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Top 10 tips for troubleshooting PC system slowdowns

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User complaints are minimal when new PCs are rolled out. They start up quick, and programs seem to open in a snap. But over time, users begin to notice that their system is slow or that it hangs up often. While the possibilities for system slowdown are endless, I have identified 10 common troubleshooting areas you should examine first before you suggest to management that it's time for an upgrade.

1. Processor overheating

Modern processors generate a lot of heat. That's why all processors require some sort of cooling element, typically a fan of some type. When the processor temperature goes over spec, the system can slow down or run erratically. The processor fan may fail for several reasons:

- Dust is preventing the fan from spinning smoothly.
- The fan motor has failed.
- The fan bearings are loose and "jiggling."

Often you can tell if there is a fan problem by listening and/or touching the computer. A fan that has loose bearings starts jiggling and vibrates the case, making a characteristic noise. You may barely notice the noise at first, and it's common for even the experienced computer pro to overlook this change. But as time goes by, the sounds and vibrations will become so prominent that you'll change the fan out just to stop the racket!

You don't always need to replace the fan. If it is covered with dust, you can often spray away the dust with compressed air. Note that even though you might get the fan running again, its life span has likely been reduced because of the overwork. You should keep an extra fan in reserve in case of failure.

Tip

Another common reason for processor overheating is overclocking. Until heat begins to take its toll, overclocking does allow for significant performance improvements. Because processor overclocking can really cook a processor, most dedicated overclockers do not use regular processor fans. Instead, they use complex—and expensive—water-cooling systems. For more information on overclocking, check out [Overclockers Hideout](#).

There are a number of utilities that will track the temperature of your processor and case. If you want to try some of these utilities, check out [CNET's Download.com](#) and use the search term "temperature."

2. Bad RAM

Several situations can lead to a bad RAM relationship with a particular machine:

- RAM timing is slower than optimal machine spec.
- RAM has minor flaws that only appear on detailed testing.
- RAM is overheating.

In the "old days" of Fast Page RAM, buying new RAM for your computer was a pretty simple affair. You just needed to know what speed your motherboard supported and the maximum each slot would take. Today, there are many different speeds of RAM, and the better motherboards may be tolerant of using RAM that does not match the motherboard's maximum specs. For example, your motherboard may support PC133 RAM but will still work with PC100 RAM. But be aware that you may see performance

decreases if you install RAM that is slower than the maximum spec.

Tip

Some motherboards will even allow you to mix speeds but will default to the slowest RAM installed.

Minor flaws in RAM chips can lead to system slowdowns and instability. The least expensive chips often have minor flaws that will cause your system to slow down or Blue Screen intermittently. Although built-in mechanisms may allow the system to keep working, there is a performance hit when it has to deal with flawed RAM chips.

In the past, no one worried about RAM chips getting hot, because they didn't seem to generate much heat. But that's changed with newer RAM types, especially SDRAM. To check for overheating, open your computer's case, power down, and pull the plug out. Ground yourself and touch the plastic on one of your RAM chips. Ouch! They get pretty hot. If you find that your RAM chips are overheating, you should consider buying a separate fan to cool your memory. If your motherboard doesn't support a RAM fan, you might be able to get enough additional cooling by installing a fan card that plugs in to a PCI slot.

Tip

Another RAM-related problem may occur if you add more than 64 MB of RAM to a system that doesn't support caching of more than 64 MB of system memory. The system's performance will degrade when it accesses the uncached memory. For example, the [Intel Triton i430FX/VX/TX](#)-based motherboards completely disable the onboard L2 cache when more than 64 MB of RAM is installed, causing major performance degradation.

3. Failing hard disk

There are many signs of imminent failure before a hard disk finally gives up. Some of these signs include:

- Slow access times on the affected drive.
- An increasing number of bad sectors when running scandisk and chkdsk.
- Unexplained Blue Screens.
- Intermittent boot failures.

Detecting a failing hard disk can be tricky because the early signs are subtle. Experienced computer professionals can often hear a change in the normal disk spin. After the disk deteriorates further, you'll see the system crawl to a standstill. Write processes will take a long time as the system tries to find good blocks to write to. (This will occur if you're using a robust file system such as NTFS; other file systems will likely Blue Screen the computer.)

When you notice the system slow down, run scandisk or chkdsk, depending on your operating system. If you notice a bad sector where a good sector existed earlier, that's a clue that the disk is going bad. Back up the data on the disk and prepare for it to fail soon. Make sure you have a spare disk ready so you can replace it when it fails, or replace the disk as soon as you notice the early signs of failure.

Disk noise and scandisk/chkdsk are your best indicators for identifying a failing drive that's leading to a system slowdown. However, if you are managing a system remotely, or you can't take the system down for a full chkdsk/R, you can use tools that monitor disk health, such as [Executive Software's DiskAlert](#).

4. BIOS settings

One often-ignored culprit of system slowdown is the machine's BIOS settings. Most people accept the BIOS settings as they were configured in the factory and leave them as is. However, slowdowns may occur if the BIOS settings do not match the optimal machine configuration. Often you can improve machine performance by researching your motherboard's optimal BIOS settings—which may not be the same as the factory defaults.

There is no centralized database of optimal BIOS settings, but you can employ a search engine such as [Google](#) or [AllTheWeb](#) and use your motherboard name and BIOS as keywords to find the correct settings.

5. Disk type/controller compatibility

You've just purchased a new UDMA-66 disk drive, and it doesn't seem any faster than

any of the other drives in your machine. You do some benchmark testing, and the new disk tests the same as the other drives in your system. So what's the problem?

It could be that your motherboard doesn't support the UDMA 66 specification. Check your manual to determine what type of IDE interface it supports. If the motherboard only supports UDMA 33, then your UDMA 66 throttles down for backwards compatibility. You can get around this problem by installing a [PCI UDMA 66 add-on card](#) and plugging the new drive in to that interface.

Another potential problem may be the cable type you are using. UDMA 66+ drives require a different cable than older drive types. The drive may not work at all with the old cable type. Aged cables will break down over time, especially if they are tightly folded and the temperature of the case remains consistently high. It's always worthwhile to change out the drive cable to see if performance improves.

Tip

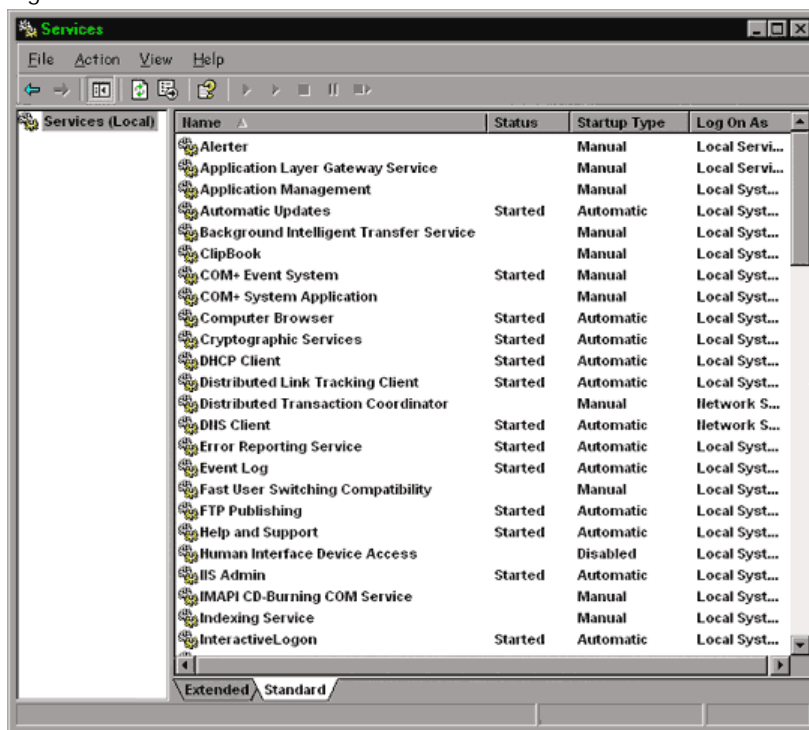
You can now get rounded IDE (and floppy) cables that are less vulnerable to breakage caused by folding and that are less likely to impede airflow. For an example of rounded cables, see [8 Balls Hardware review](#).

6. Windows services

Many Windows services are enabled by default. Many of these services, however, are not required for your machine to run properly. You should review the services running on your Windows 2000/Windows XP computer and disable those that you don't need.

One way to see what services are running is to use the Services applet found in the Administrative Tools menu. Right-click My Computer and select Manage, as shown in **Figure A**.

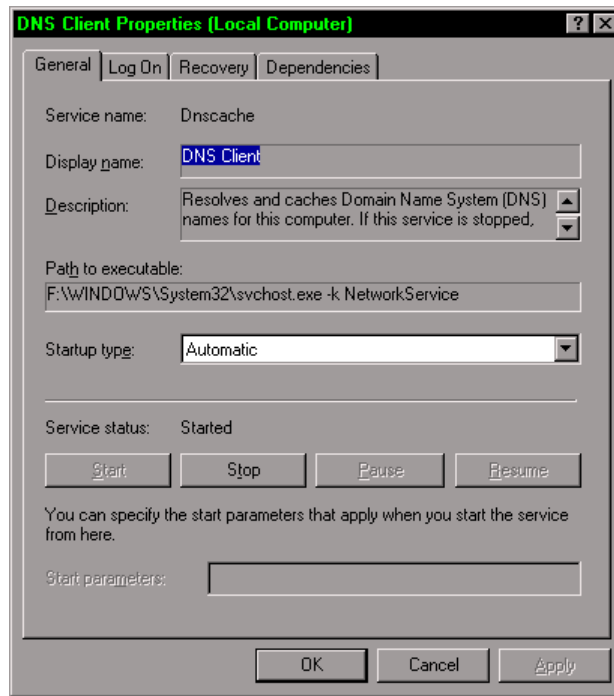
Figure A



Use the Services applet to identify the services running on your system.

Important information contained in the Services console includes the service Name, Status, and Startup Type. You can get more details on a service by double-clicking on it to bring up the service's Properties, as seen in **Figure B**.

Figure B

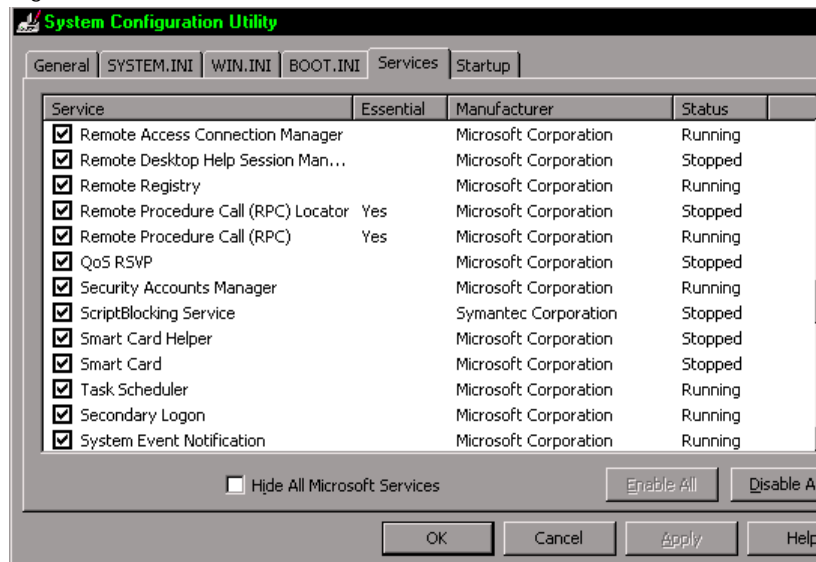


The Properties sheet for the service provides detailed information.

You can stop the service by clicking the Stop button. If you are sure that you don't need the service, click the down arrow in the Startup Type drop-down list box and set the service to Disabled. If you are not sure if you need the service, change the Startup Type to Manual. Then you'll have the option of manually starting the service if you find that you need it.

Another way of controlling which services start is using the msconfig utility (see **Figure C**). Open the Run dialog box and type *msconfig* in the Open text box.

Figure C



Use the System Configuration utility to control the behavior of services.

Notice the Essential column. These are services Microsoft considers essential to running the computer. However, note that many required services are not defined as essential in the System Configuration Utility window. You can prevent a service from starting at bootup by unchecking the check box to the left of the service.

One service that is well known for slowing down Windows 2000/Windows XP systems is the Indexing Service. This service indexes the content of each hard disk and makes it

easier for the Search utility to find files. Unless you are running a Web site that uses the indexing service, you may want to disable it to improve performance.

7. Runaway processes

Runaway processes take up all of the processors' cycles. The usual suspects are badly written device drivers, and legacy software installed on a newer operating system. You can identify a runaway process by looking at the process list in the Windows Task Manager (see **Figure D**). Any process that takes almost 100 percent of the processing time is likely a runaway process.

Figure D

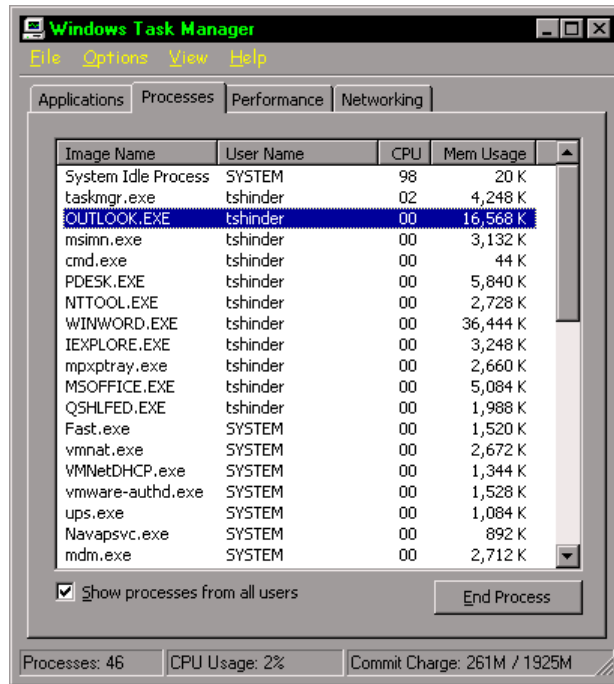


Image Name	User Name	CPU	Mem Usage
System Idle Process	SYSTEM	98	20 K
taskmgr.exe	tshinder	02	4,248 K
OUTLOOK.EXE	tshinder	00	16,568 K
msimn.exe	tshinder	00	3,132 K
cmd.exe	tshinder	00	44 K
PDESK.EXE	tshinder	00	5,840 K
NTTOOL.EXE	tshinder	00	2,728 K
WINWORD.EXE	tshinder	00	36,444 K
IEXPLORE.EXE	tshinder	00	3,248 K
mpxprtray.exe	tshinder	00	2,660 K
M\$OFFICE.EXE	tshinder	00	5,084 K
QSHLFED.EXE	tshinder	00	1,988 K
Fast.exe	SYSTEM	00	1,520 K
vmnat.exe	SYSTEM	00	2,672 K
VMNetDHCP.exe	SYSTEM	00	1,344 K
vmware-authd.exe	SYSTEM	00	1,528 K
ups.exe	SYSTEM	00	1,084 K
Navapvc.exe	SYSTEM	00	892 K
mdm.exe	SYSTEM	00	2,712 K

Processes: 46 CPU Usage: 2% Commit Charge: 261M / 1925M

Use the Task Manager to identify processes that are slowing the system.

We see an exception to this rule, however, shown in Figure D. On a smoothly running system, the System Idle Process should be consuming the majority of the processor cycles most of the time. If any other process were to take up 98 percent of the processor cycles, you might have a runaway process.

If you do find a runaway process, you can right-click the process and click the End Process command. You may need to stop some processes, such as runaway system services, from the Services console. If you can't stop the service using the console, you may need to reboot the system. Sometimes a hard reboot is required.

8. Disk fragmentation

As files are added, deleted, and changed on a disk, the contents of the file can become spread across sectors located in disparate regions of the disk. This is file fragmentation. Some operating systems, such as Windows NT, don't have a built-in defrag utility; you must obtain a third-party solution, such as [Executive Software's Diskeeper](#).

Disk fragmentation can significantly slow down your machine. The disk heads must move back and forth while seeking all the fragments of a file. A common cause of disk fragmentation is a disk that is too full. You should keep 20 percent to 25 percent of your hard disk space free to minimize file fragmentation and to improve the defragmenter's ability to defrag the disk. Thus, if a disk is too full, move some files off the drive and restart the defragmenter.

9. Background applications

Have you ever visited an end-user's desktop and noticed a dozen icons in the system tray? Each icon represents a process running in either the foreground or background. Most of them are running in the background, so the users may not be aware that they are running 20+ applications at the same time.

This is due to applications starting up automatically in the background. Look first for such programs in the Startup folder in the Start menu. Many applications place components in

the Startup folder to run in the background. Some of these, such as the Microsoft Office Findfast, can really chew up processor and disk time and noticeably slow down a system. Review each of the entries in the Startup folder and delete any that are unnecessary.

10. File system issues

Some file systems work better than others for large disk partitions. If the machine runs Windows NT 4.0, Windows 2000, or Windows XP, you should use the NTFS file system for best performance.

File system performance is closely related to cluster size and the number of clusters on the disk. NTFS file systems will bog down if you have a 60-GB hard disk configured with a cluster size of 512 bytes. This creates an enormous number of clusters, which the file system must track and seek. This becomes especially problematic when the drive is highly fragmented. One solution is to use larger cluster sizes. If you set the cluster size to 4K or larger, you will see noticeable improvement in file load times. Please note, however, that large clusters can significantly increase the amount of cluster slack space and lead to a lot of wasted disk space.

Another trick to alleviate file system issues involves tweaking some Registry values (Start Menu|Run|Regedit):

- The first Registry value you can tweak is NtfsDisable8dot3NameCreation, which can be found at HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Filesystem. When you set this value to 1, it stops NTFS from generating the 8.3 file-naming convention used for backward compatibility. If you do not need these old filenames, you can improve performance by preventing NTFS from creating them.
- Another useful NTFS entry is the NtfsDisableLastAccess value, which can be found at HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Filesystem. This is a REG_DWORD entry, and when it is set to 1, it will prevent NTFS from updating the date and time stamp of directories after they are browsed. However, this does not prevent an update to the file-access information when a file is opened or changed.

If you are not using the NTFS file system, you may be able to improve performance by moving files and folders out of the root directory. With FAT partitions, you may notice a big slowdown in system performance after running scandisk because a large number of .chk files are placed in the root directory. Users sometimes fill their root directories by making it the default file storage location. Move as many files and folders as possible out of the root directory, and performance should improve significantly.

Conclusion

In this Drill Down, I reviewed some of the common reasons behind a system slowdown. When troubleshooting a system slowdown, you should always look for potential hardware problems first. Then, investigate the common software problems. If you use a systematic troubleshooting plan, you should be able to improve the performance of most computers suffering from system slowdown.

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