UNIX. Live free or die!

This article examines the relationship between Unix, the Internet and free software, and describes how the growth of free software has impacted to such an extent that even variants of Unix itself are freely available.

The growth and popularity of the Internet has been fueled in a great part by the widespread acceptance of Unix as a operating system; the incorporation of TCP/IP within the Unix kernel by the University of California at Berkeley led to Unix being the choice of Operating System for non-proprietary networked computers. The use of Unix and the Internet also engendered a major movement centered around freely available software. The availablility of a *de-facto* standard platform (at least at source level) and a ready means of distribution meant that thousands of developers in universities, commercial organisations and research departments could (and did) make significant contributions to an ever-growing body of free software, available to anyone with a modem or Internet access. Unix, the Internet, and free software are closely intertwined; so much so that it is unlikely that any two of the three would exist without the other.

Unix itself has been the beneficiary of much of the free software movement, with kernel enhancements, new utilities and tools all becoming part of the familiar Unix landscape. No self-respecting Unix developer would operate without their toolbox of utilities such as *patch, perl* and other free software. Over the years that AT&T (and later USL) controlled the development and distribution of Unix, users and software houses were often frustrated by the politics surrounding the Unix system. In spite of this, Unix growth in the marketplace continued, and was finally being considered as a mainstream contender in the commercial world. The Unix source code, however, was still only available under strict licencing. This restriction generated a number of efforts to alleviate the situation, and create a 'free' Unix. The original motivation of the Free Software Foundation over 11 years ago was to create a Unix replacement that was totally unencumbered from source code distribution restrictions.

Meanwhile, on the Berkeley campus, continuing development was focused on improving the BSD version of Unix, and on replacing USL proprietary sections of the system with new code that could be freely distributed. The eventual result of this development (besides a law suite from USL) was several releases of software that increasingly filled in the gaps left when the USL code was removed from a Berkeley Unix distribution. At the same time, BSD unix was being ported to a number of different architectures away from the traditional VAX platform, such as Hewlett Packard workstations, Sony News workstations etc. One such port was undertaken by William Jolitz, who in the late 1980's began porting BSD Unix to the Intel i386 PC architecture. An interim release of the BSD work became available and distributed via the Internet, known as the Berkeley Networking Release 2, or *Net/2* for short. Whilst not being a complete system, it did have most elements required for a functional system. It incorporated free software contributed from many sources, as well as code developed at Berkeley.

BSDI Inc. was formed expressly to take the Net/2 release, develop the missing portions for the Intel PC architecture and sell the result as an inexpensive supported product *with source*, named BSD/386. Meanwhile, William Jolitz had continued with his i386 port (first as an early member of the BSDi team, then later on his own) and released a free distribution called 386BSD; the first release (0.0) was not considered stable, but a second

release (0.1) in 1992 proved to be viable enough for thousands of people to obtain it via the Internet and load it on their Personal Computers.

Linux, on the other hand, is a clone of the Unix system, and shares little (if any) of the same code as BSD Unix. With Linux being originally written specifically for the i386, it is only now being reworked to be a more portable system. Linux is considered a more polished system, and somewhat more stable since it has originated from a clean slate. Linux has a larger installed base (as a free Unix clone), and was favoured when the BSD releases were under the shadow of the AT&T law suite.

For the first time, a fully functional BSD Unix system was freely available with source code, and many people took the opportunity to work on the code to make it more stable and usable. With the Research Group at Berkeley being disbanded, there was no central body to co-ordinate the effort; instead the development effort was centered in the virtual world of the Internet, with people all over the world contributing to the free BSD version. Instead of a vendor phone number, mutual support was available via USENET, and anonymous file transfer archives replaced tape/CD distribution of new versions.

Two groups eventually emerged, each with different goals. One group distributed a version termed 'NetBSD', which operated on a range of architectures and had a relatively slow release cycle, whereas the 'FreeBSD' group concentrated on the i386 architecture, releasing new versions more often. Both versions were based on the Net/2 release.

With the availability of the final BSD release (4.4) from UCB, the way was clear to legally distribute the BSD Unix versions that the NetBSD and FreeBSD groups had developed. Both NetBSD and FreeBSD replaced the Net/2 portions of their code with the new 4.4 release, which removed any source of legal contention. With the recent release of FreeBSD 2.0, a system was available that was easier and faster to install than many commercial systems, and came with compilers, networking, utilities and complete source code to boot! NetBSD has released development versions for the Sun SPARCstation and MIPS systems. Work is proceeding on other architectures such as the DEC Alpha.

Whilst there is a strong argument that a combined BSD Unix camp would be more beneficial than a divided one, it seems that politics have once more intruded and it is unlikely that a single BSD Unix (called *OpenBSD*?) will emerge. The best one can hope for is that binary compatibility will be possible. Free market economists tell us that competition is good for the marketplace, but does this apply to free software?

So from the past where Unix was only available under licence, there are *three* versions that may be obtained freely and with source. The future of free software and BSD Unix seems to be assured, as well as the Unix dream of *Live Free or Die*.

FreeBSD 2.0 is available via the Internet on freebsd.cdrom.com and a number of mirror archives, and is available on CD from Walnut Creek or Info-Magic.