

Time Machine: FreeBSD

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Every month we delve into the PC Update archive to take a look at what computing was like in the past...this month, a review of FreeBSD from February 2000.

Until recently my home workstation was host to several operating systems: Linux, my preferred environment; Windows 98 and Windows NT (I have legacy applications), and BeOS which I loaded to see if it really was 'cool'. An on-going episode with a sound card and Windows NT got me thinking it was time for something new.

FreeBSD is a freely available operating system primarily for Intel-based (386 and higher) PCs. A descendant of 386BSD, it has many features expected from a UNIX type operating system, for example multi-user support, preemptive multi-tasking, TCP/IP networking, and memory protection; it can also run SCO and Linux programs.

People may take these features for granted, but what also interested me was that FreeBSD was behind some popular and busy Internet sites including Yahoo! and Walnut Creek (the world's busiest ftp server which recently served out more than a terabyte of data in a day).

In this article I will describe installing and running FreeBSD.

Preamble

I purchased FreeBSD (3.2) online and received the package a few hours later. (A couple of days later FreeBSD 3.3 was released.) Since I was not rushed into installing the software I took time and read FreeBSD related news-groups (comp.unix.bsd.freebsd.misc) to prepare for the "Oh no, what have I done?" kind of feeling.

FreeBSD requires at least 5 MB RAM to install (though it will run with 4 MB RAM), and a minimum of about 100 MB of free hard disk space. Additionally, FreeBSD does not attempt to support as many devices as possible as its focus is elsewhere: it may be preferable to scan through the compatibility list.

Two problems arose immediately: FreeBSD must reside on a primary partition and to enable it to boot, certain files must be located within the first 1024 cylinders of the disk on it is installed. (Note some motherboards enable booting of operating systems loaded within the first 8 GB.) Disk partitioning software is supplied however it may be inadequate (FAT32 or VFAT partitions are not supported), so a commercial product may be required. In my case, I played a variation of the Towers of Hanoi problem with my partitions to allocate space.

Installation

The installation manual describes various install methods including installing over the Internet; the simplest method though is via CD-ROM, which I chose. If your system cannot boot from CD-ROM discs, boot floppies must be created.

When the computer was rebooted the first recognizable thing to pop up was a kernel configuration program that enables you to manually select and configure components such as hard disk controllers and network cards, or remove support for components: I removed support for components not present in my system. Once completed, FreeBSD probes the computer and after a few moments the install program is (automatically) started.

The install program is text-based and offers several install methods: beginners, impatient, and expert.

I chose expert as this option gives the most flexibility. With the expert option you set up partitions for FreeBSD; partitioning can be a complex process as hard disk performance and maintenance are dependent on the way partitions have been set up, so it may be worthwhile investigating. During the partitioning stage, a boot manager may be installed: the boot manager enables booting from various partitions or from different hard disks.

I chose to forgo this option as I have been happy with the Linux boot manager lilo. It is also possible to use NT's boot manager. (As no boot manager was installed, the installation process sets the partition FreeBSD was installed on as bootable.)

To assist users select programs to install, several prepackaged distributions are offered, for example, 'X-User' which installs a graphical user interface (the X Window System, which is more than a GUI) and general programs along with documentation,

and 'X-Kern-Developer' which along with the programs installed for 'X User', lots of source code and the necessary components to create the operating system itself are loaded. Alternatively, a custom distribution can be created where various components are selected for installation.

Once my selections the system started installing. This process took about an hour. If installing the X Window System you are required to select the appropriate X server that supports your graphics card and extra fonts to install.

Post installation

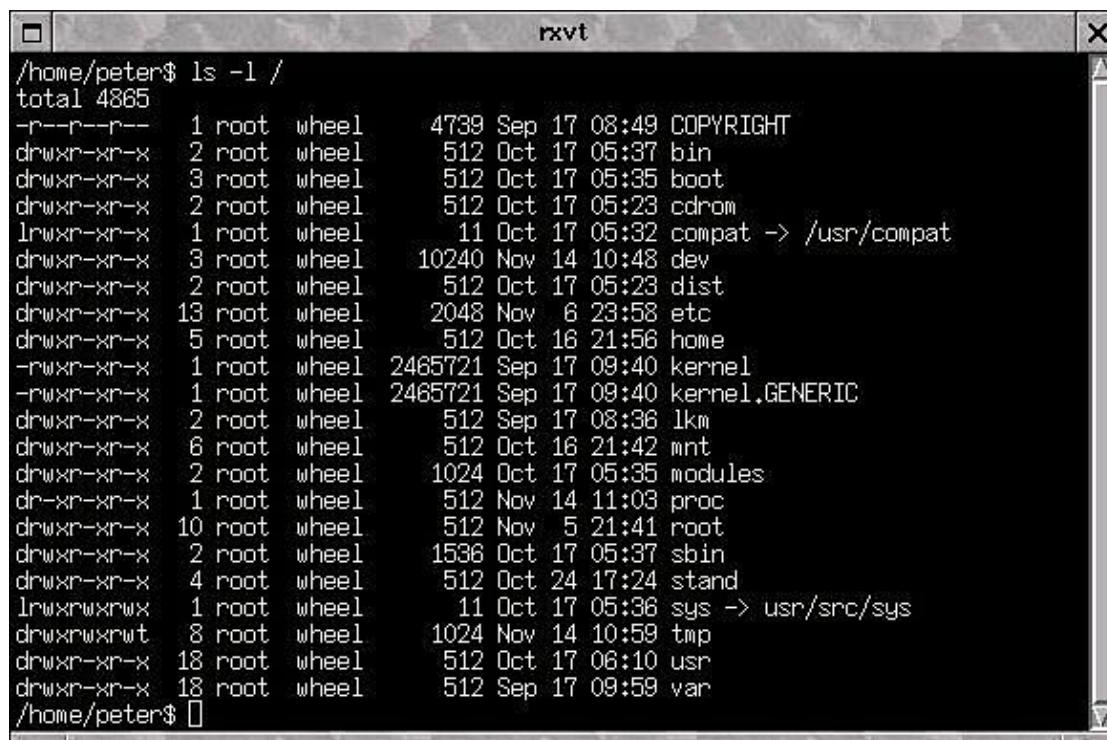
At this stage FreeBSD is about ready to run. Here several user accounts were created as was a group 'ppp' for those users who will have Internet access.

I also setup access to my Windows partitions and configured the X Window System with the program XF86Setup. This process involves selecting an appropriate graphics card, graphics modes, monitor timings, and keyboard. More programs can also be installed: I wanted to make the system resemble what I was accustomed to with Linux so I installed the Windowmaker window manager.

To enable my system to boot FreeBSD I restarted Linux and added a FreeBSD section in the lilo configuration files and ran the program lilo to commit the changes.

Working with FreeBSD

The first time I started FreeBSD I was presented with a login prompt on a text console. Once logged in, I started exploring the system by issuing commands like 'cd' to change directory and 'ls' to list the contents of directories. At first it may be difficult for those new to UNIX. However, once familiar with it you may find working with Windows difficult!



```
rxvt
/home/peter$ ls -l /
total 4865
-r--r--r--  1 root  wheel   4739 Sep  17  08:49 COPYRIGHT
drwxr-xr-x  2 root  wheel   512 Oct  17  05:37 bin
drwxr-xr-x  3 root  wheel   512 Oct  17  05:35 boot
drwxr-xr-x  2 root  wheel   512 Oct  17  05:23 cdrom
lrwxr-xr-x  1 root  wheel    11 Oct  17  05:32 compat -> /usr/compat
drwxr-xr-x  3 root  wheel  10240 Nov  14  10:48 dev
drwxr-xr-x  2 root  wheel   512 Oct  17  05:23 dist
drwxr-xr-x 13 root  wheel   2048 Nov  6  23:58 etc
drwxr-xr-x  5 root  wheel   512 Oct  16  21:56 home
-rwxr-xr-x  1 root  wheel 2465721 Sep  17  09:40 kernel
-rwxr-xr-x  1 root  wheel 2465721 Sep  17  09:40 kernel.GENERIC
drwxr-xr-x  2 root  wheel   512 Sep  17  08:36 lkm
drwxr-xr-x  6 root  wheel   512 Oct  16  21:42 mnt
drwxr-xr-x  2 root  wheel  1024 Oct  17  05:35 modules
dr-xr-xr-x  1 root  wheel   512 Nov  14  11:03 proc
drwxr-xr-x 10 root  wheel   512 Nov  5  21:41 root
drwxr-xr-x  2 root  wheel  1536 Oct  17  05:37 sbin
drwxr-xr-x  4 root  wheel   512 Oct  24  17:24 stand
lrwxrwxrwx  1 root  wheel    11 Oct  17  05:36 sys -> usr/src/sys
drwxrwxrwt  8 root  wheel  1024 Nov  14  10:59 tmp
drwxr-xr-x 18 root  wheel   512 Oct  17  06:10 usr
drwxr-xr-x 18 root  wheel   512 Sep  17  09:59 var
/home/peter$
```

Figure 1. The files and directories under the root directory

For those unfamiliar with UNIX, '/' is a file delimiter and the topmost directory (the root directory) is identified by /. Figure 1 shows the files and directories under the root directory: /kernel and /kernel.GENERIC are kernels (programs that interact with hardware); /var contains log files, administration files, and mail; /usr contains system files and system programs; /usr/local is usually reserved for programs that you load, and; /home is the base directory for users, for example /home/peter is the work directory for the user 'peter'.

Concluding Remarks

Some newsgroups have heated discussions on which is the best operating system as zealots wave their banners; occasionally some people add they have the best of most worlds by running several operating systems, and this is the camp I am in. With thousands of applications available, its ability to run Linux programs (Oracle for Linux, DB2 for Linux, WordPerfect for Linux), (limited) support for running Windows programs via the WINE project, and being behind some high profile Internet sites, FreeBSD has become the darling of operating systems on my PC.

To find out more about FreeBSD, visit <http://www.au.freebsd.org>.