Building a New Computer System for Linux

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Going to build a new computer soon, and outfit it with Linux? Here's the story of one such recent foray into purchasing components and assembling a new system.

Introduction

As a 55 year-old computer user and a high school computer science teacher, I'm not a typical system builder or adventurous case modder. Indeed, many would consider my using Linux the only daring thing I've ever done in the realm of computer science. Also, at the high school where I teach, I'm not the hardware teacher?I'm the software guy, as I teach computer programming, basic computer applications/literacy, and web page design.

So, my choices of equipment for my new home computer system were definitely a mix of my conservative stick-to-what-you-know tendencies coupled with a rare desire for something different. I like good performance in a computer system, but I'm not a speed demon. I'm not much of a computer game player, and the games I do play are not that demanding of computer resources. Finally, on a school teacher's salary, money is always a concern.

This new system was to be my new main home computer system, and would run only Linux. No MS-Windows or Linux/MS-Windows dual boot. In fact, none of my home computers run MS-Windows, as I converted (upgraded) my wife's machine to Linux about 6 months ago.

Processor and Cooler

When building a new computer system, the choice of the CPU determines other choices. I've been an AMD processor user for several years now, so while I'm not opposed to an Intel CPU (I do like Intel Corporation for their support of computer science education in my home state of Oregon, USA), I will stick with an AMD processor. But, this time, I decide to go 64-bit, and I end up purchasing an AMD FX-64 3200 CPU (socket 939). Yes, I wanted to go faster, but prices rise sharply in the AMD FX-64 processor line as you step up in CPU clock speed. I do decide to buy an OEM version of the processor, without a fan/heat-sink or instructions, as I've built other Athlon CPU based systems and I want to select a quiet, effective cooler for my processor.

So, next, a processor cooler. I've always used the stock bundled AMD fan/heat-sink before, but this time I'm buying my own. Now, I'm not a CPU overclocker, so something that cools a little better than the stock Athlon cooler is fine. Of greater importance is that the fan be quieter than a stock cooler. Another factor is that I'm definitely not going to the expense (and installation trouble) of a water-based CPU cooling system. Back to the Internet to spend some time reading CPU cooler reviews.

One of my students tells me about www.xoxide.com, which has many excellent photos of different makes/models of CPU coolers (and good prices too). One concern is that many of the coolers require attaching a mounting bracket onto the underside of the motherboard for installation. I finally go with the Arctic Cooling Freezer-64 cooler because the reviews all say it's very quiet, it cools better than the stock Athlon cooler, it clips onto the stock mounting lugs on a socket 939 motherboard, and it's reasonably priced. While this cooler lacks the razzle dazzle look of some of the other coolers, it appears to be the perfect match for my needs and preferences.

Motherboard and Video Card

For now, I plan to use the video card that I had with my previous system, and upgrade the video card a couple of months down the road when I have more cash. For a while, my old AGP 8X NVidia 5700 video card will do just fine. Since it's an AGP, I decide not to purchase a mainboard with PCI-Express slots. When I do upgrade the video card, I plan to buy an MSI Nvidia AGP 8X Geforce 6600 GT card.

I've used many different motherboards over the years, including motherboards from Tyan, Gigabyte, Albatron, MSI, Biostar, and Soyo. I've had good luck with all of these (only problem was that I had to update the BIOS with one of them to get it to work properly), and I'm not wedded to any particular manufacturer. However, one feature that all these motherboards have in common is that they've all been AMD/VIA chipset boards. While you may prefer an Nforce or SIS chipset board, my cautious nature propels me to stick with with the familiar VIA chipset. So I finally purchase a Soltek SL-K8TPro-939 VIA K8T800 Pro ATX motherboard. While this is not the most feature packed or fastest mainboard around, it certainly is a great fit with the rest of my gear, and has excellent reviews on the Internet.

Getting Radical?the Case

I really don't like wild-looking computer cases. When some of my students show me the gaudy cases they've bought for their systems, I try to be polite and kind with my opinions, but I always look for elegance and simplicity rather than flash and splash. One minor prejudice is that I don't like cases with a hinged closing cover over the cd-drive bays.

My choice of computer system case surprised even me. I decided to go with a blue tinted clear acrylic case.

Yes, I know there are many disadvantages to clear acrylic cases.

They have to be cleaned frequently as the dust that gathers inside will make them look incredibly ugly in a hurry. They typically use a large number of screws (10 to 12) for fastening the side panels. They scratch and mar easily. Finally, installation of drives into the drive bays can be tricky.

Yes, I know all this?but I bought one anyway. I purchased a Logisys CS888UVBL UV blue acrylic clear case.

I bought the case first, and then went back and did some more research on clear acrylic cases after the purchase. If I had it to do over again, I would still purchase a clear acrylic case, but it would be a case by another manufacturer, where the motherboard is mounted on a slide out tray instead of being directly mounted to the case side panel.

One reason that I went with a clear case is that I can use it for instruction with my students in my computer literacy class at school when we discuss computer hardware. But, bottom line, the real reason is that I just like the look of this case.

More Power

The case doesn't come with a built-in power supply like other systems I've built, so I'll have to buy one separately. Back to the Internet for more research. After reading countless power supply reviews, I finally buy an MGE XG Vigor 500 Watt Power Supply. This PS has a fan-speed adjustor knob on the back, nicely wrapped cables, an attractive chrome finish, good power stability and accurate voltage levels as assessed in reviews, and a relatively modest price. I'm very pleased with this purchase, and I think the selection of this particular power supply may be the best cost versus value component I've purchased for this system.

RAM

I've decided on 1 Gigabyte of Memory. I won't buy the most expensive, but I won't stint on this either. I end up buying the Corsair XMS TWINX1024-3200C2PT 1GB (2 x 512MB) 184-Pin DDR SDRAM DDR 400 (PC 3200) Dual Channel Kit. This is good quality stuff. If you buy the cheapest RAM, you may get away with it?or you may not. With this Corsair RAM, I know that if any problems arise later, they are very unlikely to be memory related.

CD/DVD Drives

I already have a LITEON CD burner/DVD-ROM drive that works very well for me. However, I want to do some DVD burning, so I purchase another LITEON with DVD burning capability. Both optical drives are installed in my new system. But?wait a minute?both drives have beige colored front bezels. Frankly, this won't look too good in my new acrylic case. I get some metallic silver Testor hobbyist spray paint and spray the fronts of my optical drives as well as an old floppy drive that's going into the system. Then I get some clear mailing label stock, print new identification labels for my drives, and affix the labels to the fronts of the drives. It all looks pretty good?not perfect, but better than stock drive bezels would look with my case.

I burn a lot of CDs (mostly open source software for my students), so I install the two optical drives and leave one empty drive bay between them, as heat build-up with repeated cd-burns is a major cause of coasters. When doing mass burning sessions, I'll alternate back and forth between the two drives.

Hard Disk Drive

I'm going to go with a SATA drive. This is my first experience with SATA, and I end up purchasing a 160GB Maxtor drive. As I install this drive, I'm struck with how neat, small, and tidy the SATA data and power cables are--this is really the way to go. I may eventually purchase a couple more drives, and try a SATA-RAID configuration. But, because the primary role for this machine is workstation rather than server, one sata drive will do.

The Smoke Test

When you first power on a newly built computer, you experience that stressfull moment of doubt, and maybe even a little panic. After all, you've spent an awful lot of time and money on this. And, if you're foolish like me, you've probably been bragging to others about this wonderful new computer system you've been building. Not only have you invested considerable money and time, you've invested major macho ego into getting this thing working. Clearly, failure is not an option.

The brain starts to whirl rapidly with increasingly wild thoughts. Have I missed anything? Will the motherboard complete the Power On Self Test? Will the processor overheat? Will the memory function? Will the motherboard melt? Will a cloud of smoke rise from the machine? Will I bring down the entire Northwestern USA power grid?

A now slightly trembling finger reaches out to press the on switch.

In fact, the system starts just fine?what a relief.

Wait a minute?there is a problem?the BIOS is not recognizing one of the Optical Drives.

I power down, and scratch my head for a moment. After a few seconds of thought, I realize that when installing the optical drives, I forgot to make sure that one drive was set as a master and the other as a slave. Yes, the optical drives are cabled to the same IDE port, so the master-slave arrangement matters. I take a close look at the backs of the optical drives, and sure enough that's what I've done?both are set as masters. I quickly grab another cable out of stores, and connect each optical drive to its own IDE channel. Problem fixed. With my heart rate now back to normal, it's time to install Linux.

Which Linux Distribution?

I've been a Mandrake (now Mandriva) user ever since version 7.1. Though I enjoy installing and trying different distributions, I want to install a familiar distribution?this is to be my main production machine at home?and I know

Mandriva inside and out. I've also been a member of the Mandriva Club for several years, so I'll install Mandriva Limited Edition 2005.

Changes (If I Had It All to do over Again)

Although more expensive, I would buy a BeanTech BT-84-B blue tinted acrylic case instead of the Logisys case. With the BeanTech case, the motherboard is mounted to a slide-out-tray. The BeanTech case also has rubber pads in the drive bays.

People tell me that the comparable Seagate sata drive is quieter and quicker than the Maxtor I purchased. I would investigate this furthur, and perhaps purchase the Seagate.

Conclusion

I've now been using this system for 3 weeks. It runs quietly, and the processor stays relatively cool at 40-43 degrees Celsius. The system is extremely quick, and all my devices are recognized.

I haven't tried any overclocking at this point, but the cool CPU temperature, good quality RAM, and the capabilities of the motherboard and processor should provide opportunities to experiment with this later. All in all, I'm very satisfied and I think this system is going to serve me wll for some time to come.

Original [4] in pdf.

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