



Hunt down hard disk resource hogs?

By Brien M. Posey

Most users find that the longer they use [Microsoft Windows](#), the slower it seems to run. While there are countless areas in which you can tweak Windows to regain that lost speed, most techniques result in negligible performance boosts. In this [Daily Drill Down](#), originally published as an article on March 26, 2002, Brien Posey shows you how to focus your troubleshooting efforts to restore Windows XP to its past performance levels.

Disk time percentage and disk queue length

IT professionals think of hard disk corruption or inadequate disk space as the cause of most system performance problems, but disk time is an equally important performance factor. Disk time is represented as a percentage of time that the hard disk is in use. If the hard disk is running 80 percent of the time, for example, you can be sure that system performance is suffering.

Another factor to consider is the average disk queue length, which refers to the number of processes that are waiting to use the hard disk. Using the disk time percentage in conjunction with the disk queue length will tell you not only how much the hard disk is being used but also if the heavy usage is a problem. For example, if the disk time is 40 percent but the average disk queue length has a factor of two or less, then the hard disk is keeping up with the demand that's being placed on it.

On the other hand, if the percentage of disk time and average disk queue length are both high (above 80 percent disk time and a factor of two or more for the average disk queue length), it means that processes are waiting for the hard disk to become available. Anytime a process has to wait for a component to become available, a user will experience less-than-desirable performance.

Measuring hard disk performance

To accurately diagnose a system's hard disk, you need to measure the percentage of disk time and the average disk queue length.

Begin by performing a full defragmentation on all of the system's partitions to ensure that all files are contiguous and that the hard disk can perform file reads and writes optimally. Click on the Start menu and select All Programs | Accessories | System Tools | Disk Defragmenter.

Once you've defragmented all partitions, run the Performance Monitor utility by opening the Control Panel and clicking Administrative Tools | Performance.

Tip

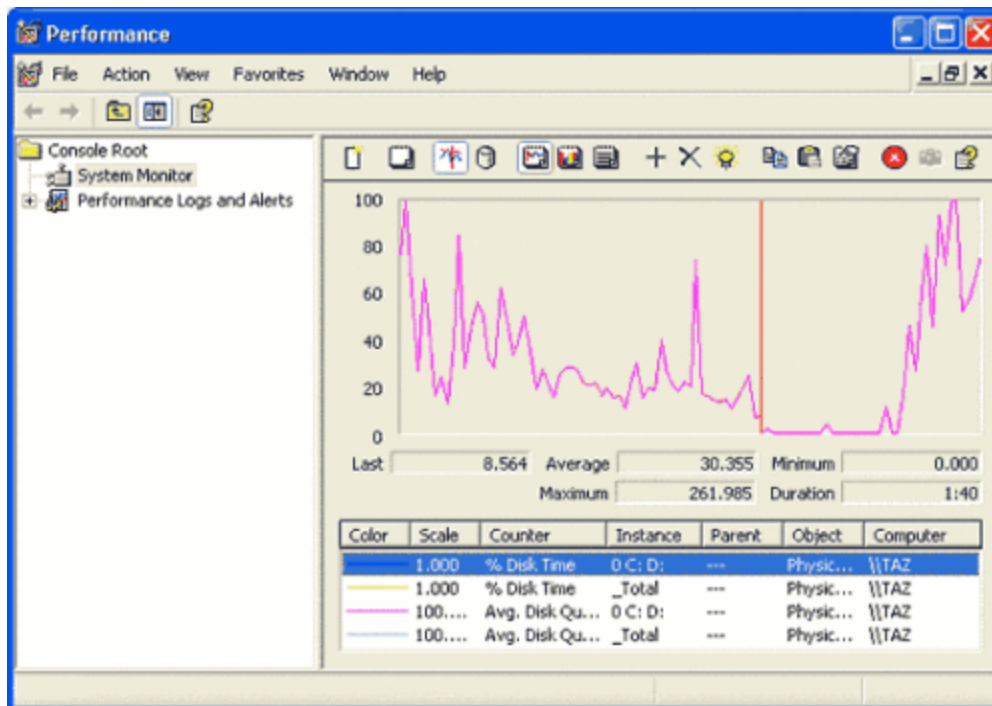
When the Performance Monitor opens, select any counters that are previously running from the bottom of the window and press Delete. Every counter that's running has a slight, but noticeable, impact on the system's performance. Therefore, the fewer counters you use, the more accurate your measurements will be.

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In the Performance Monitor utility, follow these steps:

- Click the Plus icon to open the Add Counters dialog box.
- Next, select PhysicalDisk from the Performance Object dropdown list, which will bring up a list of the physical disk counters.
- Now, select the %Disk Time counter from the list, and select the All Instances radio button to tell the system to measure the performance of all hard drives.
- Next, click the Add button to add the counter to the Performance Monitor.
- Finally, select Avg. Disk Queue Length from the counter list, select the All Instances radio button, and click the Add button followed by the Close button. When you do, the performance monitor will begin analyzing the disk usage as shown in **Figure A**.

Figure A



The numbers beneath the graph refer to the percent of disk time for Drive 0.

As you look at the output, you can see that the lines on the graph correspond to the counters that you've installed. For example, in Figure A, the pink line is predominant. You can tell by the legend that the pink line corresponds to the average disk queue length for the C: and D: partitions of Drive 0. You can also tell the exact values of any counter by selecting the counter that you want to examine. It's best to look at the actual numbers rather than the graph, as the graph can be deceptive if the scale isn't set correctly.

Narrowing down the suspects

Now it's time to figure out which process is using all of those disk resources. The first thing that I recommend to track down the culprit is to press [Ctrl][Alt][Delete] simultaneously to access the Windows Security dialog box. Next, click Task Manager to bring up the Task Manager utility, which reports on the resource utilization of every process running on the entire system.

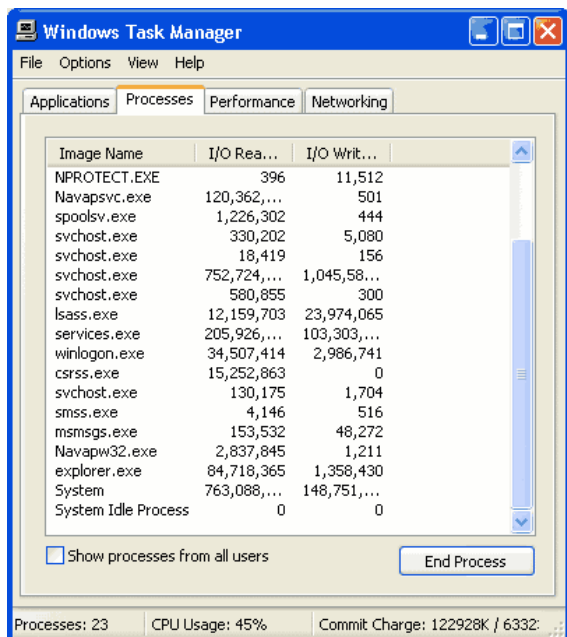
While disk usage isn't one of the factors that Task Manager normally reports, you can configure it to provide this information.

- First, select the Processes tab to view the list of processes that are running on your machine.
- Next, select the Select Columns command from the View menu. You'll now see a list of all of the resources that you can monitor through the Task Manager.

I recommend deselecting every resource except for I/O Read Bytes and I/O Write Bytes. When you click OK, you'll see the number of bytes read and written by each process, as shown in **Figure B**.

The trick now is to go through the list and look for rapidly changing values. It's normal for most of the values to occasionally change, but if you see one that is constantly changing, then the process that corresponds to that value is hogging your system's disk resources.

Figure B



To kill a system resource hog, highlight the process and click End Process.

If the rogue system process is a part of the Windows operating system, there's a good chance that the excessive disk usage is caused by thrashing.

Swapping vs. thrashing

The process of moving memory blocks between physical and virtual memory is called swapping. Although swapping is inefficient, it's a perfectly normal process in a Windows environment. Virtual memory is hard disk space that is used as extra memory. Basically, any time Windows needs to read something that exists in virtual memory, it must move that memory block into the system's physical memory. Thrashing problems are caused by excessive physical and virtual memory swapping.

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However, if the disk usage is traced to a non-Windows process, then you may have problems with an individual service.

Be careful

If you eliminate a process you feel is causing excessive disk usage, processor time and memory will also be affected.

The usual suspects

We've focused on explaining how excessive disk time usage can degrade system performance, and you have seen some ways to track down the processes that create this problem. By using the Performance Monitor to measure both disk time and average queue length, you can get a sense of whether or not the hard disk is being taxed by the systems' processes. Analyzing the Task Manager further narrows down the possible suspects that may be causing the problem.

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Version history

Version: 1.0

Published: June 3, 2009

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