 displays a list of the disks. Activate the check box beside each disk you want to include in the restore, and then click Next.
6. Click Finish. Windows 7 asks you to confirm that you want your system restored.

7. Click Yes. System Restore begins reverting to the restore point. When it's done, it restarts your computer and displays a message telling you the results of the restore.
8. Click Close.

TIP

System Restore is available in Safe mode. So, if Windows 7 won't start properly, and if using the last known good configuration doesn't work, perform a Safe mode startup and run System Restore from there. If you can't start Windows 7 at all, you can also run System Restore using the System Recovery Options, discussed in Chapter 23.
