Picking Computer Hardware

“How much computing power do you need?”

by Pete Choppin

Along with my career as an IT professional, I am also affectionately known in my family as the "resident computer person." I am often asked what computer to buy, where to buy from, which is the "best," and "Is this computer better than that one?" You get the idea.

A few months ago, one of my relatives, who by no means is a "computer person," spent nearly $1,000 on a new PC. He made some good decisions. He opted for a more reliable Windows XP operating system instead of the less stable Windows Vista (although I believe he should have waited until Windows 7 was released). He bought from a local computer vendor instead of going to a big-box store or mail-ordering online. But this doesn't change the fact that he spent almost $1,000 on a PC tower with dual CPUs, 3GBs of RAM and a 200+ GB hard drive—to check e-mail, surf the Web and use Microsoft Office.

I thought it was kind of a waste. And I tried to tell him as much, although he loves his new machine so much that he didn't listen to me. But then I thought about my own recent purchase. I put together a custom PC with an ASUS P5Q Deluxe system board, Intel Core 2 Duo CPU, 4GBs of RAM and 300GB hard drive. What was I, the family's resident "computer person," going to do with this machine? Check e-mail, edit Web pages, and write articles for *ComputorEdge*. I had to consider, was I wasting money too? Or do I truly need this much computing power?

You do have to consider what your primary purpose will be when you shop for a computer. Will you be doing graphic design work that requires high-end graphics and powerful processing capabilities? Will you be generating complicated 3-D models and rendering textures, spatial regions, and CAD designs requiring massive calculations? Do you need a system for recording and editing professional music? Or will you simply be browsing the Internet, sending and receiving e-mail, using a word processor, playing music and possibly watching a DVD movie once in a while? Whatever your specific task, the computer you buy should be suited for that task. Let's talk about some basic hardware components and what functions they have.

The Processor (CPU)

Also known as the CPU (Central Processing Unit) and sometimes referred to as the "brains" of the computer. Actually, the processor is really just a very fast calculator. Processors are rated by their clock speed, which is (today) measured in gigahertz, or abbreviated GHz. The processor affects mainly anything that requires a high degree of calculation or mathematics to run. We refer to these applications as "processor intensive." These would include CAD and engineering design applications, as well as several scientific or problem-solving software applications that require repetitive or complicated mathematical calculations. You might think this is a key component to how fast a computer performs, but you would be surprised: Depending on what you are running, the processor may have less to do with the computer performance than you think.

Memory (RAM)

There are many types of memory that computers can use; so many that it would take an entire article to explain. Suffice it to say that memory (often referred to as RAM or Random Access Memory) is a temporary storage space in your computer. The word "temporary" is crucial here. Information stored in memory remains there only as long as there is power to the computer. Once the computer shuts down, any data that was in memory is lost. Memory is measured in bytes. Without going into the long history of how bytes came to be, let's just say that a byte is a single unit in computer measurements (or one character of text). The next step is the kilobyte, then megabyte, then gigabyte, and at present we are using terabytes of information. Memory today is being sold by the gigabyte.

The most common type of memory you will see in use today is called DDR2. DDR2 is fast, reliable and still widely available. The next type that is now beginning to see more popularity is DDR3. DDR3 is the next generation of RAM; however, if you want to use this memory you will have to buy the system board that is compatible with it. System boards that now take DDR2 memory cannot use DDR3, and vice-versa.

A good rule of thumb is get the most RAM you can afford. Especially with Windows operating systems, you can never have too much memory (there was a limit of just over 3GB RAM for Windows XP. This has been fixed with 64-bit Windows 7).

Hard Drive

The hard drive is another one of those components on which we could spend a long time, but I would like to make a few points here. First is reliability, or rather the lack thereof. There is no such thing as a fail-proof hard drive. Your hard drive will fail. It is not a question of if, but of when. I cannot emphasize too much the importance of a reliable backup, and entire articles have been written on the subject. It is worth pointing out, however, that the hard drive, with all its problems and non-reliabilities, is a necessary and vital component. We come to depend on our hard drive and can sometimes become complacent. We forget the inevitable fact that the hard drive will fail one day. Just have a backup of things you need saved and you will be fine.

The good news is hard drives really are cheap for the amount of space you get. The first drive I ever purchased was a 150MB drive. That much space today is laughable. Drives now are in the terabytes, which is more space than I can comprehend. This is one of those areas where you need to evaluate what you will be doing with your computer. If all you will be doing is some Web browsing and word processing, you will not need the largest hard drive made; 150GB will be more than adequate. But if you plan to edit large format images or store full-length movies, you may want to consider something in the 500GB range (or more). Now, if you do end up needing something larger down the road, you can always get an external USB hard drive. This can be connected as an extra hard drive for data storage you did not plan on or did not anticipate.

Video

The video components of your computer (video monitor and controller card) control the display of things such as video games, movies and online Web videos. Many motherboards come with a decent video controller; however this is not usually adequate for intense video applications such as 3-D graphics, video editing or high-end video games. For these applications you will need an expansion video card that has much better video capabilities

and more specialized video memory. These cards can either be installed when you purchase the computer or after the purchase. If the motherboard already has a video controller onboard, you simply disable the onboard controller in the system settings and then install the expansion card.

What's the Bottom Line?

So how much will all this cost? Actually, the cost of a new computer can depend on many things. What is in the computer? What is the quality of the components? Is there a warranty or service contract? What software comes installed? All these factors can affect the price of the computer. Much of it also depends on what is important to you—the customer. Is the hardware performance most important, or the service of the company where you buy the computer? Is it the price? Is it the name behind the product? Sometimes you can get a lot of these features in your computer purchase, and sometimes they come at a high price.

Bare Bones

There is a concept in the computer hardware world called "the bare-bones computer," which is a computer that is stripped down of everything that would be non-essential to run the computer; only a basic machine and nothing special. No extras. Nothing more than a basic PC that could be turned on and booted up—that would be a bare-bones computer. You might find these priced anywhere from $400 to $500. The idea is to start from one of these basic computers as your base and build from there, knowing that anything you add to this will, of course, increase your total cost of the computer.

Many computer hardware companies will offer this type of shopping method. They allow you to "customize" a computer by offering you selections of components. You begin with the bare-bones computer, and as you make your selections, you see your price go up. The benefit of this type of shopping is that you can add and subtract components as you go along, and you really can customize your computer. Also, you are pretty much assured that the components you are offered are all compatible, one with another, so it takes the guesswork out of selecting compatible computer parts.

From time to time I like to experiment and take a trip down dream land and build my "dream" computer this way—just to see how much it would cost to buy my ultimate PC. If you try this, just be careful not to turn that dream into a reality unless you are ready. The price for my dream computer: $3,500.

Questions

Here are some questions people frequently ask me about computer shopping:

What about the "Big Name Computers" at the "Big Box Stores"?

These are Dell, HP, Compaq (which is HP) and IBM machines available either online or at the big stores such as Best Buy and Costco. Should you buy from them?

Well, I don't. This is because I don't like dealing with an enormous company where I am just one of thousands of customers. The customer support tends to be lousy, you don't usually get

the selection that you can from a local computer store, and frankly, I don't think their product is really all that terrific. However, I have talked with some people that have been very satisfied with their Dell computer. Take that for what it is worth.

What about the Mac?

I like the Mac. I want a Mac. And as soon as I can afford one, I will get one. They run about twice the price for about half the computer, but they are rock solid and really cool. If I could get one today, I would.

I have been told, "Buy as much PC as I can afford." Is that true?

In general, yes. I do recommend that strategy for two reasons. First, PC prices are still dropping like crazy. Second, I have tried cutting corners before, and my personal experience is that it just does not pay. You do, in fact, get what you pay for with computers. Put as much money as you can afford into your computer. Do not buy cheap, off-brand components. You will be sorry if you do.

How often should I replace my computer?

Every four to five years. That is about as long as technology will allow you to function without changing your computer. Beyond that, your computer will become truly obsolete—I'm talking beyond the definition of the power user.

Should I get a laptop?

How mobile are you? That, in my mind, is the defining point. Yes, it is true that today, a laptop can do about anything a desktop can do. But what you are paying for is the ability to carry the computer around. It is that simple. Laptops are, comparatively, more expensive than desktops and they tend to be less reliable. The only real trade-off is that you can take laptops places. So if you do need to go places, and you do a lot of work at those places, then I recommend a laptop. Otherwise you are wasting your money.

If you have other questions or comments, feel free to submit them and I will be more than happy to try to give you an answer.

Resource

Tom's Hardware Guide—The definitive guide to all things hardware.