



Green Computing Makes ¢ents



By Jim Klein

When most technologists think of “green computing” they tend to gravitate toward the obvious: lower power devices, auto-shutoff tools, and less polluting material construction. These are all great when considering new purchases, but can account for only a fraction of the environmental and capital savings of equipment re-use.

The U.S. Environmental Protection Agency (EPA) recently released its electronics environmental benefits calculator, which is intended to assist users with quantifying the benefits of environmentally sound management of electronic equipment. According to this tool, re-using just one computer and monitor saves:

- 30 lbs of hazardous waste
- 77 lbs of solid waste
- 77 lbs of materials
- 147 lbs (17.5 gallons) of water from being polluted
- 32 tons of air from being polluted
- 1,333 lbs of CO2 from being emitted
- 7,719 kilowatts of energy

This is roughly the equivalent of taking half a car off the road and saving 68 percent of one U.S. household’s allotment of electricity for a year. These numbers are significant and certainly worthy of consideration.

So then the question is: how do we in K12 leverage computer re-use strategically and effectively to both increase student technology access and reduce our footprint on the environment? To answer this question, a realistic analysis of computer use in K12 schools and districts is required, and will undoubtedly reveal obvious opportunities.

First, consider that the vast majority of computer use requires very little processing power. Most individual desktop applications in educational environments spend the majority of their time waiting for the user to do something, rather than the computer actually processing. Consider also that we are using more Web-based applications, in which the server does most of the work.

With these facts in mind, it becomes quite easy to conclude that operating systems are the primary driver of continually escalating system requirements, which lead to ever more rapid and premature (and unnecessary, in our opinion) equipment retirement. As such, the logical conclusion is to utilize operating systems which are capable of supporting the same or similar software with lower system requirements. In other words, leveraging lightweight open-source

applications and Linux on desktops and thin clients.

Here at Saugus, we have long been supporters of Linux on the desktop (Fedora is our favorite flavor.) Linux on the desktop offers a number of significant advantages:

Fast and light: Linux is significantly smaller (in lines of code) than mainstream operating systems, which means that it is more efficient for machines with fewer resources. Its modular design allows a user to install only the parts they want, and to leave off the parts they don’t. The result is better performance on low powered hardware.

Secure and stable: The design of Linux is inherently secure, and is generally far less susceptible to viruses and malware than other systems. And, Linux is widely regarded as one of the most stable operating systems on the planet. These factors make it ideal for use in K12, where availability of support resources is often limited.

Broad hardware support: The open-source community is well known for its hardware support, especially for older hardware, which makes Linux extremely easy to install on older machines. In general, everything just works without effort. No more hunting for drivers.

More variety: Most Linux distributions offer a wealth of applications for a variety of needs, including education. Common applications such as OpenOffice.org, Firefox, Adobe Reader, and myriad others are widely available. Projects such as Tux4Kids, KDE Education Project, GCompris, and others have wonderful offerings for classroom use. And, all are free.

Flexible networking: Linux is extremely flexible as a network client and can be easily integrated into Microsoft, Apple, and Novell environments.

Free: Did I mention free? Often, older machines have Windows 2000, 98, ME, XP Home Edition on them. The cost and effort to upgrade these machines to XP Pro or Vista is hardly worth the effort.

Linux = Green Computing: A number of articles have surfaced lately declaring Windows as an energy hog. Have a look at “Not so Green Computing: Is Windows an energy hog?” and “True or False: Switching from a Windows-operated computer to a Linux-operated one could slash computer-generated e-waste levels by 50 percent.” (Links are on next page.) In addition, there are a number of efforts to make Linux even greener, such as Intel’s Less Watts project and IBM’s Big Green Linux project.

Every Linux client we install operates as a fully functional network client. Users log in to the network using our Windows-based authentication mechanism and automatically mount network home folders and shares. VNC is installed and configured, enabling remote technical support. Everything an IT department would expect is available on each machine.

But we don't stop there. We make sure that the latest Internet technologies and media players are installed, as well as a host of educational, multimedia, scientific, and productivity applications. Each work station easily contains more than 40 software applications for ready use in the classroom.

We've even relaxed our "just say no" policy toward accepting donations. Over the past several months, we have accepted more than 200 machines from the Department of Defense and other organizations, and have installed Linux on the vast majority of them. Since we are able to script and fully automate the Linux installation, classroom teachers are able to handle the deployment and increase their computer count in a matter of minutes.

The impact of this approach on the education and the environment is significant. Student- to-computer ratios drop, and schools gain increased flexibility with technology allocation. Students gain access to a greater number of applications and reliable computing resources. Teachers are empowered to implement broader technology driven lessons as a result of increased technology access. And equipment usable life is extended, driving down the cost of technology integration and reducing our impact on the environment.

The "wins" provided by computer reuse are hard to ignore, especially in tough economic times such as ours. Consider making the most of those old machines, rather than simply throwing them out—your students and the environment will thank you! ■

Resources:

- EPA Electronics Environmental Benefits Calculator—<http://www.federalelectronicchallenge.net/resources/bencalc.htm>;
- Fedora Project—<http://fedoraproject.org>;
- Not so green computing: Is Windows and energy hog?—<http://blogs.computerworld.com/node/6283>;
- True or False: Switching from a Windows-operated computer to a Linux-operated one could slash computer-generated e-waste levels by 50 percent—<http://www.cnn.com/2007/WORLD/asiapcf/12/03/ecomyth.ewastel/index.html>;
- Intel Less Watts Project—<http://www.lesswatts.org>;
- IBM Big Green Linux—http://en.wikipedia.org/wiki/Project_Big_Green
- OpenOffice.org—<http://openoffice.org>;

- Mozilla Firefox—<http://www.mozilla.com/en-US/firefox>;
- Adobe Reader—<http://www.adobe.com/products/acrobat/readstep2.html>;
- Tux4Kids Project—<http://www.geekco-mix.com/tux4kids>;
- KDE Education Project—<http://edu.kde.org>;
- GCompris—<http://gcompris.net>.

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