

OS Alternatives

Forget Windows and Linux: The lesser-known BSDs may be just what you need. **By Brett Glass**

It's hard to browse the Web or read a computer magazine without finding a reference to Linux, the operating-system wunderkind created by Linus Torvalds and developed by a host of others. But although Linux steals the headlines, ISPs and system administrators often choose one of the BSDs—a group of operating systems based on code polished during more than 20 years of research at one of America's leading academic institutions.

What are the BSDs? And why should you consider using them if you're looking for a non-Windows operating system?

A SCHOLARLY TRADITION

BSD stands for *Berkeley Software Distribution*, a collection of software developed at the University of California at Berkeley. Originally intended as an add-on package for early versions of AT&T's Unix, BSD gradually evolved into a complete, highly sophisticated Unix-like operating system—the first to incorporate built-in networking.

Fussed over by perfectionist academics and then torture-tested by generations of brutal college students, BSD is perhaps the most robust, secure, and reliable of operating systems. It is common for a BSD-based operating system to run for years without maintenance or rebooting. And because it was developed at public expense, BSD was made completely free to all comers—including software developers who wanted to build it into commercial products. Networking code from BSD is at the heart of nearly every modern operating system, including Linux, OS/2, and even every version of Windows since Windows 95.

SECRET WEAPONS

If the BSDs are so good, why aren't they making the headlines, as Linux is? The most important reason is cultural. Many Linux developers see themselves as software revolutionaries. But members of the academic community, where the BSDs have their roots, tended to focus more on results rather than getting the word out. The BSDs also have a dedicated following among system administrators and ISPs, who often prefer to treat their favorite BSD as a secret weapon rather than publicizing the fact that they are using the OS.

As a result, not many people realize that versions of BSD form the foundations of major Internet sites such as Yahoo! and also power high-

ly reliable embedded systems such as the IBM InterJet Internet appliance and Maxtor's network storage servers. One of the BSDs—NetBSD—has the distinction of being the most portable operating system in the world, running on more than 64 different central processing units and hundreds of brands and models of computers.

Today, there are five popular BSD operating systems. Three of them—FreeBSD (www.freebsd.org), NetBSD (www.netbsd.org), and OpenBSD (www.openbsd.org)—are covered by the BSD license, which makes the operating systems and their source code free for use by anyone for any purpose. The other two—BSD/OS and Mac OS X—are commercial products that build upon the open-source BSD code and offer unique advantages and distinctive technology. In this article, we'll look at the no-cost BSD versions. For a discussion of BSD/OS and Mac OS X, and the advantage of the BSD license over the Linux General Public License, see the sidebar "More about BSD" on our Web site.

FREEBSD

FreeBSD evolved from 386BSD, a version of BSD ported to the Intel 80386 chip by Berkeley computer scientist Bill Jolitz. Because of its origins, FreeBSD has always worked best on the 32-bit x86 architecture. Of the no-cost BSDs, this is the most finely tuned for PC-compatible computers and supports the greatest variety of PC-compatible peripherals. Although FreeBSD also runs on the Alpha processor, and ports to other architectures are in the works, you should consider this OS primarily for x86 systems.

Of the no-cost BSDs, FreeBSD has the most bells and whistles, the largest cadre of developers, the most active collection of mailing lists, and the greatest number of users. It is also probably the easiest to install of all free operating systems—especially if you want to install across the Internet instead of buying a CD.

Linux distributors often make their distributions difficult to install across the Internet. Their businesses, after all, rely on sales of CDs. Not so with FreeBSD. All that's required is a pair of floppy disks (which can easily be created with utilities and image files on the FreeBSD Web site) and a reasonably fast Internet connection. Boot from the first disk, then insert the second. An installation program helps you choose configuration options, downloads the entire system from the Internet, and installs everything in the right place.

Virtual Device Driver Trouble

I'm running Windows 2000. When I start or install certain programs, I get a message saying "16 bit windows subsystem: SYSTEM\CurrentControlSet\Control\VirtualDeviceDrivers\VirtualDeviceDriver format in the registry is invalid", and asking me to Close or Ignore. If I choose *Ignore*, everything seems to work properly. What could cause this error?

DIETER ABELE

This problem is caused by invalid Registry data. To fix it:

1. Launch REGEDT32 (you can enter the name in the Start menu's Run dialog). You must use Regedit32, not Regedit.
2. Open the HKEY_LOCAL_MACHINE subwindow.
3. Navigate to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\VirtualDeviceDrivers.
4. In the right-hand pane, select the value named VDD.
5. Select *Delete* from the *Edit* menu.
6. Select *Add value* from the *Edit* menu.
7. In the *Add value* dialog, enter VDD, and choose REG_MULTI_SZ as the data type.
8. When the Multi-String Editor appears, click *OK* without entering anything.
9. Quit the Registry Editor.

For more information see the Microsoft Knowledge Base article Q254914, titled "Virtual Device Driver Error Message in 16-Bit MS-DOS Subsystem," at <http://support.microsoft.com/support/kb/articles/Q254/9/14.ASP>.—Neil J. Rubenking

Add Programs to Open With Dialog

Sometimes I want to use the *Open With* dialog box to open files that are not registered. Not all programs are listed in this box. How can I get a program to appear in the *Open With* dialog box?

RICH JOHNSON

Windows populates the program list in the *Open With* box by reading all of the file type information from the Registry and adding every program

that's registered to open at least one type of file. The easiest way to force a program into the Open With list is to associate it with a nonsense extension. Create a file with a name like Getrid.nosuchextension, right-click on it in Windows Explorer, select *Open with...*, and browse for the program you want added. Check the *Always use this program to open this type of file* box and click OK. Now that a file type is associated with the program, the program will appear in the Open With dialog.—NJR

The Applog Folder

There are over 9MB in the C:\Windows\applog folder. What is this? Can it safely be deleted?

PHILIP S. JOHNSON

In Windows 98 and Windows Me, the Task Monitor tracks which programs are launched and how they load from disk, and it records the info in the Applog folder. The Defrag utility then uses this info to provide special optimization for the program files you use most often.

DESKTOP SOLUTIONS

Those who would rather have a CD, though, can get one from Wind River Systems' FreeBSD Mall (www.freebsdmail.com) or from Cheap Bytes (www.cheapbytes.com). You can also burn your own CD from an ISO image available on the FreeBSD Web site.

Another of FreeBSD's strengths is its extensive ports collection—more than 5,800 free applications you can instantly download and install on FreeBSD systems (www.freebsd.org/ports/index.html). Virtually all of the software you need to set up a desktop workstation or an industrial-strength server is either installed with FreeBSD or available via the ports collection.

In addition, FreeBSD, like OpenBSD and NetBSD, can run virtually any program that's sold for Linux, for SCO Unix, or for the Intel version of Solaris. Like Linux, FreeBSD uses the X Window system and all the desktops and graphical user interfaces developed for that protocol, including KDE, GNOME, and the programs written for both.

Finally, FreeBSD has the most literature for new users. The FreeBSD Handbook (www.freebsd.org/handbook) provides excellent instructions for newcomers. And books for beginners and more advanced users are arriving from many publishers.

In short, FreeBSD is a strong challenger to

Linux—and may offer superior stability, ease of installation, and convenience.

OPENBSD

OpenBSD, another no-cost BSD derivative, is reputed to be the most secure operating system in the world. OpenBSD's home page (www.openbsd.org) reports that OpenBSD has gone "four years without a remote hole in the default install." What this means is that—as far as anyone knows—no version of OpenBSD released in the past four years can be taken over from across the Internet. (You can, of course, make any operating system—including OpenBSD—vulnerable to a takeover if you configure the server badly or run insecure software that lets intruders in.) OpenBSD also has fully integrated cryptographic software to keep data safe from prying eyes.

OpenBSD isn't the most feature-packed Unix implementation, nor is it the fastest. But it's no slouch in these areas. And the OS is so small and efficient, it can run well on an old 486 with 16MB of RAM—hardware that couldn't even boot Windows 2000. And no other operating system shares OpenBSD's sterling security track record. Several remote root vulnerabilities are typically discovered every month in Microsoft operating systems such as Windows 2000. And



DESKTOP SOLUTIONS

many recent Linux distributions have been vulnerable to exploits such as the Ramen worm.

Like FreeBSD and NetBSD, OpenBSD has a ports collection that contains customized versions of many free software packages (www.openbsd.org/ports.html). The collection is not as large as FreeBSD's but contains most of the utilities you'd want for a Unix server or workstation. The x86 version of OpenBSD can also run programs created for FreeBSD, Linux, and Solaris. OpenBSD supports ten computer architectures—more than FreeBSD but not as many as NetBSD.

OpenBSD CD-ROMs are available from OpenBSD itself or from Cheap Bytes. An ISO image isn't available, however, because the group prefers to sell CDs as a way of supporting its efforts. You can install the OS over the Internet, though the installer's user interface is not as polished as that of FreeBSD.

Of the three no-cost BSDs, OpenBSD has the smallest group of developers and the most difficult learning curve for Unix newbies. But if you need to construct a bulletproof Internet firewall or server, OpenBSD is the way to go.

NETBSD

NetBSD, also available at no cost, is the most portable of the BSD-based operating systems.

Currently running on 46 different hardware architectures (and more are in the works), NetBSD is at home running on everything from an ancient 68K-based Macintosh or Amiga to AMD's as-yet-unreleased x86-64 Hammer architecture.

This portability makes NetBSD one of the best choices for embedded systems—computers that churn away, unseen, inside other devices. Because porting code from one platform to another tends to expose bugs that might otherwise go unnoticed, code from NetBSD is unusually solid; both OpenBSD (originally a spin-off of the NetBSD Project) and FreeBSD have borrowed from it over time. NetBSD is also the operating system of choice for many types of orphaned hardware, including old Sun workstations.

Like FreeBSD and OpenBSD, NetBSD has a large collection of free ports and packages (fewer than FreeBSD and more than OpenBSD) and can run commercial programs compiled for Linux and other versions of Unix.

NetBSD CD-ROMs are available from Wasabi Systems (www.wasabisystems.com), Cheap Bytes, and several other sources listed on the NetBSD Web site. An ISO CD-ROM image is available for download, and you can also install via FTP.

Rather than rearranging the clusters of these files in sequential order, Defrag rearranges them in the order they're loaded when the program launches.

This specialized processing reduces the time required to launch certain programs, but you may prefer to trade that speed for disk space. You're perfectly free to delete the entire contents of this folder, but Task Monitor will start refilling the folder right away. To prevent this, you need to tweak a Registry setting. Launch Regedit from the Start menu's Run dialog and navigate to

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HKEY_LOCAL_MACHINE\
SOFTWARE\Microsoft\Windows\
CurrentVersion\Applets\
Defrag\AppStartParams. In the
right-hand pane, find or create a
DWORD value named UseProfile,
and set its value to 0. For more
information, see the Microsoft
TechNet article at www.microsoft.com/technet/Win98/Reskit/Part2/wrkc10.asp.—NJR
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Software Matters.

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