

ComputerEdge™ Online — 02/12/10



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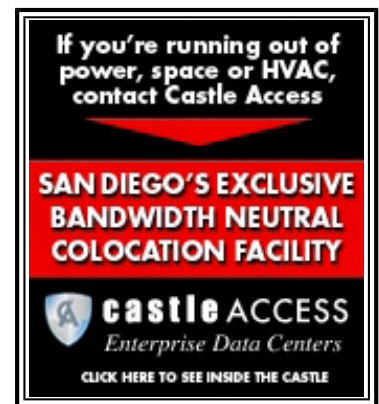
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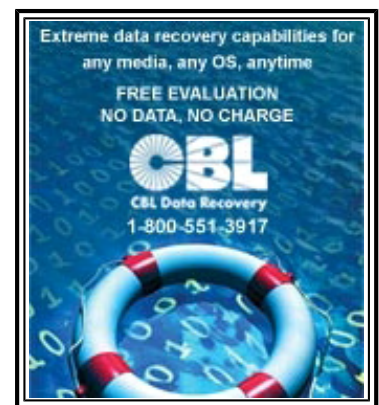
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Digital Dave

“Digital Dave answers your tech questions.” by *Digital Dave*

A reader's Internet connection got lost during an OS upgrade. Are drivers the answer?; a reader purchased a new flat-screen LCD monitor that isn't working with his older computer; a reader's computer is infected with Trojans and it may be time to start with a clean slate.

Dear Digital Dave,

I recently upgraded my Windows 2000 operating system to XP. When I changed it, my Internet connection stopped working. Can you help me get back online? Is it the Internet drivers or the network adapter driver that I need to change? And how do I find out which drivers I need? Do I need to pop the case and look at the network card, or is there an easier way?

Carolyn
Ramona, CA

Dear Carolyn,

There are a number of things that you want to try before opening the case on your computer. In most circumstances, these steps will get your connection back unless your network card has gone bad. Replacing the network card is generally a last resort, although not necessarily uncommon.

First, it could be the drivers for your network card. This is old equipment if it was running 2000. This would be evidenced by the network adapter not showing up in the network adapter list (Control Panel/Network Connections). It's probably not a bad network card if it worked in 2000 recently.

The first trick is to renew the IP (network address) of the computer. In Windows XP, select the Run command from the Start menu and type "ipconfig /renew" (without the quotes). Run the command, then test your Internet with your Web browser.

If that doesn't work, the next step is to reset all of the components in your Internet connection: the modem, the router (if you have one) and the computer. Power down all three of these devices. (You will most likely need to disconnect the power adapter for modems and routers.) Then, in the following order:

1. Power up the modem; wait 10 to 30 seconds.
2. Power up the router; wait 10 to 30 seconds.
3. Power up and log on to your computer.

This process allows each component time to assign a new IP to each device. In my experience, this sequence usually brings back Internet access. If not, then you may have an IP conflict.

Open the Control Panel and select Network Connections. Right-click on Local Area Connection and select Properties. In the Properties windows highlight Internet Protocol (TCP/IP) and click the Properties button. A window similar to Figure 1 will open. Make sure that "Obtain an IP address automatically" is selected and click OK. After closing all the windows, restart the computer.

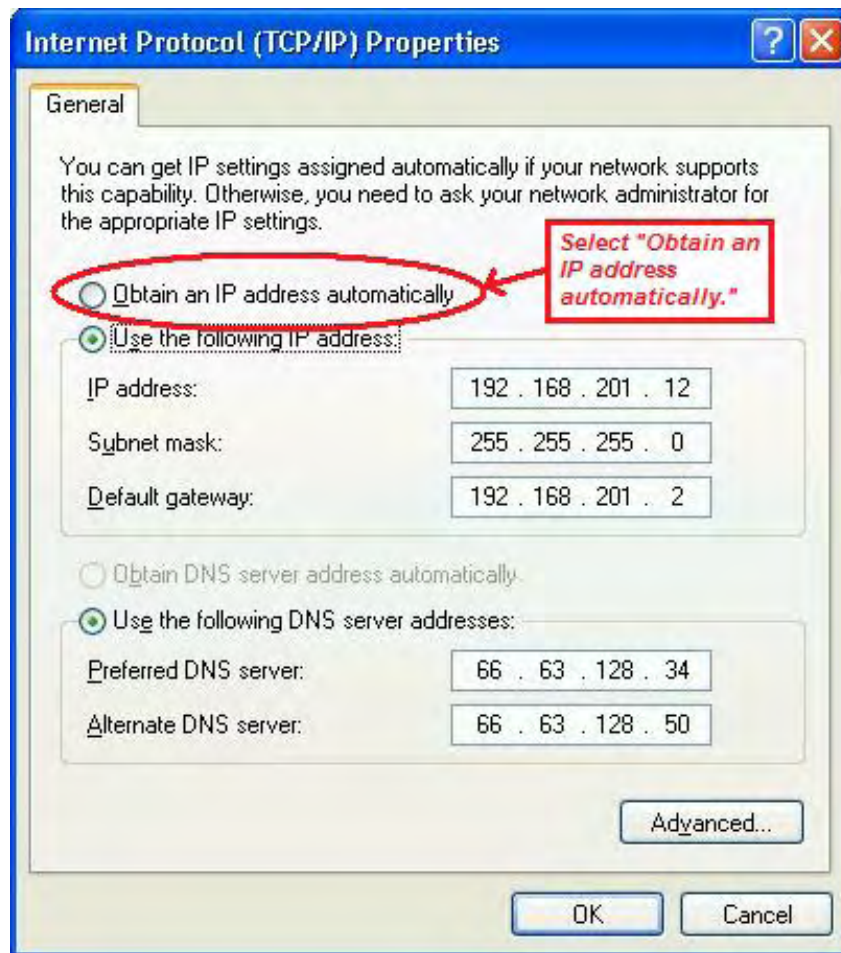


Figure 1. Internet Protocol (TCP/IP) Properties window in Windows XP.

If none of the above works, it is possible that you have a bad network cable or your network card has gone bad. Swap those out as necessary.

There are other possibilities that involve the router, but since you only changed the operating system on your computer, it's unlikely that the router or the modem is the problem. You may also want to call your Internet provider to make sure that the problem is not on their end before you start swapping out components. They should be able to tell you if your modem is operating properly.

Digital Dave

Dear Digital Dave,

I have a five-year-old 2400 Dell PC. I changed the monitor (CRT) to a flat (new) monitor, but when I did, it did not work. What do I have to do?

*Conrad
Chula Vista*

Dear Conrad,

Does the monitor power up? Is it plugged into the right video port? If it's a new LCD, it probably has both the older video and DVI cables. If you use the video cable (likely in this case), then you probably have to switch to that input on the monitor, as they usually default to DVI now.

If that doesn't solve the problem, while it's rarely the drivers, usually new flat-screen monitors come with a disc that contains the drivers for optimizing the screen with your computer. Most often, if you load those drivers (put the disc in your DVD drive and run the setup), then your monitor will automatically be properly configured. If you don't have a disc, then you can probably download them from the manufacturer's Web site. (This is a tough trick, if you can't see the output on your new screen. You will need to load the drivers with your

old monitor, prior to plugging in the new monitor.)

It is possible, although highly unlikely, that your video card will not support your new flat screen. Most flat screens will drop to a low resolution for older video cards. If your video card is incompatible with the monitor, you will need to replace it. Make sure that you take the old video card with you when you buy a new one. This way you can ensure that you have an identical interface (connector) on the card. This is a huge problem with older computers because the connectors have changed regularly, and you may have trouble finding a video card compatible with your machine.

Digital Dave

Dear Digital Dave,

I have had an infected computer since May 2009. I get funky pop-ups on booting. IE runs a little screwy. Sometimes the screen goes blank or I get residual images from a closed screen.

I think the problem malware is called Trojan.Win32.Tdss!IK, Trojan.Win32.Alureon!IK, Trojan.Win32.Small!IK and Trojan.Win32.Agent!IK.

I have run the a-squared anti-malware program and it finds the files, but I never seem to get rid of it completely. I have run AVG 8, but it doesn't find this malware. I also have run SpyBot Search & Destroy. Also, I suspect this Trojan is preventing me from updating my antivirus programs.

I am running Windows XP-SP3 Home edition, version 2002. It has an AMD Athlon XP 2400 processor, 2GHz, and 624MB RAM. I have two drives, and I use DSL.

I hope you can help me out.

*Byron Morton
San Diego*

Dear Byron,

Wow! I could see you spending weeks trying to eliminate all those problems. It's sad to say, but sometimes it's best to start all over. The most insidious viruses get embedded in the operating system where it's extremely difficult for the antivirus software to root them out. While the virus cleanup can usually be done (eventually), even the experts will often defer to a fresh install of the operating system. It's just easier.

If you don't want to reformat one of your current hard drives because of data that you will lose, buy a new one (not that expensive) and reinstall the operating system. Reinstall your software from the original discs. Do not attempt to copy programs from your old drives. Then after you have antivirus software installed that will scan all files copied to the drive, add the other drives one at a time as a second drive. Copy over the data files you want to keep.

Sometimes it's best to start with a clean slate.

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Solid State Drives

“The good news, what to watch out for, and where the solid-state craze is taking us.” by Pete Choppin

Depending on who you talk to, the rush to solid-state storage—a purely electronic system without moving parts to fail or slow performance—is on the horizon, just over it, right around the corner, or already upon us.



I am thrilled this week to be able to write about solid-state drives. Ever since I heard that the storage technology was moving to a purely electronic system without moving parts to fail or slow performance, in addition to the read/write access time being more than double that of the fastest hard disk drives in bench tests (see Computerworld's review, June '09 ([www.computerworld.com/s/article/9134468/Review_Hard_disk_vs.](http://www.computerworld.com/s/article/9134468/Review_Hard_disk_vs._solid_state_drive_is_an_SSD_worth_the_money_) [solid_state_drive_is_an_SSD_worth_the_money_](#))), my geek meter began flashing and, like many of my IT friends, I just had to have one.

Depending on who you talk to, the rush to solid-state storage is on the horizon, just over it, right around the corner, or already upon us. Analysts, journalists and hardware fanatics can't seem to come to an agreement on exactly where we are in the process. One thing seems certain, though. It's not a question of *if* solid-state storage will take over from traditional mechanical hard

drives, but *when*.

This is not to say that the mechanical hard drive is on the way out. The steady pace of platter development is still yielding impressive increases in performance and capacity. But as the price of solid-state alternatives continues to drop, SSDs are sure to carve out a niche in the mobile space, where their superior shock tolerance and low power consumption are as important as their storage capacity. Solid-state drives won't just dominate notebooks, though. The near-instantaneous seek time of flash memory offers tantalizing performance potential for any workload.

But before I start getting too excited, let's first break this down into exactly what all the hype is about solid-state. We'll also talk about the good news, what to watch out for, and where this is all taking us.



What Exactly Is 'Solid State?'

Solid state refers to the electronics that make up the circuitry on the main board of the drive. A solid-state drive (SSD) is made entirely of semiconductors.

I am sure someone out there is thinking the USB flash drive has been around for quite some time now and that the SSD is simply a modified USB flash drive (without the USB interface) that is built into a computer, and they are nothing more than the portable external devices we are so familiar with. This is sort of true, for the most part. There are, however, some important differences to understand in order to be aware of how an SSD performs and why there is such a dramatic price difference between the two technologies.

Also, there is a difference in the form factor of the drives. While a flash drive is designed to be external to the computer system, an SSD is designed to reside inside the computer in place of the traditional mechanical hard drive.

NAND and SDRAM

Solid state disks use either NAND flash (en.wikipedia.org/wiki/Flash_memory) or SDRAM (non-volatile and volatile storage respectively). NAND flash is so-called because of the NAND-gate technology it uses and is common in USB flash drives and many types of memory cards. NAND flash-based drives are persistent and can therefore effectively mimic a mechanical disk drive. Synchronous dynamic random access memory (SDRAM (en.wikipedia.org/wiki/SDRAM)) is volatile and requires a separate power source if it is to operate independently from a computer.

Capacity is also a factor that differentiates the USB flash from solid state. Because the SSD is designed to replace traditional hard drives, their storage capacity needs to be able to handle an entire operating system as well as the applications and data typically used on desktop and laptop computers. This can be a problem where cost is a concern, as we will look at later.

The Good News

Obviously, one of the most impressive things about solid state is the stability. The NAND flash memory cells found in SSDs can last for years beyond the three-to-five-year life expectancy of a magnetic hard drive. Because hard drives include numerous moving parts, they are vulnerable to wear and tear over time, especially if dropped or jostled.

An SSD can still break if you drop it, but as a whole, the lack of moving parts makes them less prone to damage. If left unbothered, a solid-state drive can last up to 60 years longer than a hard drive in a similar desktop environment. And as an added bonus, SSDs don't produce any noise and generate very little heat.

Another plus is performance. Unlike the mechanical hard drive, SSDs don't have to wait for a physical arm to move read and write heads to specific points on a spinning magnetic platter. Reading from flash memory is a virtually instantaneous process, giving SSDs the ability to reach faster random read times and greater read throughput than magnetic hard drives.

The Not-So-Good News

Well, not all the SSD news is good, although it is getting better all the time. NAND flash is still a relatively expensive technology, making for a high cost per gigabyte. Some manufacturers have managed to lower the cost of SSDs by using multi-level cell (MLC) technology to cram more bits of data onto a single memory cell. The problem is, MLC technology incurs a performance hit over single-layer cell (SLC) technology. The voltage complexities involved in maintaining the multi-bit cells can significantly slow the speed of write operations.

And just a caution: Unless a manufacturer specifies what kind of flash memory powers its drives, you won't know whether you're getting high-performance SLC or low-performance MLC flash. The price tag is the only distinguishing factor outside of benchmarks. MLC drives are among the cheapest SSD drives available (typically half the price of SLC SSDs).

Also, SSDs can suffer from inferior random write and sequential write times because the data on an SSD is stored in kilobyte-size blocks. Adding more data to a block is a time-consuming process: The SSD copies the entire contents of the block to RAM, changes the data in the block, erases the original block of data on the SSD, and writes the changed block back to the SSD.

The Future of Solid State

So where are we headed with all this? All signs are showing the market is moving closer to affordable and more reliable solid-state technology, especially with mobile devices. Laptops, notebooks and PDA devices all are taking full advantage of SSD benefits such as less weight, shock-proof features and much lower power consumption.

Also, expect to see upgrades in controllers and NAND flash push SSD prices lower over time, but don't hold your breath for either hard drives or SSDs to ever oust the other from the marketplace. According to Michael Yang, flash product marketing manager for Samsung, NAND flash capacities will continue to grow at a rate of 40 to 50 percent each year. This puts SSD development on par with the 40 percent capacity growth touted by top hard drive manufacturers.

Single-layer cell (SLC) and multi-layer cell (MLC) technology will continue to make up the flash cell foundations of solid-state drives. But according to Yang, SSDs will start moving away from the conventional form factors—1.8-inch, 2.5-inch and 3.5-inch drive sizes—established by the magnetic hard drive market. This could bring forth SSDs of all shapes and sizes, an appealing prospect for notebook vendors that want more internal customization options.

A Word of Caution

Solid-state drives may seem to be *the* solution to less reliable and slower-performing traditional hard drives—especially for a total geek, such as myself, who loves new and cool technologies. But you need to know what you are buying, just like any new technology. You might not realize what you're getting when you purchase an SSD. The nuances of an SSD's construction can make a huge difference in its performance.

Here's My Take

The potential for this technology is, frankly, astounding. Just think—storage technology where there are no moving parts to break or slow performance, access is literally light speed, and lifespan of the drive is six to 10 times that of conventional storage media. We're only on the cusp of the solid-state storage revolution.

However, right now the MLC-based drives just aren't worth their low prices. While their read speeds are certainly impressive compared to those of the fastest hard drives, poor write performance holds them back. I wouldn't use an MLC-based device as the primary volume for my operating system. The capacity just isn't there yet. The Windows folder alone on my Windows 7 Ultimate system registers just shy of 14GB. Office 2010 will want 3GB. You've probably got several gigs of your own apps that need to be installed. Keep in mind that you want to leave at least 20 percent of your SSD free for optimal performance. I really don't recommend anything less than 64GB for a boot drive these days and though you can certainly find solid-state drives in that capacity, they carry a high price tag.

There will come a day when solid-state drive technology is a more compelling desktop option. Maybe NAND flash will get cheaper to produce or larger-capacity SSDs will start bumping down prices on the lower-capacity end of the SSD spectrum. Don't expect this turnaround to occur for a while yet. This is only the beginning of the storage war.

Related Resources

- From Tom's Hardware Guide (www.tomshardware.com/reviews/windows-ssd-performance,2518-2.html)

- Review from Computerworld (www.computerworld.com/s/article/9134468/Review_Hard_disk_vs._solid_state_drive_is_an_SSD_worth_the_money_/)

Pete Choppin has been an IT Professional for over 15 years. He currently works as a network and systems administrator for a company called Albion based in Clearfield, Utah. He has experience in all types of hardware, software, and networking technologies. He is proficient in many operating systems including Linux, Windows and Macintosh. His interests include cooking, sci-fi, computers and technology, and Web design—a semi-professional endeavor, having designed Web sites in the dental field, e-commerce businesses, and for the Boy Scouts of America.

Pete has been a devout reader of *ComputerEdge* since 1990 and contributes regularly to featured articles as well as the Linux Lessons section of *ComputerEdge*. He can be contacted at pchoppin@comcast.net but prefers to have comments on *ComputerEdge* articles submitted to the editor and posted for the benefit of all readers.

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How Memory Sticks Work--It's Not As Complicated As You Think

“When you hold one of those tiny data sticks in your hand, treat it with respect.” by James Hartnett

Memory stick technology is changing the world around us in ways we cannot even imagine, and those changes are only coming faster and faster.

Here it is, 2010, and we still don't have flying cars, food pills, or vacations on the moon. That's the way the 21st century was always portrayed when I was growing up: a time when technology would provide seemingly magical solutions to our problems. Instead we get office cubes, electronic junk mail and climate change. I guess we're all still waiting for that 21st century in which all our problems are part of history.

Thankfully there is one area that has exceeded even the rosiest expectations of the 21st century future we all wanted: microprocessors and their semiconductor cousin, memory. Even the projected 23rd century of Star Trek had Mister Spock swapping around data cubes, and the main computer of the Enterprise used reel-to-reel tape storage.

If Mr. Spock were around, I would be happy to help him out with some digital storage. I could give him a tiny device, weighing less than an ounce, and small enough to fit in those tight-fitting Star Fleet uniforms. It operates silently, quickly and with no moving parts: the USB data stick.

A Bit of Information About Information

To understand how USB stick drives work, all you need to know is binary mathematics, semiconductor physics and a bit of electrical engineering. That doesn't sound too hard, does it? Let's get started with the math—always the best starting point for understanding any aspect of technology.

Any information that can be expressed as drawings, pictures, sound or text can be represented mathematically as a stream of ones and zeros. Everything, from teenage Facebook angst to Hamlet, can be converted to ones and zeros. Just as you can take the letters of this article and convert them to Morse Code, so you can also take the letters of this article and express them with a binary code called the American Standard Code for Information Interchange—ASCII.

The determination of what code goes with what letter is arbitrary, just as it is with Morse Code. In ASCII, an upper-case A is represented with the bit pattern 01000001. These bits have no intrinsic meaning; they could stand for any letter. But if we are to make sense of each other's binary information, we all must agree. So we agree that 01000001 stands for "A."

Each of these ones or zeros we call a bit—and it's the smallest bit of information you can come up with: 1 or 0, dot or dash, high or low, true or false. It doesn't matter what you call it: it's binary information.

Some Easy Math

Bits have their own sort of math, but, like the bits themselves, it is quite simple. Instead of addition or multiplication, bits have three main operators: AND, OR and NOT.

NOT is the simplest—it just turns a bit to its opposite value. If bit A is a one, then NOT A is zero.

OR works just like it sounds—the output of an OR is 1 if any of its inputs are one. So A OR B is one if either A or B is one. In other words, A OR B is true if A is true, or B is true (or both are true).

AND is the complement of OR—the output of an AND is 1 if all of its inputs are one. So A AND B is one if both A and B are one. Otherwise it is zero. For an AND to be true, all of its inputs must be true.

The NOT can be applied to the output of the AND and the OR operators, to get the NAND operator. For an NAND, the output is one only if all inputs are zero. (This is the same as the AND, with the final result flipped from zero to one or one to zero.)

There are nice diagrams for the AND, OR and NOT operators, or "gates." Below is the diagram for the NAND gate, which is the gate used to construct USB data stick memory.



The NAND Gate outputs zero unless both inputs are zero, then it outputs one.

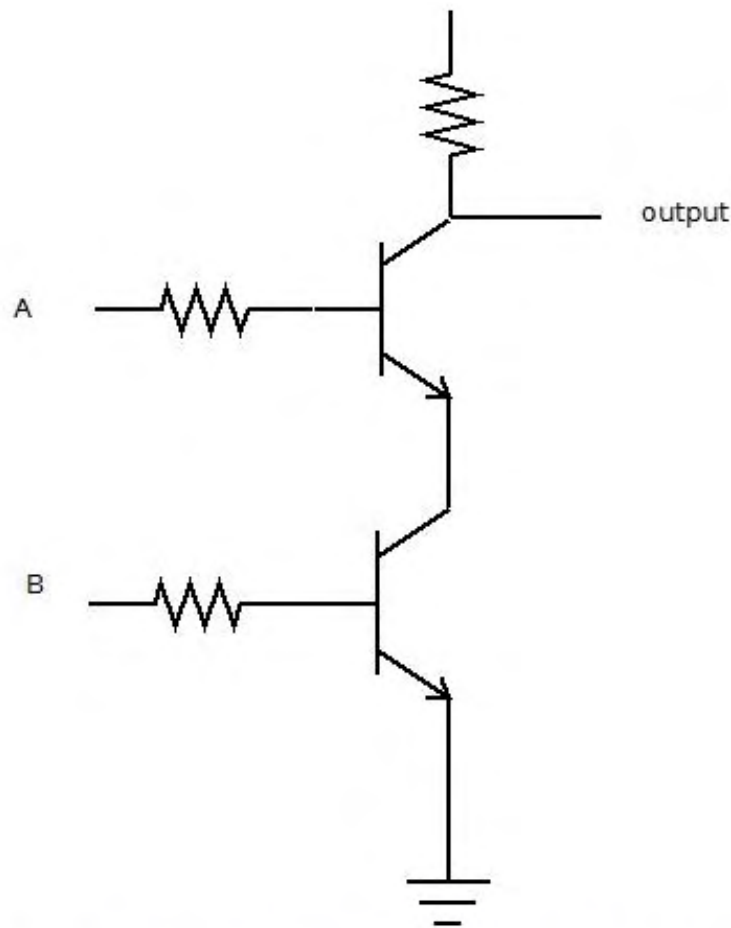
Now for the Hard Part

So far, this is all very simple. And if I showed you some electronics, some little wires and cylinders soldered into a circuit board, and told you it was a NAND gate, I would have little trouble convincing you that it takes two inputs, has one output, and matches the functionality of a NAND gate.

But I can't show you the electronics, not without an electron microscope, because they are very, very, very small indeed. Really tiny. Itsy-bitsy, teeny-weeny, little electronics. And here's where it gets complicated.

The simple part is the fact that some materials, like copper, can transmit electricity, while others, like rubber, cannot. We call the materials that can transmit electricity conductors, and those that can't insulators. Some materials, like silicon, can function as conductors sometimes, and insulators other times: semiconductors.

Using semiconductors, electrical engineers can construct something called a transistor. In fact, they can construct billions of transistors on silicon the size of a postage stamp. The NAND gate can be very simply constructed from two transistors and three resistors. It's simple, but it's not easy!



This circuit diagram shows the simple way of building a NAND gate with two transistors and three resistors.

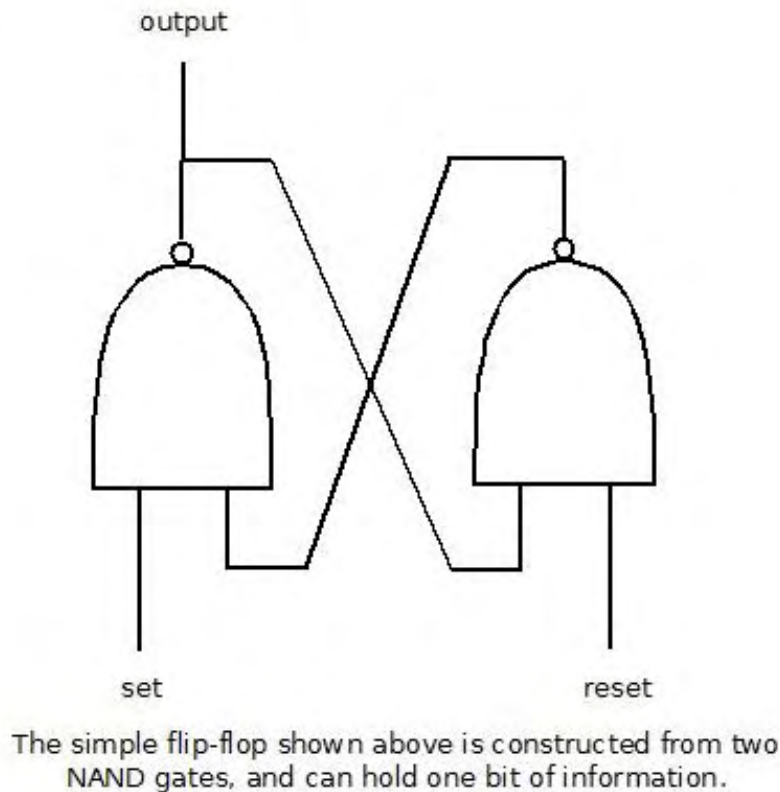
The beauty of a transistor is that it turns on or off depending on an input signal. The diagram above shows two transistors in series, and the inputs A and B control their operation. If A is true then the top transistor lets current flow through it. If B is true, the bottom transistor lets current flow through it. If both are true, then both transistors are open to current flow, and the output of the entire device will be 0. This is the NAND gate.

Flip-Flop—Bad in a Politician, Good in an Integrated Circuit

Take two NAND gates, and feed the output of each into the other, along with two other inputs. You can create a simple memory device. By setting one of the inputs momentarily to one, the output of this paired NAND gate becomes one. The output remains at one long after the original input is gone, because the output from one NAND gate feeds into the other.

This device is called a flip-flop, so called because of the noise it made in operation when first built from vacuum tubes and electronic relays. But now it's all atoms flowing around in silicon, and silent as a tomb.

The flip-flop holds one bit of information. It can be set to one, and reset to zero, and that's all it does. But that's all you need (if you have enough of them) to hold the collected works of Mozart and Britney Spears, the writings of Shakespeare, Ghandi, Einstein, and more than 250 million people on Facebook.



Putting It All Together

Now that you understand how a flip-flop holds one bit of memory, just multiply that by 1,048,576 and you have a megabit. Take eight sets of those and you have a megabyte. Multiple that by 1,048,567 times, and you have a gigabyte of storage. That's a total of 8,796,093,022,208 flip flops—all on a device smaller than your thumb.

These days, data sticks can easily be found up to 128GB, and 256GB data sticks are starting to come out. Where will it all end? Will we one day have data sticks so large that they can hold all the information collected by humans, up to the invention of computers? It seems that such a feat will be likely in just a few years.

The Silicon Age

Historians may one day divide human history into ages of stone, bronze, iron and silicon. When we learned how to use stone, bronze and iron, we increased the range and strength of the tools we use. With silicon, our tools can now incorporate brains—in some way they can be said to think.

Now our tools are not just stronger, they are smarter. This certainly represents a fundamental shift in history, more significant, perhaps than the addition of the many properties of iron to the human toolbox. And this process has just begun. We have already moved to robot manufacturing in some industries, and the others must surely follow as robots become smarter, better and cheaper with the silicon-based technology that drives them.

Robot cars have already been developed that can drive across country without accident, and everyone is amazed. The amazing thing is that we endure so many deaths and injuries in automobile accidents every year, when clearly robot cars would be far safer. They will never tire (or have a few too many). They will have senses beyond our limited biological eyes and ears, seeing into the infrared, through fog, communicating with each other.

The disruptions to our society from a switch to robot-based manufacturing are under way, and the disruptions due to the penetrations of robots into other areas of our lives are just beginning.

When you hold one of those tiny data sticks in your hand, treat it with respect. It is changing the world around you in ways that you cannot even imagine, and those changes are only coming faster and faster. But at least you know a little about how data sticks work, and though

they are truly amazing devices, they are built from almost countless little devices, not too hard to understand one at a time.

James is a writer and software developer who has been with the free software movement from the beginning. He lives, writes, and programs in sunny Colorado.

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Windows Tips and Tricks

Windows Tips and Tricks: Changing Drive Letters

“Disk Management for Drive Letter Reassignment” by Jack Dunning

The Windows Disk Management feature makes it relatively simple to change the drive letter assignments of your removable devices.

If you use Windows Backup and Restore Center to protect your most valuable work on an external drive or save it to a mapped drive on a remote computer, then you will note that the designated drive is assigned its own letter (F, G, H, etc.). When the program is automatically launched, there is a potential problem if the drive is either not found or has the wrong drive letter.

If you use an external USB hard drive as well as a USB flash drive, you could easily encounter this problem. Drive letters are generally assigned to USB devices as they are plugged into the ports, although I have noticed some consistency when using a port such as the Secure Digital Card slot. If contrary to your normal procedure, you happen to plug in the flash drive before the hard drive, you will get a different set of drive numbers assigned.

In Figure 1, the drives are displayed in Windows Explorer (also called Computer in the Start menu, CTRL+E). The drives include one hard drive (two partitions), a DVD drive, an external hard drive, a flash drive (also using two drive letters) and a Secure Digital card in the special slot. The hard drive uses two drive letters, C and D, with D being used for the recovery partition. The optical drive is assigned E. F and G have been assigned to the flash drive and appear as two separate drives even though they coexist on the same memory stick. (F is for accessing the programs that came with the flash drive.) The external USB hard drive is G:. The SD card is I.

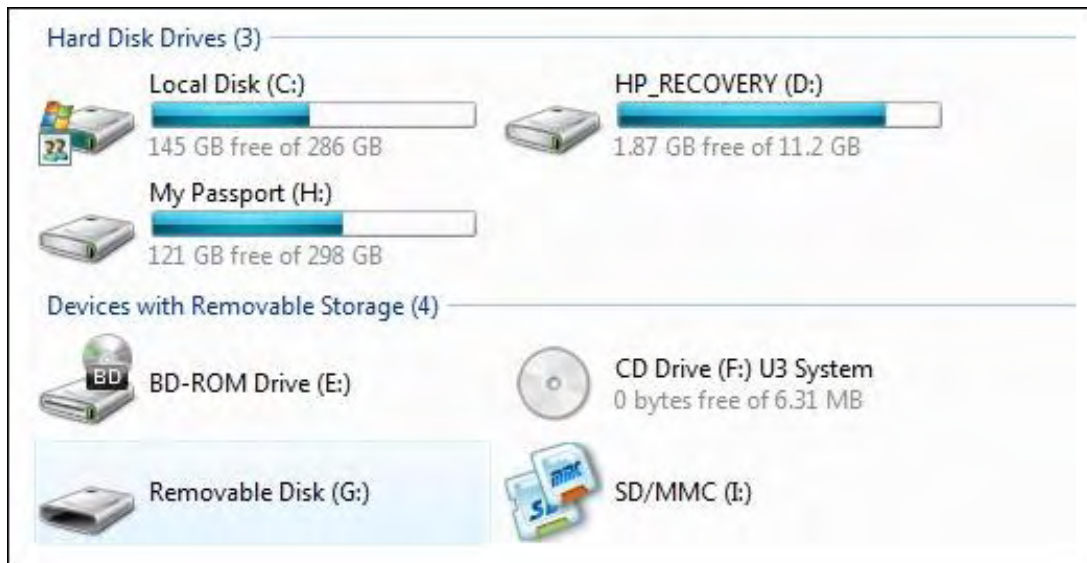


Figure 1. Windows Explorer displaying installed drives.

Normally, I would plug in the external drive first with it being assigned drive letter F, then the flash drive would occupy G and H. In situations where programs use the drive letter for finding letters, it does matter which order devices are added to the computer. You might think that you could merely remove both devices with "Safely Remove Hardware" and reinsert them in the proper order. This will not work because unless you have a fresh reboot, the system remembers which device is which for drive letter assignment. At this point you could reboot the computer with the devices removed, then reinsert the devices in the proper order, but there is an easier way.

This is done through the Disk Management program discussed two weeks ago. While you can view Disk Management through Computer Management, the quickest way to load the disk drive program is to select Run from the Start menu and enter diskmgmt.msc (see Figure 2). The disk numbers on the left (Disk 1, Disk 2, Disk 3) do respond and change when the drives are removed and reinserted in a different order, reflecting that new order; however the drive letters will not change without a reboot.

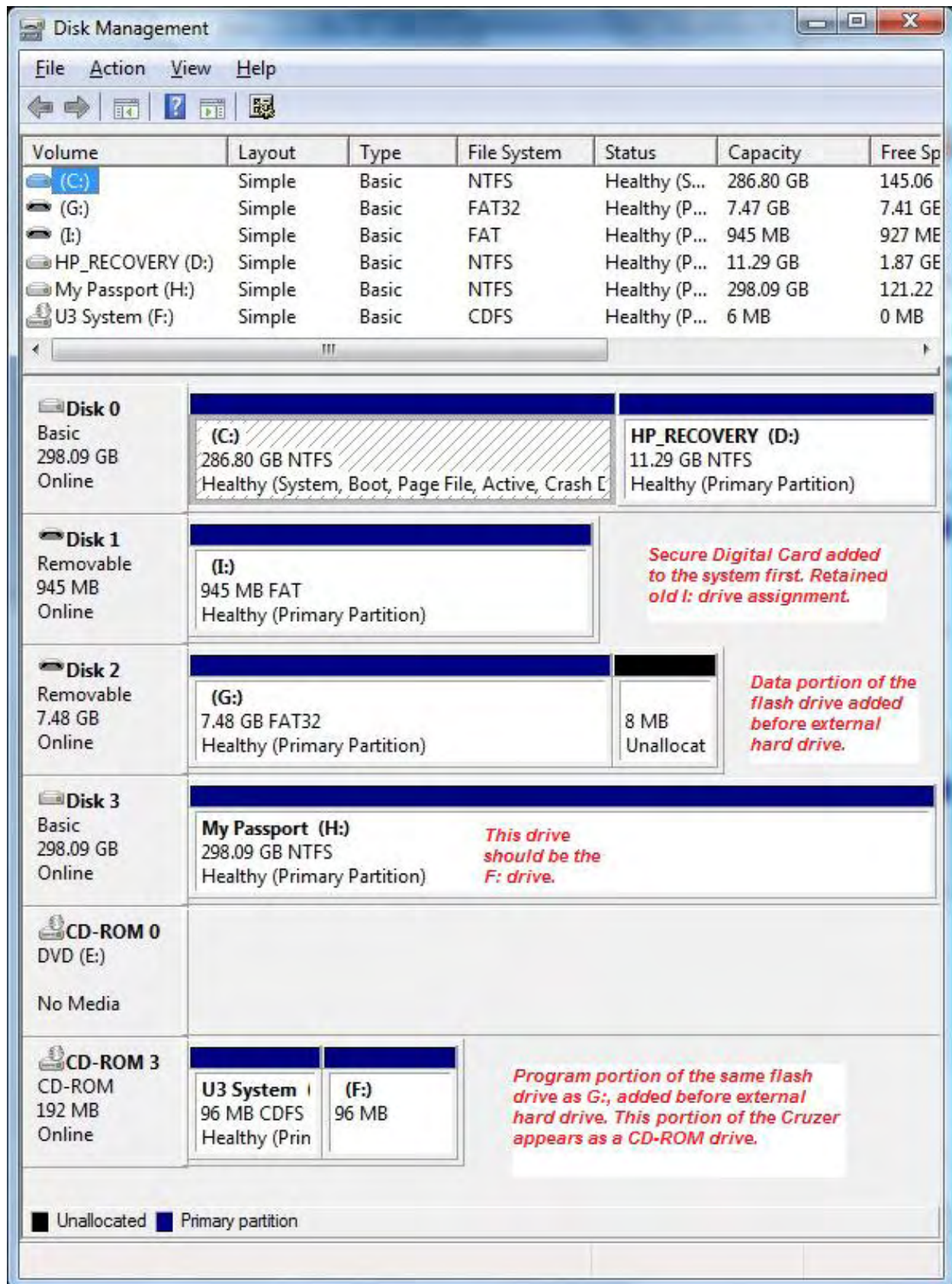
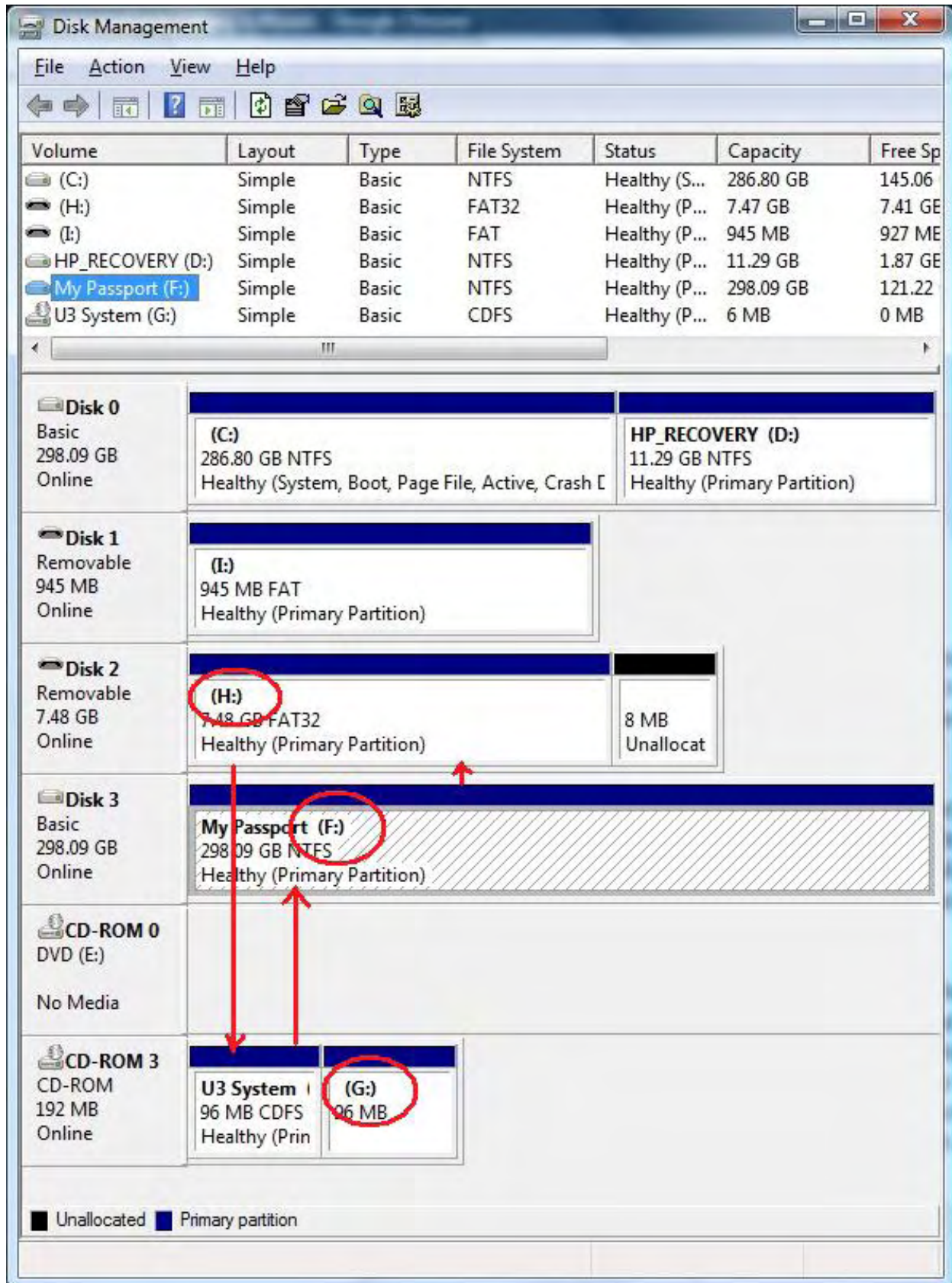


Figure 2. Disk Management displaying installed drives with wrong drive letter assignments.

At this point it is relatively simple to change the drive letters of your removable devices. Right-click on one of the drives that you plan to reassign and select "Change Drive Letters and Paths..." A window will open offering the option to "Add..." or "Change..." Selecting "Change..." will open a window where you can select a new drive letter from a drop-down menu. You may select any drive letter, since only those that are unassigned will appear. You will need to perform this procedure on each drive until you have all the drives assigned the way you want them. If you are swapping two drive letters, you will need to first assign one of the drives to a temporary location until you have freed up its permanent destination. Once you have completed the process, the drives will have the desired new assignments as shown in Figure 3.



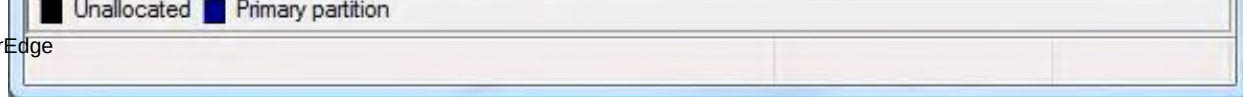


Figure 3. Disk Management displaying new assignments for the installed drives.

One Additional Tip: If you want to assign a drive to a particular folder name to fool a program into looking for data or programs on a different external or temporary drive, you can create an empty working folder and use the "Add..." button to assign that folder name to the drive.

Jack is the publisher of *ComputerEdge* Magazine. He's been with the magazine since first issue on May 16, 1983. Back then, it was called *The Byte Buyer*. His Web site is www.computoredge.com. He can be reached at ceeditor@computoredge.com

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Wally Wang's Apple Farm

“Solid-State Drives: The Mac Perspective” by Wally Wang

Apple's new iPad relies on solid-state storage to maintain a slim profile. As more people rely on mobile devices, expect to see solid-state drives appear in everything. Also, the digital book revolution is coming, but it's not going to be as promising as everyone thinks; the future of computing belongs to Apple, Amazon and Google; IPA naysayers are simply afraid; and a tip on dragging a file over an icon on the Dock to load that file.

Wally Wang's Apple Farm

Hardly anyone uses floppy disks anymore, and lomega's once-popular ZIP drives haven't been seen in years. So it's no surprise that old-fashioned mechanical hard disks are on their way to obsolescence.

Right now, the main advantage of mechanical hard drives is their low cost, especially when compared to rival solid-state drives. If you want a solid-state drive on a Macintosh, expect to pay \$400 or more for that privilege, and even then you can only get a solid-state drive for a MacBook Pro or MacBook Air.

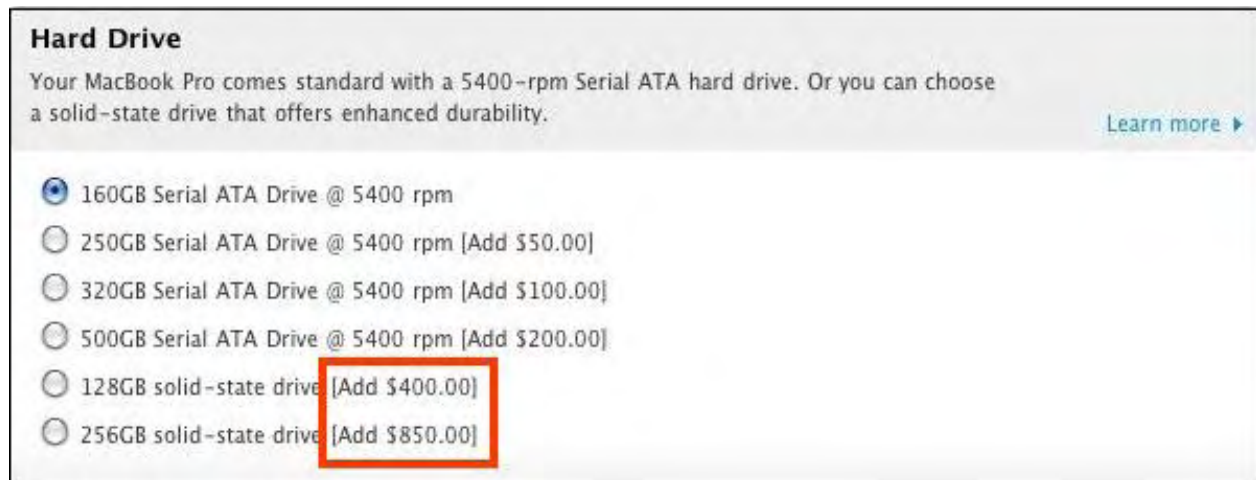


Figure 1. Solid-state drives are expensive options for the MacBook Pro and MacBook Air.

The main advantage of solid-state drives is reliability. Instead of storing data on a physical metallic platter spinning around an enclosure, solid-state drives have no moving parts at all and store data in memory. If you've ever used a Secure Digital, CompactFlash, or MemoryStick in a digital camera, you've already used a solid-state drive.

Solid-state drives also require less power. Keeping a mechanical hard drive spinning constantly takes power, which slowly drains the battery of the device. Solid-state devices can retain data even after the power has turned off. When the device is turned on, solid-state drives require low amounts of power to use, allowing your batteries to last longer powering other parts of the device, such as the screen.

While mechanical hard drives eventually fail, solid-state drives can only read and write data a limited number of times before they completely wear out as well. Still, given the lower power consumption of solid state drives, greater reliability and smaller size, solid-state drives will eventually move into the mainstream and make mechanical hard drives look as antiquated as tape backup systems.

Apple's new iPad and every smartphone relies exclusively on solid-state storage to maintain a slim profile. As more people rely on mobile devices, expect to see solid-state drives appear in everything from mobile phones and tablet PCs to kids' toys.

Probably the only people who won't be happy with the gradual switch from mechanical hard drives to solid-state drives will be any company that makes disk defragmenters or hard disk diagnostic tools. If your job depends on the widespread use of mechanical hard disks, you may want to look for a new job now before it's too late.

The Coming of Digital Books

In case you missed this story in The Detroit News (www.detroitnews.com/article/20100204/METRO/2040464/1026/DPS-to-make-textbooks-all-digital-in-5-years), the Detroit public school system (consistently rated as one of the worst in the country) plans to offer only digital textbooks in five years. To read a digital textbook, students will obviously need an e-book reading device.

While some school systems pass out laptops to every student, a less expensive option is to give each student a dedicated e-book reader instead. That could mean students could wind up with Amazon's Kindle or Apple's iPad. Since the iPad is also a fully functional computer, the iPad could become standard equipment for every student in America.

Although everyone hails the arrival of digital textbooks as a new revolution, it's not good for everybody. The textbook publishers currently have a virtual monopoly on the textbook market, creating new editions to make previous editions obsolete, thereby forcing students to buy new textbooks rather than saving money buying used textbooks instead.

With digital textbooks, this monopoly is going to end and the textbook publishers aren't going to be happy about it. If a digital textbook can be updated over the Internet, there will be no obsolete editions of digital textbooks to force students to buy new ones. As a result, don't expect the ability to update digital textbooks anytime soon, and don't expect publishers to allow used digital textbooks to be sold like today's used books.

Digital books supposedly save money because there aren't any printing or paper costs. However, does anyone remember when music publishers claimed that CDs were going to lower prices because they were easier and less expensive to produce while being simpler to transport with less breakage than vinyl records? CD prices stayed artificially high because the music industry's greed remained high, regardless of the actual cost savings in materials.

Because of this, forget about any potential cost savings that digital books can offer. Publishers will likely jack up the prices of digital textbooks to maximize their profits, and then run for government protection when digital piracy hurts their profits just as the music publishers jacked up CD prices until music piracy slaughtered their bottom line.

Physical books are going to fade away over time, but any cost savings will be lost through artificially high prices for e-books when publishers smell greater profits with lower distribution costs. Apple's iPad has the potential to set the standard for digital books, but the biggest drawback of the iPad is its closed ecosystem.

Creating and distributing software to the iPad means going through Apple's App Store, which blocks any tools that could crack and deliver pirated digital books to the iPad. While most people will likely be happy using their iPad to buy and read digital books legally, the real market for rival tablet devices will be in creating and distributing pirated digital books.

With its open architecture, tablet devices such as Hewlett-Packard's Slate PC and Dell's Mini 5 have the potential to thrive as digital book piracy tools, since you can freely load any software you want to read, create, crack and distribute pirated digital books.

The digital book revolution isn't going to lower prices for books, but increase them. Today's book publishers will probably get hurt by their own greed when consumers rebel over artificially high e-book prices and start pirating digital books through their computers and Windows-based and Android-based tablet devices.

This leaves the market open for new publishers to slip in, give consumers what they really want (low-cost e-books), and drive traditional publishers out from their textbook monopoly.

The digital book revolution is coming, but it's not going to be as promising as everyone thinks. Get ready to buy an iPad, but be ready for the onslaught of digital book piracy, which will make rival tablet devices appealing. Today's textbook publishers are likely to follow the music industry's futile attempt to protect their monopoly, but as long as they refuse to pass any cost savings on to the consumer, their days are numbered.

How the Mighty Fall

In his 2009 book, "How the Mighty Fall," (www.amazon.com/gp/product/0977326411?ie=UTF8&tag=the15minmovme-

20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0977326411) business guru Jim Collins outlines five stages that define the death spiral of big companies:

1. Hubris born of success
2. Undisciplined pursuit of more
3. Denial of risk and peril
4. Grasping for salvation
5. Capitulation to irrelevance or death

Apple and Amazon are probably at stage 1, while Google is at stage 2. Microsoft is on the edge of stage 3, moving toward stage 4. America Online, Borders and Iomega are firmly planted in stage 4 and slipping toward stage 5.

Although big companies don't necessarily have to fail completely like Polaroid or Montgomery Wards, they may simply fade away into the background, which is probably the fate of Microsoft.

The mobile phone market is growing with competitors such as Apple, RIM and Google fighting for dominance. Where's Microsoft? Still trying to peddle the ancient Windows Mobile 6.5 operating system that pales in comparison to Google's free Android operating system.

By 2011, Microsoft plans to ship Windows Phone 7 (dropping the Windows Mobile name), which will offer features comparable to today's iPhone and Google phones. In the meantime, Apple and Google will have continued moving forward, making Microsoft's smartphone offering look like the irrelevant, expensive offering that it is.

Apple's new competitor isn't Microsoft, but Amazon and Google. Apple has little to fear from Microsoft Windows 7 stealing Macintosh users away since it's more likely that Mac OS X will steal Windows users away.

In creating the iPad, Apple has targeted Amazon's Kindle, while Google plans to use its Chrome and Android operating systems to power rival tablet devices. Once again, where's Microsoft?

Putting Windows 7 on a slate PC isn't the answer for Microsoft, so it needs an operating system that can compete with the iPad and Kindle. Microsoft could tweak Windows Phone 7 to run on a tablet just like Apple tweaked the iPhone OS to run on the iPad, but Microsoft is already late with its smartphone operating system. By the time it gets Windows Phone 7 to run on a tablet, Apple and Google will have just moved further ahead.

Microsoft isn't going away, but it has lost its dominance and relevance in the computer industry, and it's unlikely the company will ever get it back. If you're in the computer business and aren't keeping up with non-Microsoft technology, you're setting yourself up for failure. If you think complete reliance on Microsoft for your future is a safe bet, there are thousands of people who thought that way about General Motors at one time too, so at least you'll have plenty of company at the unemployment office.

Anyone still wedded to the Microsoft-only mentality has got to wake up and realize that this isn't the '90s anymore. The future of computing belongs to Apple, Amazon and Google.

The Anti-iPad Backlash

Some people look at something new and wonder how to take advantage of it. Others tend to look at something new and fear any change that might affect them. Rather than face and adapt to change, they'd rather avoid and actively resist it.

That's the driving force behind many of these iPad naysayers—fear. Rather than come up with logical, rational reasons why the iPad might not succeed, they resort to catch phrases and emphasize missing features.

One of my favorite naysayer arguments against the iPad is that it doesn't have a replaceable battery. The reason for this is simple. Apple claims that the iPad's battery can last up to 10 hours on a single charge and can effectively last longer than the life of the iPad itself. By the time the iPad's battery wears out, your iPad will likely be several years old and easily discarded. If you really want to, you could pay Apple to replace your battery, but how many people will want to do that when it will likely be more appealing just to buy a new, more advanced iPad instead?

If you think about why replaceable batteries are important, you have to realize why they were needed in the first place. First, people needed replaceable batteries since batteries in most gadgets wore out so quickly. As a result, you always needed to keep a spare one around. In the early days, laptops barely ran for two hours, so if you wanted to work on a cross-country flight, you needed a full charge and a spare battery that you could swap in once the first battery ran out of power.

Second, batteries often had a short shelf life. After a year or two, the battery would cease to hold its charge so you'd have to replace it, since replacing the battery was cheaper than buying a new laptop.

What happens if you create a battery that can hold a charge for a long time and continue being recharged for the lifetime of the product? The answer is simple. You don't need a replaceable battery.

So all these arguments that the iPad needs a replaceable battery hinge on the obsolete idea that batteries don't last long. Thinking that the lack of replaceable batteries is a drawback is like saying that electric cars are destined for failure because they can't use gasoline from stations all over the country.

The purpose of electric cars is to eliminate the need for gasoline. Likewise, the purpose of built-in batteries is to eliminate the need for replaceable batteries. If the iPad offered replaceable batteries, how would this be an advantage if you never needed to replace the battery at all?

Of course, all of this hinges on the iPad's actual battery capabilities, which nobody knows for sure. Despite not knowing the facts of the iPad's battery life, the naysayers are quick to deride the iPad as a "failure" just because it doesn't offer replaceable batteries. By making a claim without knowing the facts, these naysayers are simply exposing their own fears and prejudices.

If you still believe that replaceable batteries are a "feature," then perhaps you can skip the iPad and buy a rival tablet device that does offer replaceable batteries. Then you can buy (and throw away) replacement batteries every year and enjoy carrying around a tablet plus a spare battery, where the added weight will help defeat the purpose of having a lightweight, portable tablet in the first place.

* * *

When you want to open a file, you have several options. First, you can open the Finder window, find the file you want to open, and then double-click on that file. This loads your file into the program that created it, such as Microsoft Word or Photoshop.

A second, clumsier way to open a file is to first open the application you want to use, such as Microsoft Excel or Corel Painter, and then use the File menu and the Open command to look for the file you want to open.

Here's a third way to open a file. Open the Finder window and look for the file you want to open. Now drag that file over a program icon on the Dock. So if you want to open a word processor file in Microsoft Word, drag that file over the Microsoft Word icon on the Dock. If you want to open that file in Pages, drag that file over the Pages icon on the Dock.

This method may not be as easy as just double-clicking on a file, but it's more visually interesting and gives you the option of choosing which program to use. If you double-click on a file, it may open a different program than what you really want to use.

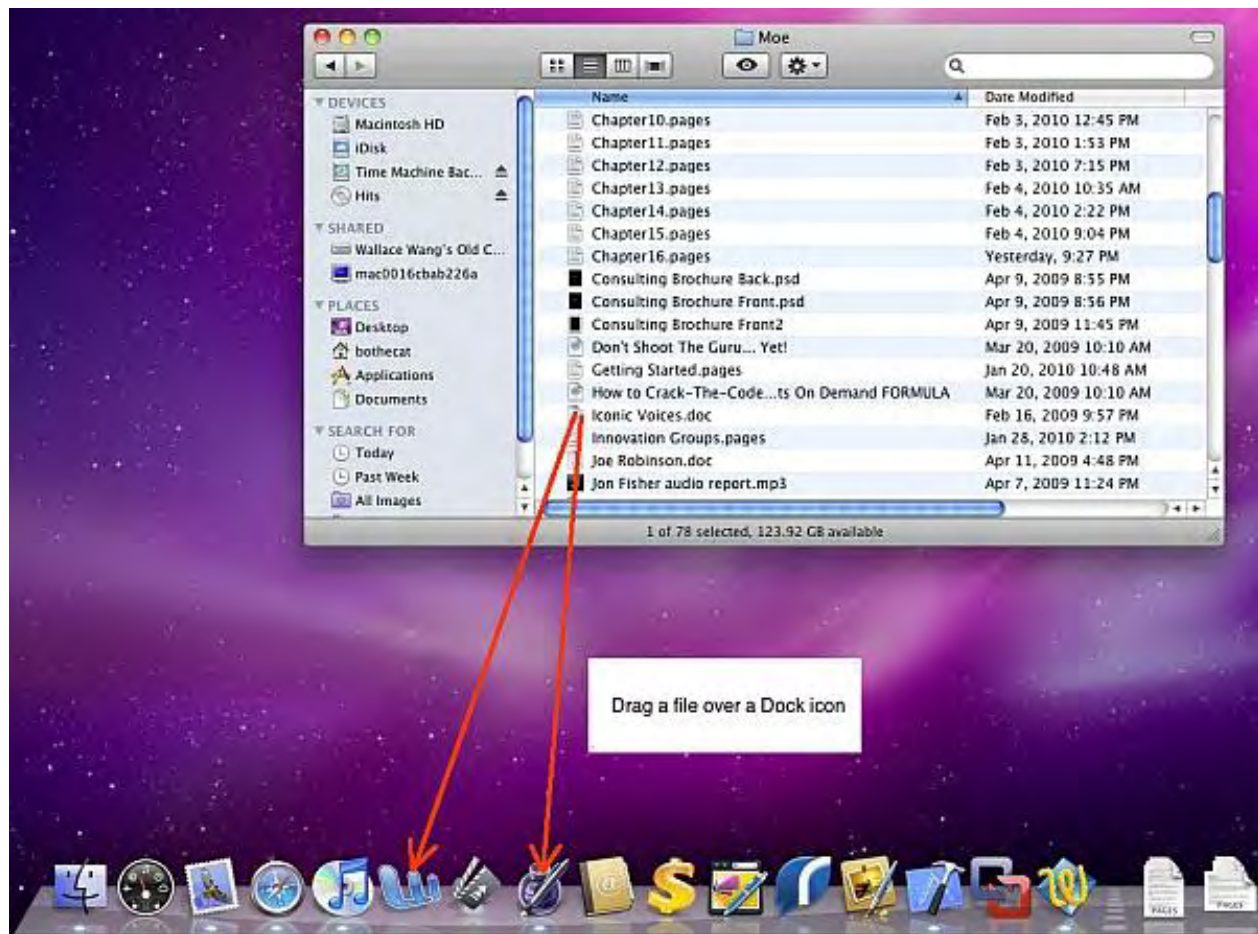


Figure 2. Dragging a file over an icon on the Dock will load that file.

In the early days, before Wally became an Internationally renowned comedian, computer book writer, and generally cool guy, Wally Wang used to hang around The Byte Buyer dangling participles with Jack Dunning and go to the gym to pump iron with Dan Gookin.

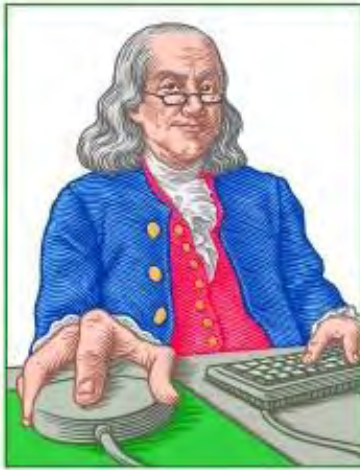
Wally is responsible for the following books:

- Microsoft Office 2007 for Dummies (www.amazon.com/gp/product/0470009233?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0470009233),
- Beginning Programming for Dummies (www.amazon.com/gp/product/0470088702?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0470088702),
- Breaking Into Acting for Dummies with Larry Garrison (www.amazon.com/gp/product/0764554468?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0764554468),
- Beginning Programming All-in-One Reference for Dummies (www.amazon.com/gp/product/0470108541?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0470108541),
- Steal This Computer Book 4.0 (www.amazon.com/gp/product/1593271050?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1593271050),
- Visual Basic Express 2005: Now Playing (www.amazon.com/gp/product/1593270593?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1593270593),
- My New Mac (www.amazon.com/gp/product/1593271646?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1593271646),
- My New iPhone (www.amazon.com/gp/product/1593271956?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1593271956),
- Strategic Entrepreneurism with Jon Fisher and Gerald Fisher (www.amazon.com/gp/product/1590791894?ie=UTF8&tag=the15minmovme-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=1590791894).

When not performing stand-up comedy or writing computer books, he likes to paper trade stocks with the video game Stock Reflex (www.plimus.com/jsp/download_trial.jsp?contractId=1722712&referrer=wwang), using the techniques he learned from a

professional Wall Street day trader.

In his spare time, Wally likes blogging about movies and writing screenplays at his site "The 15 Minute Movie Method." (www.15minutemoviemethod.com/) Wally can be reached at wally@computoredge.com.

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LINUX LESSONS

**"AN INVESTMENT
IN LINUX KNOWLEDGE
PAYS THE BEST
INTEREST."**

Linux Lessons: Symbolic Links

"Linux Desktop Shortcuts" by Pete Choppin

On the Windows desktop many applications are accessed from a shortcut icon. Linux has a similar "shortcut" method. We call them links. They are similar to the Windows shortcut, but they also have some important differences.

On the Windows desktop many applications are accessed from a shortcut icon. These icons are simply pointers that allow you to launch programs from the desktop, but they are not the actual programs themselves.

Linux has a similar "shortcut" method. We call them links. They are similar to the Windows shortcut, but they also have some important differences.

How to Create a Linux Symbolic Link

Links in Linux can be created either from the desktop by dragging an icon to the desktop, by right-clicking the desktop and choosing "Create New/Link to Application..." or from the command line.

Dragging to the Desktop

First we need to discuss the Desktop Folder in Fedora. KDE versions 4.1+ have all used the Desktop Folder for placing your links on the desktop. This was primarily because many Linux users prefer not to have their desktop cluttered with icons. KDE's answer was the Desktop Folder—a specialized place on the desktop where you can hold all your icons.

You can revert back to the old way, with your icons lined up on the desktop outside the Desktop Folder by changing to Desktop Folder view in the Desktop Properties.

Whether you are using the old KDE folder view or the new Desktop folder, you can drag and drop any program icon to these areas and this will create a link.

Create New Link

You can also create a link to a program by right-clicking the Desktop Folder (or in Folder view right click anywhere on the desktop) and select Create New, then Link to Application. You will be presented with a dialog box that will allow you to browse to the program you wish to link to. Once you have selected the program, click OK and a link will then be created.

Command Line

The last method is the command line. Actually, several helps and tips I have found for setting up programs and utilities on Linux where a symbolic link is required include the instructions for creating these links on a command line. So using this method can be very helpful.

There are actually two types of links:

- Symbolic Links: Can be created anywhere on the system and can also link to directories.
- Hard Links: Refer to the specific location of physical data. Cannot be linked to directories.

Hard links are really not all that useful. You will want to create symbolic links most of the time. To create a symbolic link, use the following syntax:

```
ln [options] sourcename [destname] sourcenames destdirectory
```

There are several [options] referred to here and you can certainly look up (linux.die.net/man/1/ln) the command if you want more information. I will be using the -s option to create the symbolic link.

For example, if I wanted to create a link to a file to the desktop called "pete_file1" located in my home directory, it would look something like:

```
ln -s /home/pete/pete_file1 /home/pete/Desktop/
```

Now when I ask for a listing and include all attributes (ls -la) for both my home directory and my Desktop directory, you can see how the symbolic link is noted:

```
[pete@f11 ~]$ ls -la pete_file1
-rw-rw-r--. 1 pete pete 0 2010-02-10 06:44 pete_file1
[pete@f11 ~]$ ls -la /home/pete/Desktop/pete_file1
lrwxrwxrwx. 1 pete pete 21 2010-02-10 06:46 /home/pete/Desktop/pete_file1 -> /home/pete/pete_file1
[pete@f11 ~]$
```

The important thing to notice here is on the link in the Desktop location, you will see a -> (arrow) indication to where pete_file1 is actually linking; in this case it's linking to /home/pete/pete_file1, which is exactly what we want. So now the Desktop will have an icon that is a symbolic link to my file.

If you would like more information about symbolic links or want to post more questions, feel free and I will try to answer them.

Pete Choppin has been an IT Professional for over 15 years. He currently works as a network and systems administrator for a company called Albion based in Clearfield, Utah. He has experience in all types of hardware, software, and networking technologies. He is proficient in many operating systems including Linux, Windows and Macintosh. His interests include cooking, sci-fi, computers and technology, and Web design—a semi-professional endeavor, having designed Web sites in the dental field, e-commerce businesses, and for the Boy Scouts of America.

Pete has been a devout reader of *ComputerEdge* since 1990 and contributes regularly to featured articles as well as the Linux Lessons section of *ComputerEdge*. He can be contacted at pchoppin@comcast.net but prefers to have comments on *ComputerEdge* articles submitted to the editor and posted for the benefit of all readers.

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Rob, The Computer Tutor

Rob, The ComputerTutor: More Web Pages

“Pointers, tips and instruction on making your own Web page.” by Rob Spahitz

Last week, we started exploring the pieces needed to create Web pages. Today we examine more of that and learn how this can be used for other things besides Web pages.

Last week, we started exploring the pieces needed to create Web pages. Today we examine more of that and learn how this can be used for other things besides Web pages.

First, we have a few messages.

This from Stephen B.:

“Noticed your comments on Office 2010. Are there any changes and anything new in VBA (i.e., programming language, etc.)?”

As best as I could find, Microsoft changed the version from VB 6.5 to what they are calling VBA 7.0. I guess they couldn't call it VB 7.0 since that was the first VB.Net, so they made it VB for Applications, which it always was anyway. From the bit of research I did, there seemed to be nothing that really made a difference on the surface. I'm still waiting for the Office link to VB.Net.

And from Stephen E. of Denver:

“The frustration of finding familiar commands in the new ribbon is all too real. I found a tool at Microsoft's OfficeLab (www.officelabs.com/projects/searchcommands/Pages/default.aspx) that helps.

“The Search Commands tool adds a ribbon item. You can type in any familiar command from earlier versions of Word, Excel or PowerPoint (in the appropriate program), and it will show you where it is on the ribbon or give you multiple choices if you don't remember the exact command. It even has guided help for some commands that will step you through the process.”

Thanks for the great link, Stephen.

Web Documents

Let's get right into the uses. Web pages are about information-sharing. What tools do you use now for sharing information? Well, some common ones include Notepad (for text files), Word (for documents), Excel (for calculations), Outlook (for e-mails) and Paint (for pictures).

Each of these tools has a different way of organizing and storing that information. Wouldn't it be nice if you could find one tool to do all of these things? It sure would be. I'd like to say that Web pages are the answer, but it's not quite the answer. From the perspective of reading the information, Web pages work great. For creating the information, that doesn't work so well. For example, you can create something that looks like a text document in a Web browser, but editing that document in the browser doesn't work very well. Similarly, viewing a picture in a browser is pretty easy; changing that picture is a very big challenge.

You'll notice that I referred to two things in the above paragraph. One thing is the Web page; the other is the Web browser. A Web browser is a way to simply view a Web page. That's why it's not the best way to change anything on the page. Conversely, a Web page is not the result of any specific tool (like a Paint picture or a Word document). A Web page is really a generic definition for how to build a resulting page, based on some predefined rules (HTML, as discussed last week).

This leads to the benefit and challenge of Web pages. First, a Web page has the benefit that it can be created so that it will work on any computer that decides to write an interpreter (typically a browser) such as Windows, Mac, Linux, iPhone, Kindle, etc. The challenge is that those systems decide how to interpret the Web page in areas that are not defined (which turns out to be just enough things that Web pages sometimes look and act differently on different systems. For simple text and pictures, that's not a problem; but if you want things to line up

just the right way on a page, you may get slightly different results on different tools.

Further, creating a Web page has benefits and drawbacks. The nice part is that you can use any tool that can edit text or some specialized tools to make the process easier to check those special tags you put in the page to mark up the text to make it look fancier. On the flip side, most editors fall into one of two categories: too basic, or too complex. For example, the text editor was not designed to help you to mark up the document, so you need to know all the codes in order to make the parts work. On the other side, tools like Dreamweaver have so many features that beginners (or those creating simple documents) often get frustrated that it's so complex to create a simple document.

Of course, there are those intermediate tools like Microsoft Word that let you create a Web page using word processing tools that you are probably familiar with (like bold and italic). When you save as an HTML document, you will have a Web page, plain and simple. The real problem here is that the document will be *very* bloated. Case in point, if you take a simple paragraph like this one and enhance it a little, instead of a file that's only a few hundred bytes, Word will make it several thousand bytes (bloating a typical document about five times from what I have typically seen).

Specifically, I created the above paragraph in Notepad (a text editor), added a few tags to make it show up as a valid Web page and saved it. It came out to 622 bytes. I then loaded that document into Word, made two words bold, two italics, and one underline. In Notepad, I could have done this with seven bytes per piece (so 49 more bytes). Word decided to get all fancy on the document, and when I saved it came out to 3,091 bytes. In Word's defense, it tried to create a document that will appear exactly the same on every platform by setting up something called stylesheets. If you want this feature, it's nice; for a basic Web page, that's way too much.

So what should you use to create Web pages? I know there are plenty of options out there. People will swear by their own choices. I have yet to find any tools I really like, and I know I'm not alone. I still code my Web pages in (ugh!) Notepad. I have full control over the parts and the bloat; but I also know my HTML well enough that I don't have to jump out to search engines to check on most tag attributes. That said, if you're looking for something, try entering "HTML DOM" into a search engine and see what you get. (FYI: DOM stands for Document Object Model, which is the definition for the parts of the HTML mark-up tags.) One that I use regularly is "w3schools (www.w3schools.com/html/dom/default.asp)." Another good source is www.w3c.org, the official Web site of the group that defined the rules. The biggest problem is that their site runs very technical and is daunting to beginners.

Now here's the great thing about Web pages: They don't have to be on the Web to use them. Any time you need to create a document, a Web page is often a great choice. No matter what tool you use to create it, it will probably work on any machine you bring it to. This is unlike a Word document that might work only if the machine has Microsoft Word on it. And this is better than a straight text document because you can fancy up the text and include pictures. Specifically, if you ever create help guides (such as instruction manuals on how to do something or greeting cards), then Web pages are an ideal choice. Simply create the page and zip it up together with the pictures it uses, and you have an instant cross-platform document.

More HTML

OK, let's get back to the details. Last week we defined a very simple document by putting some text into a text editor (Notepad), bolding one word with the "b" tag and italicizing one word with the "i" tag. We then surrounded this with the "body" tag to show that it should appear in the main display area of the browser. Finally, we surrounded the whole thing with the "html" tag to help tools recognize that this is an HTML document. (FYI: Browsers are typically designed to interpret text documents as HTML documents even without this tag, but doing the right thing here will never hurt, whereas leaving it out could cause problems).

Also, as a reminder, each tag is surrounded by "angle brackets" (also known as less-than and greater-than symbols: <, >) and ending tags have a forward slash (/) appearing as the first character within the brackets.

HTML Header

Let's explore some of the more common parts of the header section.

First, to add a header section, add a <head> opening and closing tag: <head></head>

Between these tags you add all of the parts related to the header. And to make it more readable, you typically add a new line between the pieces:

```
<head>
</head>
```

However, a good Web browser doesn't care about this kind of spacing, so organize it any way that helps you to read it better.

Next, you probably want to add a title to your document. When you do this, the browser will usually show your title in the top border. To add a title, simply add a title tag and an appropriate name like this:

```
<title>My Great Document</title>
```

This will make "My Great Document" the title of the document.

In addition to the title tag, two other tags are commonly added to this section: style and script. The style tag is used to adjust the way parts of the document are displayed without having to go through the document and change each piece. For example, if you want all bold text to appear slightly larger than the text around it, you can use a style tag to make everything of that style show up larger. We'll go over styles elsewhere. The script tag is used to create little computer programs that help make the document better. We'll also get to that in a later article.

HTML Body

The body tag is the container for most of the document's content. As we saw in the last week's example, we added the opening and closing body tag, and then added bold and italic text to this section. Some of the tags you may want to add include the paragraph (p), line break (br), bold (b), italics (i), underline (u), images (img) and hypertext link (a, known as an anchor). Aside from this, people often add tables (table), headings (h1, h2, h3), lists (ul, ol) and forms (form). Let's explore a few of these.

Spacing

The paragraph tag is used to define blocks of text. Since HTML doesn't care about spacing, it doesn't know where one block of text ends and the next begins. If you do something like this:

```
This line  
looks like  
it takes up  
four lines.
```

Then the browser will simply pull the lines together into a single line because you never told it to go to the next line. Since you probably learned in English class how to organize thoughts into paragraphs, this is your chance to make your teacher proud and block your thoughts between starting and ending "p" tags. If we were to create this document as an HTML document, wherever you see a gap between blocks of text, the original document would probably have a starting and ending p tag.

Related to this is the line break tag. Since the paragraph tag lines like to double-space, if you simply want to put some on the next line without double-spacing you would use the "br" tag. This gives the effect of single-spacing. One odd thing about this tag is that it does not have a corresponding ending tag. As such, some browsers may get confused if they are not created properly. To help with that, the tag is created as a starting and ending tag built into one. To handle that, you put the slash at the end instead of at the beginning:
 To make this more readable, most people put a space before the slash:

Formatting

To format text, you can use the bold, italic and underline tags. As seen, these use the , <i> and <u> tags. To help identify the starting and ending points of the formatting, these obviously have corresponding ending tags. Some of these actually have variations. Bold can also be marked with the tag and italics can also be marked with the (emphasis) tag. These are used just like other tags we've seen.

For example, Rob <i>the</i> <u>ComputerTutor</u> will add bold, italics and underlines to my articles.

One other thing: These tags are often nested. That means that they can be sandwiched within other tags. However, don't try to nest the same tags within each other or the browser may get confused.

For example, `<b>Rob <i>the <u>ComputerTutor</u></i></b>` will make everything bold, the last two words italics, and only the last word underlined. However, this will cause confusion: `<b>Rob <i><b>the</b></i> ComputerTutor</b>` because one bold tag is sandwiched inside another. Many browsers will simply ignore the second opening bold tag, stop bolding after the second word, then ignore the next closing bold tag.

Tag Attributes

Many of the remaining tags I showed above have a more complex form. All we've seen so far are simply tags that mark some text in a simple way. But what if I want to add a picture? How do I tell it what picture to load? And what about hyperlinks? How do we tell them what page to link to? The answer comes in what are called attributes.

Most tags have their name (like "p") and additional pieces, called attributes, that help describe additional features of the tag. For example, the paragraph tag lets you specify that you want the text right-aligned. Since we did not include that in the example above, the default left-alignment was used. To right-align a paragraph, we can use this paragraph tag:

```
<p align="right">
```

However, many of the attributes like this are considered obsolete; the current recommendation is to define styles for all tags and modify the master styles to handle these types of things. We'll get to that when we go over styles.

Quickly wrapping up our other tags with common attributes:

`` will show a picture at the location where the tag is placed, typically surrounded by text. This leads to large blank areas, so images are often placed below or above text, separated by paragraph or break tags. In addition, you can define a specific size that you would like the image to appear. This lets you scale the image down or up, or even distort the image. However, be aware that this does not change the original image. Therefore, if you take a 10,000-pixel by 10,000-pixel image and display it on your Web site as 100 by 100, the entire image will be downloaded first, and then scaled down after it's downloaded. People on dial-up services will hate you for this; for cases like this you may want to create alternate images (aka thumbnails) to show on your page, especially if you are showing a collection of images.

`<a href="http://dogopoly.com">Rob's Awesome Game Website</a>` will define a hyperlink to the dogopoly.com Web site, but show it in the browser with the text "Rob's Awesome Game Website" along with an underline. If you load it in a browser and click on the text, it tries to jump to the specified Web site.

Even the body tag has attributes. Notice how the above link probably starts with blue text before you click, then purple text after you click. You can control this through attributes in the body tag. In addition, you can define the color of standard text for the document and the background color and image like this:

```
<body bgcolor="black" text="white" link="yellow" vlink="silver" background="grass.jpg">
```

This will define the background color (bgcolor) of the page as black (a predefined Web color), the standard text as white, all new hyperlinks as yellow, and all visited hyperlinks (vlink) as silver. In addition, it will try to find an image called grass.jpg and use that as the background picture. See Figure 1 for an example of this.

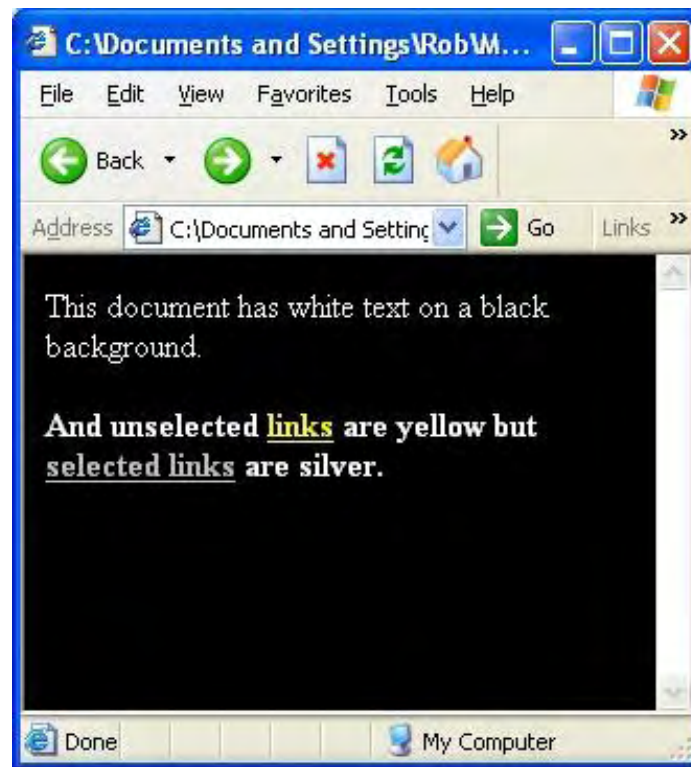


Figure 1. Sample Document with Body Attributes Set.

The above is generated from the following:

```
<html>
<body bgcolor="black" text="white"
  link="yellow" vlink="silver" background="grass.jpg">
<p>This document has white text on a black background.</p>
<p><b><a name="here"><p>And unselected <a href="somewhere">links</a>
  are yellow but <a href="here">selected links</a> are silver.</b></p>
</body>
</html>
```

Next week, we'll explore a bit more of the tags and attributes of Web pages.

Rob has been in the computer industry for over 25 years and is currently a part-time teacher, offering classes in Excel, Access, Visual Basic, and a variety of other technical tools. He has loved *ComputerEdge* since 1990 and can be contacted at RSpahitz@Dogopoly.com.

Looking for a great boardgame? Grab a copy from DOGOPOLY.com (dogopoly.com) and have a dog-gone great time.



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Worldwide News & Product Reviews

“The latest in tech news and hot product reviews.” by Charles Carr



Communications Technologies that Simplify the Complicated—Services that give you greater flexibility and mobility; Best Bets—What will be the best-selling tablet in 2010?; Rubik's Cube Contest—Learn about the eligibility and guidelines; Become a Xen Master—A review of "The Book of Xen."

Communications Technologies that Simplify the Complicated

Luc Vezina, director of product marketing for Protus (www.protus.com), a provider of communications tools for small- to medium-sized businesses and enterprise organizations, writes in this week:

Communication drives nearly every part of every transaction. Yet it seems like the more communication technologies you have available, the more difficult it becomes. Technology may set off the complexities, but handled correctly, they can also be the cure.

Virtual Phone Services

For many years, the gold standard for business phones has been a complex, equipment-based phone system. The advantages include a single number for the office; extensions for each individual; an auto-attendant to greet callers; a dial-by-name directory; voice mail; and call forwarding to another extension.

Yet, gaining these features with a traditional business phone system requires a lot of expensive back-office equipment, as well as a phone for everyone. It's not very flexible either. These systems only work within the four walls of the office where they're located, so if you have two or more offices in different locations you need two systems with two separate phone numbers. If you're away from the office when someone calls that phone, the only way you'll know is by checking voice mail. You can give out your mobile and home numbers too, but then reaching you becomes complicated.

A virtual phone service for small businesses gives you all the advantages, plus more, without the drawbacks. First and foremost, there's no equipment to purchase, install and store. Instead, you pay a small monthly fee. You don't have to buy special phones either; a virtual phone service will work with the phones you already own.

A virtual phone service isn't limited to the four walls of the office. You can have one incoming local or toll-free phone number for the business, and then create extensions for branch offices or telecommuters no matter where they happen to be. Your staff can take advantage of all the features.

Another benefit to a virtual phone service is the find me/follow me smart call-forwarding feature. Rather than giving out several phone numbers and then having callers guess which one to use, you can give them your office number, then have the call ring your mobile, home, and/or any other phone—either in a sequence or all at once.

Internet Fax Services

Faxing is still a big part of the communications picture in the many industries. Each year, thousands of pages of contracts, forms and other documents are sent that require signatures or handwritten notes.

The problem is fax machines are always at the office, but the people who need them are not. More complications. This requires faxers to go back to the office to review, have it read over the phone or find a store along the road that has a fax machine—usually for \$3 to \$4 a page.

An Internet fax service solves this issue. It allows you to send and receive faxes on a laptop, smartphone or other device via your e-mail account or a secure online server, anywhere there is an Internet connection. Since it is a service, there's no hardware to buy or maintain, and the better services don't require you to download any software.

Of course, mobility is only one advantage. Because the documents come in electronically—usually as a PDF, although again, better services will give you a choice of format—you only print the documents you need. That alone saves money on paper and toner in these

uncertain economic times, while helping you go greener as well. There's no need to pay for an extra phone line either, and since an Internet fax is accessed using devices you already own, you're not paying for electricity to power a fax machine 24/7.

The electronic format also makes important faxes portable and easier to store. You can carry all your files with you and look them up instantly, without having to bring a stack of paper to every sales call.

Individual numbers assure the privacy of confidential financial and/or health records. And by eliminating the paper, there is no chance that an important fax will be thrown out with yesterday's newspaper or ruined by a coffee spill.

An Internet fax service is faster, cheaper, more portable and more secure than a fax machine. It's also more environmentally friendly. Makes you wonder why you're still using a fax machine.

E-Mail Campaign Management Services

When it comes to e-mail campaigns, many companies will attempt to use the usual office suite tools, i.e. word processing and/or spreadsheets, to both build and manage their campaigns. The problem is those tools are not designed for the type of high-level campaigns that are required, and they are completely ineffective at tracking results to help refine future campaigns.

There are several software products that manage and track the job. But software still needs to be maintained, and the inevitable problems and crashes that occur must be dealt with. Again, confusion.

A better choice is an e-mail campaign management service. These services allow the creation of highly targeted and timely newsletters and e-mail campaigns, manage opt-in lists, and produce easy-to-read yet detailed graphical reports of the results of each campaign and your overall marketing effort. This can all be done from any location where there is an Internet connection.

Different service levels are available depending on budget and how sophisticated one's marketing needs are. For example, you can choose between simple scheduling based on dates, and automated scheduling that is triggered by a date, time, event or action. The level of personalization also varies, from simple name personalization in the subject line and body to features such as gender, geographic or other attribute-based list segmentation.

Ultimately, an e-mail campaign management service helps you target your prospects more effectively, move them through the sales cycle, and close more leads—all while allowing you to continually refine and improve your direct-marketing efforts.

To succeed, you have to communicate. Be sure the technology you're using is helping rather than hindering that objective by taking advantage of services that give you greater flexibility and mobility. They're your best bet for keeping in touch with all the people you need to reach, at all the times you need to reach them.

Best Bets

According to the CEO of Bookmaker.com, Mickey Richardson, "With the recent unveiling of the new iPad, it has without doubt raised awareness on how it will compare to similar pieces of technology on the market today." Richardson and his team have put together odds on what will be the best-selling tablet in 2010.

Apple iPad
+200
Barnes & Noble Nook
+275
Amazon Kindle
+300
Microsoft/HP Slate
+350
Dell Mini 5
+400
Sony Reader
+400
iRex Iliad
+500
Fujitsu Flepia

+550

The +/- Indicates the return on the wager. For example: Betting on the candidate least likely to win (the Fujitsu Flepia tablet) would earn the most amount of money, should that happen.

Good luck, contestants. We'll see you at the finish line.

Rubik's Cube Contest

Our SoCal area readers might be interested in either attending or competing in the upcoming Rubik's Cube tournament being held at Petco Park during the San Diego Science festival. There's still time to enter a team for a chance to win a whole bunch of money.

According to organizers, "The San Diego Science Festival will host a Rubik's Cube competition where students (K-12) will compete for the fastest time to collectively solve 25 Rubik's Cubes. Registration has been extended until February 15, and each team that signs up will be competing for their share of \$5,000 in prizes that will be awarded during the final round."

The final tournament will be held Saturday, March 27; semi-finals are held one week prior.

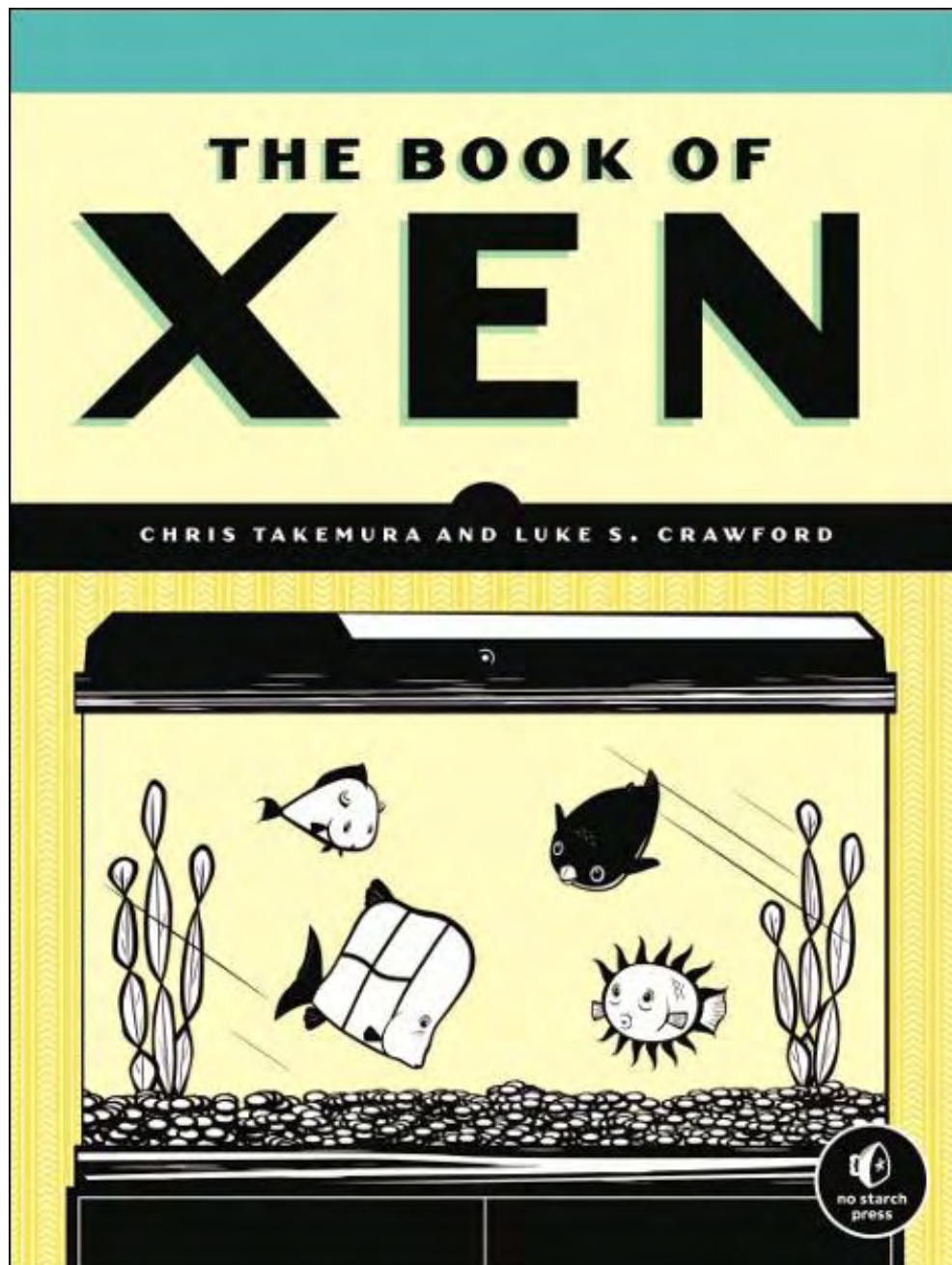
Some background from provided by Science Festival organizers:

Thirty years after its introduction to America by Erno Rubik, the Rubik's Cube today is being used to teach important math concepts including area, perimeter, volume, angles, algorithms and enumeration, among many other geometry and algebra topics. To date, the You CAN Do The Rubik's Cube program is used as an education tool and confidence booster in thousands of schools K-12 in 48 states across the U.S. and in over 100 Boys & Girls Clubs of America and YMCA after-school programs. With the launch of the new You CAN Do The Rubik's Cube "Competition Guide," dozens of schools have hosted regional competitions as well. The "You CAN Do The Rubik's Cube" solution kits available to schools, camps, and after-school programs include 12 Rubik's Cubes, 12 solution guides, an instructional DVD, cube sign-out sheets, posters, stickers and award certificates for when a child solves the puzzle.

Visit www.YouCanDoTheCube.com for more information on eligibility and guidelines.

Become a Xen Master

If you're a system administrator, you're probably going to love "The Book of Xen" (No Starch Press, October 2009, 312 pp., \$49.95, ISBN 9781593271862). It's a high-quality, high-performance virtual machine monitor.



If you're not familiar with Xen, it allows system admins to consolidate all the machines under their oversight, cutting costs for hardware, maintenance and even power.

I like the book because it gives you a sense of both the theory behind the Xen and plenty of real-life examples of its practical use. And authors Chris Takemura and Luke S. Crawford know that of which they speak because both are seasoned Xen consultants and use Xen extensively in their own hosting company, *prgmr.com*.

They start out with a top-down view of Xen and then work into the on-the-ground stuff like memory management, installation, networking and virtualized storage. They also explain how to use Xen and standard Linux tools to take snapshot backups, perform QoS ops, and limit over-aggressive disk users.

The Book of Xen also shows how to set up and manage multiple guests, including various Linux distributions, Solaris, NetBSD, and Windows. It also provides help setting up virtual hosting for multiple users, each with their own requirements.

This is a great book packed with useful information, especially for sys admins who know quite a bit about Linux and want to put Xen into production.



Review contributed by Kenny Castner

In addition to being an editor and columnist for *ComputerEdge* and *ComputerScene* Magazines, where he has written hundreds of feature articles and cover stories over the past decade, Charles Carr has also penned well over 1,000 non-tech newspaper and magazine articles and columns for various publications, including two widely-read columns each week for San Diego's *North County Times* newspaper.

Carr has covered such diverse topics as pesticide use in area schools, invasive background checks for county volunteers, asthma awareness, the debate over standards-based grading, potential vulnerabilities in electronic voting machines, and Southern California's devastating 2003 and 2007 wildfires. He has also written many humorous pieces.

Carr has also edited dozens of stories and articles written by others which have appeared in major publications and web sites across the country.

He has been a contributor and technical advisor to *L.A. and San Diego Parent* magazines and receives dozens of requests a year to appear on Southern California television and radio stations to talk about important events in the tech world.

Carr has judged many writing competitions including San Diego Press Club and Time-Warner Communications contests and was sole judge for the national NAPPA Tech Toys awards for five years (which his kids really appreciated). He was recently a judge for the national "Poetry Out Loud" competition.

He has won many writing accolades, including Press Club awards for Best Column Writing, Consumer Writing and Best Arts and Entertainment, and has repeatedly taken top honors in San Diego Songwriter's Guild competitions for his original musical compositions.

Carr will soon publish his first book, *What a World*, a collection of his best writings.

Learn more at www.charlescarr.com.

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Spam of the Week

Spam of the Week

"The latest in annoying and dangerous e-mail currently making the rounds." by ComputerEdge Staff

Two oldies but goodies make a return this week: the Visa spam scam and the "some jerk posted your picture" trick. Don't click those links!

Two of the previous scam e-mails are making the rounds this week. The most prolific are the VISA fraud spams. One uses the subject "your VISA 4XXX XXXX XXXX XXXX: possible fraudulent transaction," while the other virtually identical spam uses the subject "possible fraudulent transaction occurred with your VISA card" (see Figure 1).

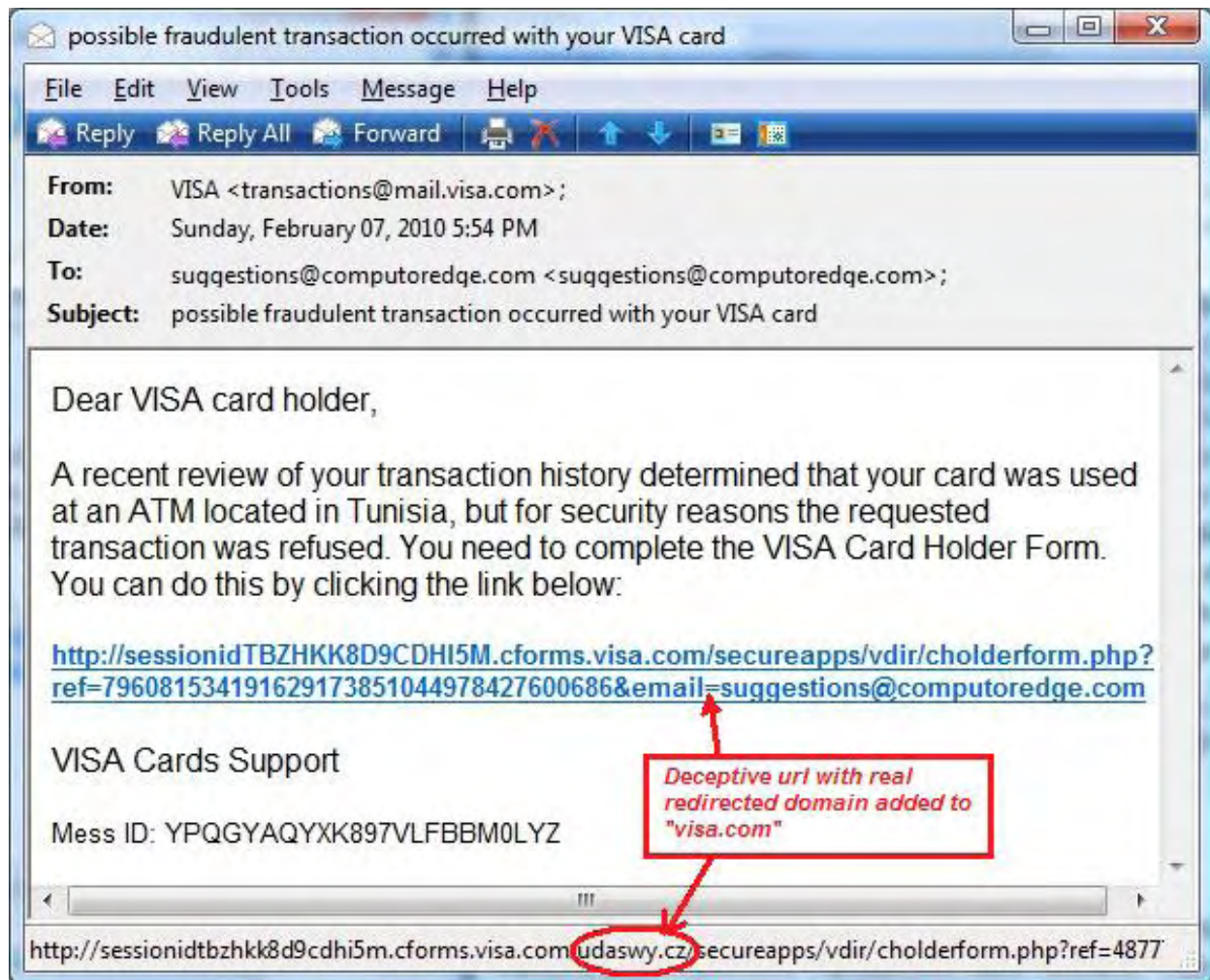


Figure 1. VISA spam scam e-mail.

Note the .cz (Czech) in the domain of the link. Don't follow the link! Just delete the e-mail!

The second returning spam scam, although not in as great of numbers, is the vanity spam, which attempts to lure you with the idea of your

picture on the Internet (see Figure 2). Thanks, "Trevor"! With friends like you, who needs the government to protect us?

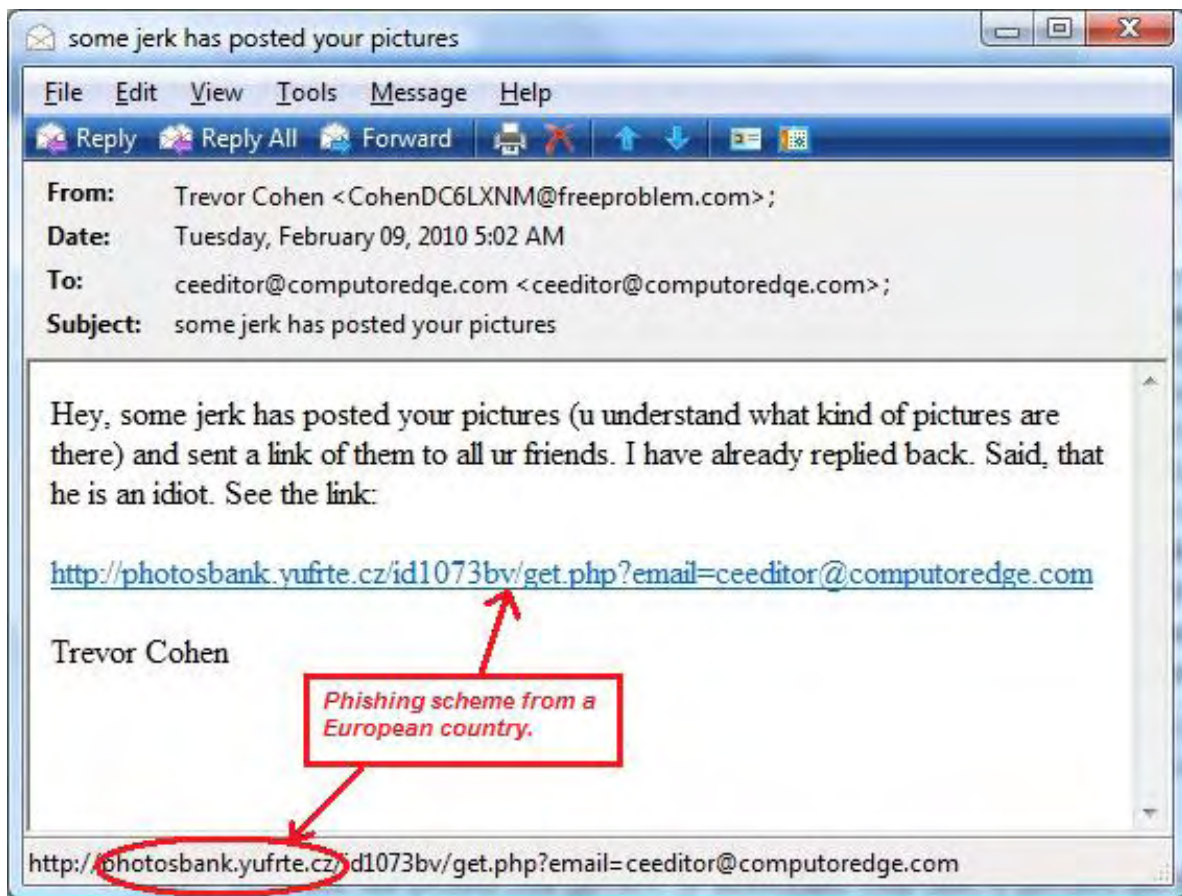


Figure 2. "Some jerk posted your pictures" spam scam e-mail.

Notice the .cz in the domain—just like the first one. The Czech Republic is busy this week. As before, don't follow the link! Just delete the e-mail!

ComputerEdge always wants to hear from you, our readers. If you have specific comments about one of our articles, please click the "Tell us what you think about this article!" link at the top or bottom of the article/column. Your comments will be attached to the column and may appear at a later time in the "Editor's Letters" section.

If you want to submit a short "ComputerQuick Review", or yell at us, please e-mail us at ceeditor@computoredge.com.

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EdgeWord: Who Needs an iPad?

“Jack weighs in on solid-state storage and the existence of the iPad.” by Jack Dunning



Rather than a revolution, the movement to solid-state storage will be evolutionary. Also, a look at the resurgence of tablet computers. Is it all media hype, or will these little devices take the market by storm?

Most of us are already using solid-state drives in the form of thumb or flash drives. They are small and handy for saving files in our pockets. They have completely eliminated the need for floppy drives, which are now considered an anachronism.



Elmer is upset because he can't hear the Solid State Drive whirling, clicking and chirping.

There are two reasons why we don't seek solid-state drives to replace our current hard drives. First, they are comparatively expensive for similar-capacity devices. Second, the solid-state drives do not yet provide the performance—especially in relation to write speed—that can be had with the spinning mechanical drives. Eventually, it is likely that solid state (in some form) will surpass the hard drive in popularity, but somehow, the hard drive manufacturers continue to remain ahead of the technological and marketing curve.

Rather than a revolution, the movement to solid-state storage will be evolutionary. At some point, solid state will become standard in computers—first holding the operating system programs and files, probably as complements to the hard drive, which will handle the ever-changing data storage. Yet this change will occur slowly enough that we may not even notice the eventual disappearance of the hard drive—just as I didn't notice when the floppy drive went away.

* * *

It's time that I weighed in on the tablet computer. We have had a great deal of discussion in *ComputerEdge* just before and since the introduction of the iPad by Apple. It seems that people are either very excited about the computers or they can find plenty of fault with them. My guess is that for the vast majority of people, the tablet computer is

a phenomenon that is getting little attention.

If other people are at all like me, they may be having trouble figuring out why they would want a tablet computer—regardless of brand. I have no particular desire to use a touchscreen for my data entry, and an emulated keyboard with no tactile feel leaves me empty. I have worked well with my laptop and don't understand how replacing it with a tablet computer would be an improvement. Of course, I'm just one person and there are plenty of reasons that other people may have to own one.

If you're an avid reader, then an e-book reader such as the Kindle may be an ideal device. A tablet computer could certainly substitute for a dedicated e-book reader; however, I'm not the type of person to buy a Kindle. Most of the reading I do is on the computer, but I'm not likely to buy a special computer just to read a book or two—which I can borrow from a friend.

If you're an artist, I can certainly see the charm of a tablet computer with its touchscreen capabilities. There is nothing new in the desire to put pen to computer in an artistic way. I can remember playing with the Wacom tablet input devices years ago. Maybe the new tablet computers will offer a better surface for artwork. Although it seems unlikely that a stylus (or finger) on a computer screen will give the same experience or tactile feedback that can be had with charcoal on paper.

People working in the field are already using various forms of tablet computers in their jobs. Whether they are delivery people, estimators for moving companies, or meter readers for local utilities, they are taking their tablet devices with them on their daily rounds. Are these businesses going to rush out to replace their current systems with the new tablet introductions? Maybe—only time will tell.

The problem is that I don't fit into any of the above categories. When I use a computer, the keyboard is everything that I can't do with a mouse. I suppose that eliminating the mouse with a touchscreen might be a good thing, but that could be done in a laptop. I still don't see a reason to buy a tablet computer.

All the hype around the tablet computer is interesting, but the fact is that a tablet computer is nothing new. Over the past few decades many tablet devices and tablet computers have been introduced. None have taken the market by storm. I'm sure that the new models are much better than anything before. However, I'm not convinced that most people are as intrigued with them as are the media and the manufacturers. I know that I'm not. Of course, as I have pointed out before, I'm usually wrong when it comes to predicting the future—and I'm probably wrong here. In a few years, I might be raving about tablet computers.

Jack is the publisher of *ComputerEdge* Magazine. He's been with the magazine since first issue on May 16, 1983. Back then, it was called *The Byte Buyer*. His Web site is www.computoredge.com. He can be reached at ceeditor@computoredge.com

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Editor's Letters: Tips and Thoughts from Readers

“Computer and Internet tips, plus comments on the articles and columns.” by ComputerEdge Staff

"Database Administration?," "Deleting Stubborn Files," "Gmail Spam Filter," "Old News Rant," "Free Good Reader," "Bogus Links," "Excelente!!!," "iPod and Zune"

Database Administration?

[Regarding Pete Choppin's January 22 article, "Computer Careers: Succeed in an IT Job":]

After reading through your article, I am wondering a few things. I anticipate changing careers in the next two years, and have begun the study of Database Administration. Am I spinning my wheels? You didn't directly reference DBA, and I wonder if this is more antiquated.

Thanks for your advice,

-Cathy Chant

Cathy,

Thank you for your comments on ComputerEdge.

Although I am not personally familiar with that particular field, I do know a few DBAs, and I can tell you that it is quite a lucrative field. Most medium to large businesses will maintain one or more databases, and your services will be high in demand. I will also tell you that some of the skills that I mentioned in my article—such as programming, troubleshooting and security—will be quite valuable to you. I would put as much effort toward these skills as your database skills.

The article tries to focus on areas in the IT field that are high profile and will have a large impact in 2010, but certainly this does not exclude Database Administration. I have the utmost respect for my DBA friends, and I look to them for advice in many areas, including Web development. As you may be aware, many Web sites require a database back-end, and I can certainly appreciate your skills in that regard.

Thank you for bringing this up.

-Pete Choppin

Deleting Stubborn Files

[Regarding the January 22 Digital Dave column:]

I tried to download five torrent files, but the files did not work. The zero-byte files were in the My Downloads folder in Win 7. I was unable to delete them. I have since reinstalled Windows 7, and the files are in the Windows Old folder, and I still cannot delete them. I have taken ownership of the folders and subfolders down to the files themselves, and cannot delete folders, subfolders or the entries either. What can I do to get rid of these pesky entries/files?

-James Tepe, Lakewood, CO

Trying renaming them to .txt files, then try to delete those. Sometimes that works.

-Kent, Round Rock, TX

Gmail Spam Filter

Gmail has a great spam filter. They do not pass the spam to the POP server, but keep the spam online for 30 days. You need to check out the online spam folder every so often for legitimate e-mails that they may have marked as spam.

-Rich DiSanto, Denver, CO

Old News Rant

[Regarding the January 22 EdgeWord: Put Dates on Your Web Site and Don't Yell! column:]

I think we are learning to ignore all caps from all the software license agreements. The least important parts at the end are just all-caps boilerplate stuff. While we're on the subject of fixing the Web, how about making horizontal scrolling for text illegal and impossible? OK for pictures and diagrams, but not for text.

-Ron Cerrato, San Diego

I agree with you, Jack, that failing to date an article causes me to wonder if I'm wasting my time. Unfortunately, it is common. I'll go a step further and suggest that it is also thoughtless and rude.

I also agree with Ron Cerrato that horizontal scrolling for text should be impossible.

Now, if only grammar, punctuation and spelling could be considered worthy high school and college topics, communication in general would be easier, and progress at fixing the Web as well as the evening news babble might begin.

-Don Neilson, San Diego, CA

Free Good Reader

[Regarding Barry Fass-Holmes's January 8 article, "How to Read ComputerEdge on an iPod Touch":]

There is a free version of Good Reader, too. So you don't even need to pay the 99 cents.

-Donja Carroll, Coronado, CA

Bogus Links

[Regarding the January 8 Spam of the Week: "Where's the Spam?" column:]

I have never been able to figure out how to display misdirection by hovering over a hot link in an e-mail. Please tell me how to activate this feature. I use Outlook both at home (2002) and at work (2003).

-Lewis J. Miller, San Diego, CA

Generally, there is an option under the View menu called "Layout..." If you check and Apply the Status Bar box, the bar at the bottom of the window will display the real URL of the hovered-over link. —Editor

Excelente!!!

[Regarding the January 22 Windows Tips and Tricks: Playing Games column:]

Now I have games to spend some free minutes on!

Thank you!

-Silverio Reyes, Tijuana Baja California

iPod and Zune

[Regarding the January 1 Worldwide News & Product Reviews column:]

I really enjoyed your comparison of the iPod and Zune. However, for those of us not willing to spend \$250 on a player, could you recommend a player that would operate like the iPod Nano? It would allow you to highlight a song and play it. That's all I want, no photos, no gaming and not a lot of songs. I just don't want to have to click through a bunch of songs to find the one I want. I have considered a Sansa Fuze, but not sure if it has that capability. I want to spend around \$50-\$60, and any help you could give me would be great. I am a grandmother.

Thanks,

-Sally

Hi, Sally,

The best models out there for your price range, which aren't Zune or iPod, are Sansas. You aren't going to find much, but there is a model for \$50 called the Sansa Clip ([www.bestbuy.com/site/SanDisk+-+Sansa+Clip+2GB+MP3+Player+-+Black/8553834.p?id=1188561248598&skuld=8553834](http://www.bestbuy.com/site/SanDisk+-+Sansa+Clip+2GB*+MP3+Player+-+Black/8553834.p?id=1188561248598&skuld=8553834)). It's two gigs, but has a fairly small screen. Not sure if that is a problem.*

I would definitely recommend the Sansa Fuze ([www.bestbuy.com/site/SanDisk+-+Sansa+Fuze+4GB+MP3+Player+-+Blue/8753789.p?id=1202649765792&skuld=8753789&st=sansa](http://www.bestbuy.com/site/SanDisk+-+Sansa+Fuze+4GB*+MP3+Player+-+Blue/8753789.p?id=1202649765792&skuld=8753789&st=sansa)). It's \$70 and is one of the top rated out there. It's a bit of a splurge, but it has a bigger screen, easy controls and four gigs.*

Let me know if that helps.

-Jeremy Halligan

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