

What's the real capacity of your hard drive?

January 19th, 2010, 3:15 pm · [Post a Comment](#) · posted by [Ed Schwartz, NOCCC](#)



*Stump the PC Club is a free tech-advice column written by members of the **North Orange County Computer Club**, which has been in existence since 1976. Visit the club's site at noccc.org. And don't forget to stop by the Gadgetress' home for the PC Club, at ocregister.com/link/pcclub, to find out how to ask a question and read past answers.*

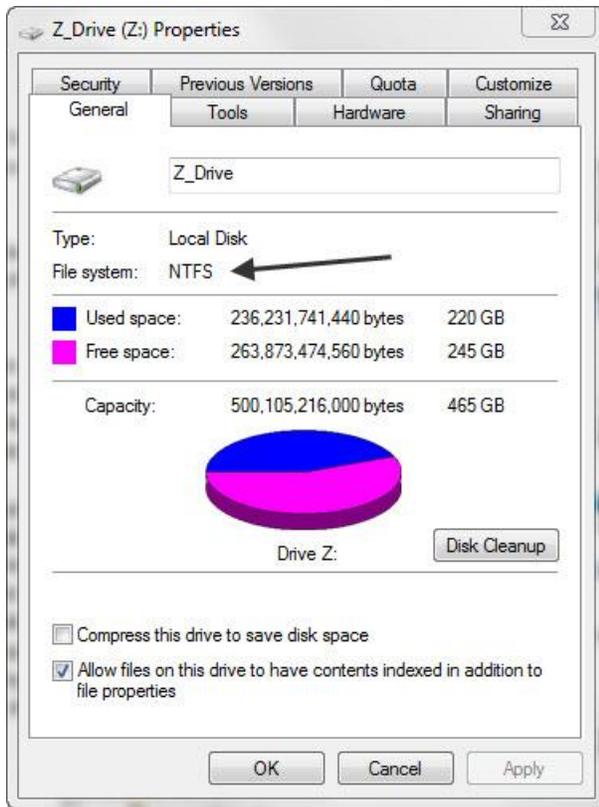
QUESTION: I have a PC running Vista Home Premium. I have a 500 gigabyte hard drive with an actual capacity of 455 gigabytes. When I look at "Properties" for the C drive, it shows that I have used 444 gigabytes with 11 gigabytes remaining. However, when I use Windows Explorer and add up the sizes of each directory (e.g. Documents, Windows, Program Files, etc), I end up with 400 gigabytes used. I have a gap of 44 gigabytes between what Properties says and what I added up. What is in the hidden 44 gigabytes and how can I see what it is?

PC CLUB: This is a common question since there's a lot of confusion regarding advertised disk capacity versus the capacity reported by Windows. This confusion stems from the fact that 1 gigabyte is actually 1,073,741,824 bytes, or 2^{10} . Therefore, if you open My Computer (or Computer in Vista or Windows 7) and examine the properties of a hard drive by right-clicking it, you will see 2 numbers. Assuming the disk is advertised as a 500 gigabyte disk, the numbers will be listed as follows:

Capacity: 500,096,658,212 465 GB

This confusion led to a [lawsuit](#) several years ago resulting in disk drive manufactures having to place the following or similar statement on their packaging:

One megabyte (MB) = one million bytes, one gigabyte (GB) = one billion bytes.



If your PC has a 500 gigabyte drive, then it should have capacity of 465 GB as listed above (and pictured on right). Another way to look at it is that a kilobyte is 1,024 bytes and a megabyte is 1,024 times 1,024 or 1,048,576 bytes. It's easy to think that a gigabyte is 1,000 megabytes but it's actually 1,024 megabytes. The world of PC's is all about powers of 2.

In summary, what this all means is that when you purchase a hard drive with "500 GB Hard Drive" stated on the box and check its properties, it will show up as 465 GB but it actually holds 500,096,658,212 bytes.

In addition to using Windows, you can use a free program called FreeCommander (available at freecommander.com) to examine your disk contents. You can also configure Windows Explorer to show hidden files and folders and hidden protected operating system files while examining your disk's files and folders. I wouldn't recommend this setting permanently, however.

A general rule of thumb to quickly convert the manufacturer's hard disk capacity to the standard Microsoft Windows formatted capacity is to multiply by 0.93. For example, a box labeled as containing a 500 GB drive has a drive with a capacity of 465 GB.

When you use Windows Explorer to add up the size of each directory, you may or may not get the correct numbers but the percentage error will be small. This is mostly true on the C drive which stores non-standard files and folders such as temporary files, hidden files and the Recycle Bin. There are several other free disk usage utilities available

including the following. I have found varying results with these programs since they all treat “special files” differently.

- WinDirStats available at windirstat.info/
- Space Sniffer available at bit.ly/spacesniffer
- Disk Detective available at www.disktective.com/

Another factor to consider is that a file’s size and the space it occupies on a disk may be reported differently. This is due to the fact that files occupy a minimum of 4,096 bytes on most disks regardless of their actual size. ~*Ed Schwartz, NOCCC member. View his Web site at www.edwardns.com.*