NAME

INSTALL – Installation procedure for NetBSD/pc532.

DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 1.5 on the *pc532* platform. It is available in four different formats titled `INSTALL.`*ext*, where *ext* is one of `.ps`, `.html`, `.more`, or `.txt`:

`.ps` PostScript.

`.html` Standard Internet HTML.

`.more` The enhanced text format used on UNIX-like systems by the `more`(1) and `less`(1) pager utility programs. This is the format in which the on-line *man* pages are generally presented.

`.txt` Plain old ASCII.

You are reading the *PostScript* version.

What is NetBSD?

The NetBSD Operating System is a fully functional Open Source UNIX-like operating system derived from the University of California, Berkeley Networking Release 2 (Net/2), 4.4BSD-Lite, and 4.4BSD-Lite2 sources. NetBSD runs on thirty-one different system architectures featuring twelve distinct families of CPUs, and is being ported to more. The NetBSD 1.5 release contains complete binary releases for fifteen different machine types. (The sixteen remaining are not fully supported at this time and are thus not part of the binary distribution. For information on them, please see the NetBSD web site at **http://www.netbsd.org/**)

NetBSD is a completely integrated system. In addition to its highly portable, high performance kernel, NetBSD features a complete set of user utilities, compilers for several languages, the X Window System, firewall software and numerous other tools, all accompanied by full source code.

NetBSD is a creation of the members of the Internet community. Without the unique cooperation and coordination the net makes possible, it's likely that NetBSD wouldn't exist.

Changes Since The Last Release

The NetBSD 1.5 release provides numerous significant functional enhancements, including support for many new devices, integration of hundreds of bug fixes, new and updated kernel subsystems, and many userland enhancements. The result of these improvements is a stable operating system fit for production use that rivals most commercially available systems.

It is impossible to completely summarize over one year of development that went into the NetBSD 1.5 release. Some highlights include:

Kernel

- Ports to new platforms including: arc, cobalt, hpcmips, news68k, sgimips, and sparc64.
- Improved performance and stability of the UVM virtual memory subsystem.
- Implementation of generic kernel locking code, as well as a restructure and re-tuning of the scheduler, to be used by the future symmetric multi-processing (SMP) implementation.
- Improved compatibility support for Linux, OSF1, and SVR4 programs.

- New compatibility support for Win32 programs.
- Support for dynamically loaded ELF kernel modules.
- Kernel process tracing using `ktruss`(1).
- Deletion of swap devices using `swapctl`(8).
- Easier hot-pluggability of keyboards and mice using a new wscons device - wsmux.
- Improved PCMCIA and Cardbus support, including support for detaching of devices and cards, resulting in better support for notebooks and PDA devices.
- Numerous hardware improvements, including areas such as: audio, UDMA/66 support for ATA drives, USB, and wireless networking.

Networking

- Addition of IP version 6 (IPv6) and IPsec to the networking stack, from the KAME project. This includes addition of kernel code for IPv6/IPsec, IPv4/v6 dual-stack user applications and supporting libraries. Due to this, the shlib major version for `pcap`(3) is incremented and you may need to recompile userland tools. The KAME IPv6 part includes results from the unified-ipv6 effort.

File system

- Significant Fast file system (FFS) performance enhancements via integration of Kirk McKusick's soft updates and trickle sync code.
- Support for the Windows NT 'NTFS' file system (read-only at this stage).
- Support for revision 1 of the Linux 'ext2fs' file system.
- Enhanced stability and usability of LFS (the BSD log-structured file system).
- Various RAIDframe enhancements including: auto-detection of RAID components and auto-configuration of RAID sets, and the ability to configure the root file system (`/`) on a RAID set.
- Support for Microsoft Joliet extensions to the ISO9660 CD file system.
- Improved file system vnode locking mechanisms, thus resolving a source of several panics in the past.
- Support for NFS and RPC over IPv6.
- Server part of NFS locking (implemented by `rpc.lockd`(8)) now works.

Security

- Strong cryptographic libraries and applications integrated, including the AES cipher Rijndael, the OpenSSL library, more complete Kerberos IV and Kerberos V support, and an SSH server and client.
- `sysctl`(3) interfaces to various elements of process and system information, allowing programs such as `ps`(1), `dmesg`(1) and the like to operate without recompilation after kernel upgrades, and remove the necessity to run setgid kmem (thus improving system security).
- Disable various services by default, and set the default options for disabled daemons to a higher level of logging.
- Several code audits were performed. One audit replaced string routines that were used without bound checking, and another one to identify and disable places where format strings were used in an unsafe way, allowing arbitrary data entered by (possibly) malicious users to overwrite application code, and leading from Denial of Service attacks to compromised system.

System administration and user tools

- Conversion of the `rc`(8) system startup and shutdown scripts to an 'rc.d' mechanism, with separate control scripts for each service, and appropriate dependency ordering provided by `rcorder`(8).
- `postfix`(1) provided as alternative mail transport agent to `sendmail`(8).
- User management tools `useradd`(8), `usermod`(8), `userdel`(8), `groupadd`(8), `groupmod`(8), and `groupdel`(8) added to the system.
- Incorporation of a login class capability database (`/etc/login.conf`) from BSD/OS.
- Improved support for usernames longer than eight characters in programs such as `at`(1) and `w`(1).
- Many enhancements to `ftpd`(8) providing features found in larger and less secure FTP daemons, such as user classes, connection limits, improved support for virtual hosting, transfer statistics, transfer rate throttling, and support for various IETF ftpext working group extensions.
- The `ftp`(1) client has been improved even further, including transfer rate throttling, improved URL support, command line uploads. See the man page for details.

Miscellaneous

- Updates to the NetBSD source code style code (located in `/usr/share/misc/style`) to use ANSI C only (instead of K&R) and reflect current (best) practice, and begin migrating the NetBSD source code to follow it.
- Implementation of many SUSv2 features to the `curses`(3) library, including support for color.
- Updates of most third party packages that are shipped in the base system, including `file`(1), `ipfilter`(4), `ppp`(4), and `sendmail`(8) to the latest stable release.
- Many new packages in the *pkgsrc* system, including standard desktops like KDE and GNOME as well as latest Tcl/Tk and perl and many of the components of the Java Enterprise platform. The package framework itself now has full wildcard dependency support.

As has been noted, there have also been innumerable bug fixes.

Kernel interfaces have continued to be refined, and more subsystems and device drivers are shared among the different ports. You can look for this trend to continue.

This is the sixth major release of NetBSD/pc532.

There are a few known problems in the pc532 port. They include:

1. **`ppp`** reports a lot of input errors on some machines.
2. Some tape drives do not work very well. Some have hung the system.
3. The serial drivers do not have all the desired features. (**`ttyflags`** is the most glaring omission.)

The Future of NetBSD

The NetBSD Foundation has been incorporated as a non-profit organization. Its purpose is to encourage, foster and promote the free exchange of computer software, namely the NetBSD Operating System. The foundation will allow for many things to be handled more smoothly than could be done with our previous informal organization. In particular, it provides the framework to deal with other parties that wish to become involved in the NetBSD Project.

The NetBSD Foundation will help improve the quality of NetBSD by:

- providing better organization to keep track of development efforts, including co-ordination with groups working in related fields.
- providing a framework to receive donations of goods and services and to own the resources necessary to run the NetBSD Project.
- providing a better position from which to undertake promotional activities.
- periodically organizing workshops for developers and other interested people to discuss ongoing work.

We intend to begin narrowing the time delay between releases. Our ambition is to provide a full release every six to eight months.

We hope to support even *more* hardware in the future, and we have a rather large number of other ideas about what can be done to improve NetBSD.

We intend to continue our current practice of making the NetBSD-current development source available on a daily basis.

We intend to integrate free, positive changes from whatever sources submit them, providing that they are well thought-out and increase the usability of the system.

Above all, we hope to create a stable and accessible system, and to be responsive to the needs and desires of NetBSD users, because it is for and because of them that NetBSD exists.

Sources of NetBSD

Refer to **http://www.netbsd.org/Sites/net.html**.

NetBSD 1.5 Release Contents

The root directory of the NetBSD 1.5 release is organized as follows:

`.../NetBSD-1.5/`

`CHANGES` Changes since earlier NetBSD releases.

`LAST_MINUTE` Last minute changes.

`MIRRORS` A list of sites that mirror the NetBSD 1.5 distribution.

`README.files` README describing the distribution's contents.

`TODO` NetBSD 's todo list (also somewhat incomplete and out of date).

`patches/` Post-release source code patches.

`source/` Source distribution sets; see below.

In addition to the files and directories listed above, there is one directory per architecture, for each of the architectures for which NetBSD 1.5 has a binary distribution. There are also `README.export-control` files sprinkled liberally throughout the distribution tree, which point out that there are some portions of the distribution that may be subject to export regulations of the United States, e.g. code under `src/crypto` and `src/sys/crypto`. It is your responsibility to determine whether or not it is legal for you to export these portions and to act accordingly.

The source distribution sets can be found in subdirectories of the `source` subdirectory of the distribution tree. They contain the complete sources to the system. The source distribution sets are as follows:

gnusrc This set contains the ''gnu'' sources, including the source for the compiler, assembler, groff, and the other GNU utilities in the binary distribution sets.
22.3 MB gzipped, 98.8 MB uncompressed

pkgsrc This set contains the ''pkgsrc'' sources, which contain the infrastructure to build third-party packages.
5.6 MB gzipped, 57.0 MB uncompressed

sharesrc This set contains the ''share'' sources, which include the sources for the man pages not associated with any particular program, the sources for the typesettable document set, the dictionaries, and more.
3.3 MB gzipped, 13.2 MB uncompressed

src This set contains all of the base NetBSD 1.5 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.
24.2 MB gzipped, 120.6 MB uncompressed

syssrc This set contains the sources to the NetBSD 1.5 kernel for all architectures, `config`(8), and `dbsym`(8).
17.6 MB gzipped, 88.6 MB uncompressed

xsrc This set contains the sources to the X Window System.
35.2 MB gzipped, 176.8 MB uncompressed

All the above source sets are located in the `source/sets` subdirectory of the distribution tree.

The source sets are distributed as compressed tar files. They may be unpacked into `/usr/src` with the command:

```
# ( cd / ; tar -zxpf - ) < set_name.tgz
```

The `sets/Split/` subdirectory contains split versions of the source sets for those users who need to load the source sets from floppy or otherwise need a split distribution. The split sets are named `set_name.`*xx* where `set_name` is the distribution set name, and *xx* is the sequence number of the file, starting with ''aa'' for the first file in the distribution set, then ''ab'' for the next, and so on. All of these files except the last one of each set should be exactly 240,640 bytes long. (The last file is just long enough to contain the remainder of the data for that distribution set.)

The split distributions may be reassembled and extracted with **cat** as follows:

```
# cat set_name.?? | ( cd / ; tar -zxpf - )
```

In each of the source distribution set directories, there are files which contain the checksums of the files in the directory:

`BSDSUM` Historic BSD checksums for the various files in that directory, in the format produced by the command: **cksum -o 1** *file*

`CKSUM` POSIX checksums for the various files in that directory, in the format produced by the command: **cksum** *file*.

`MD5` MD5 digests for the various files in that directory, in the format produced by the command: **cksum -m** *file*.

`SYSVSUM` Historic AT&T System V UNIX checksums for the various files in that directory, in the format produced by the command: **cksum -o -2** *file*.

The MD5 digest is the safest checksum, followed by the POSIX checksum. The other two checksums are provided only to ensure that the widest possible range of system can check the integrity of the release files.

NetBSD/pc532 subdirectory structure

The pc532-specific portion of the NetBSD 1.5 release is found in the `pc532` subdirectory of the distribution:

`.../NetBSD-1.5/pc532/`

`INSTALL.html`
`INSTALL.ps`
`INSTALL.txt`
`INSTALL.more` Installation notes in various file formats, including this file. The `.more` file contains underlined text using the `more`(1) conventions for indicating italic and bold display.

`binary/`
`kernel/`
`netbsd.GENERIC.gz` A gzipped NetBSD kernel containing code for everything supported in this release.
`sets/` pc532 binary distribution sets; see below.

`installation/`
`floppy/` pc532 boot and installation floppies; see below.
`misc/` Miscellaneous pc532 installation utilities; see installation section, below.

Binary distribution sets

The NetBSD pc532 binary distribution sets contain the binaries which comprise the NetBSD 1.5 release for the pc532. There are eight binary distribution sets. The binary distribution sets can be found in the `pc532/binary/sets` subdirectory of the NetBSD 1.5 distribution tree, and are as follows:

base The NetBSD 1.5 pc532 **base** binary distribution. You *must* install this distribution set. It contains the base NetBSD utilities that are necessary for the system to run and be minimally functional. It includes shared library support, and excludes everything described below.
15.9 MB gzipped, 37.9 MB uncompressed

comp Things needed for compiling programs. This set includes the system include files (`/usr/include`) and the various system libraries (except the shared libraries, which are included as part of the **base** set). This set also includes the manual pages for all of the utilities it contains, as well as the system call and library manual pages.
11.6 MB gzipped, 37.7 MB uncompressed

etc This distribution set contains the system configuration files that reside in `/etc` and in several other places. This set *must* be installed if you are installing the system from scratch, but should *not* be used if you are upgrading. (If you are upgrading, it's recommended that you get a copy of this set and *carefully* upgrade your configuration files by hand.)
0.1 MB gzipped, 0.6 MB uncompressed

games This set includes the games and their manual pages.
2.9 MB gzipped, 7.2 MB uncompressed

kern This set contains a NetBSD/pc532 1.5 `GENERIC` kernel, named `/netbsd`. You *must* install this distribution set.
0.6 MB gzipped, 1.2 MB uncompressed

man This set includes all of the manual pages for the binaries and other software contained in the **base** set. Note that it does not include any of the manual pages that are included in the other sets.
5.0 MB gzipped, 19.9 MB uncompressed

misc This set includes the (rather large) system dictionaries, the typesettable document set, and other files from `/usr/share`.
2.6 MB gzipped, 10.1 MB uncompressed

text This set includes NetBSD 's text processing tools, including `groff`(1), all related programs, and their manual pages.
1.3 MB gzipped, 4.6 MB uncompressed

NetBSD maintains its own set of sources for the X Window System in order to assure tight integration and compatibility. These sources are based on XFree86, and tightly track XFree86 releases. They are currently equivalent to XFree86 3.3.6. Binary sets for the X Window system are distributed with NetBSD. The sets are:

xbase The basic files needed for a complete X client environment. This does not include the X servers.
? MB gzipped, ? MB uncompressed

xcomp The extra libraries and include files needed to compile X source code.
? MB gzipped, ? MB uncompressed

xcontrib Programs that were contributed to X.
? MB gzipped, ? MB uncompressed

xfont Fonts needed by X.
6.2 MB gzipped, 7.5 MB uncompressed

The pc532 binary distribution sets are distributed as gzipped tar files named with the extension **.tgz**, e.g. `base.tgz`.

The instructions given for extracting the source sets work equally well for the binary sets, but it is worth noting that if you use that method, the files are `/`-relative and therefore are extracted *below* the current directory. That is, if you want to extract the binaries into your system, i.e. replace the system binaries with them, you have to run the **`tar -xpf`** command from `/`.

The initial installation process on a pc532 without a previous NetBSD installation is supported by the following files:

`floppy-144.fs` A file system containing the boot loader and install kernel with a 2 MB root.

`download.c` The source for a program to download `inst-11.fs` into memory via the pc532 ROM monitor.

The upgrade process is supported by having a copy of a 1.5 kernel available. This file is:

`kern.tgz` Contains a kernel produced from the `DEFAULT` configuration file in `pc532/conf`.

Note: Each directory in the pc532 binary distribution also has its own checksum files, just as the source distribution does.

NetBSD/pc532 System Requirements and Supported Devices

NetBSD/pc532 1.5 runs on a PC532 computer. It supports a subset of the ''standard'' hardware to date. This is defined as:

- 4 MB of memory
- 8 serial lines done by 4 scn2681 chips
- The NCR DP8490 SCSI chip (SCSI only)

  - Most SCSI disks work (fixed and floppy)
  - A few SCSI tapes work
  - Some SCSI CD-ROM drives work

- The Matthias Pfaller Parallel Port.

NetBSD/pc532 currently expects the ROM monitor to be the ''autoboot monitor'' of Oct/Nov 1991. It includes support to set up auto booting of NetBSD, including a secondary boot program that the autoboot monitor will load that in turn loads the NetBSD kernel from a NetBSD file system. Source and ROM images of the autoboot monitor are located at

ftp://ftp.cs.wwu.edu/pub/pc532/mon.auto.tar.gz

Most of the pc532 specific development of NetBSD/pc532 was done on a machine with 8 MB of memory. It should run with 4 MB of memory although it may be slower.

Getting the NetBSD System on to Useful Media

The 'standard' method of getting NetBSD/pc532 onto your pc532 is via the console terminal and using the downloading parts of the ROM monitor. As such, usually another computer has the distribution on disk and is connected via a serial line to your pc532's console port. A terminal connected to the attached host computer is used to access the pc532 console via a terminal program. The source for a program called download is part of this distribution. Download sends data to the ROM monitor over the serial line.

You may need to find and read the documentation about the ROM monitor download command and other low level comands.

Other methods of getting NetBSD/pc532 on your pc532 may include SCSI tape or SCSI floppy disk or cloning a disk on a system already running NetBSD/pc532.

If you have some operating system already running on your pc532, you can use that OS to get NetBSD/pc532 on a hard disk much easier than with the ROM monitor. NetBSD/pc532 was developed from Minix/pc532 until it was self hosting. You can run NetBSD and Minix or other OS off the same disk.

Preparing your System for NetBSD installation

The major preparation needed is to make sure you can recover any current bits stored on your pc532. If you don't care about your data on the disk, you don't need to do anything.

Installing the NetBSD System

(If you already have NetBSD/pc532 installed and you only want to update your system, see the next section.)

To install NetBSD/pc532, there are several things you need to know. First, NetBSD ''autoconfig 's'' the SCSI devices. `floppy-144.fs` has only support for disks configured into the kernel. Starting the search at SCSI address 0, lun 0 and increasing, the first disk found will be `sd0` regardless of the address, the second will be sd1. KLONDIKE for example has the following devices installed:

`sd0`	ID 0 LUN 0: Quantum LP52S hard disk drive
`sd1`	ID 1 LUN 0: Micropolis 4110 hard disk drive
`sd2`	ID 2 LUN 0: Teac FC-1, 3.5" floppy disk drive
`sd3`	ID 2 LUN 1: Teac FC-1, 5.25" floppy disk drive
`cd0`	ID 3 LUN 0: Toshiba XM-4101TA CD-ROM drive
`st0`	ID 4 LUN 0: Tandberg TDC3600 QIC tape drive

Only `sd0` - `sd3` are supported by the `floppy-144.fs` kernel.

Next you need to know what the install script wants to do. This install is script on the ram disk root that can do most of the work of configuring your disk.

1. The script assumes your are using the first n sectors of your disk, where you can specify n. It will allow you to create up to 5 file system partitions, one swap partition and one boot partition.
2. You should know how many total sectors are on your disk. The configure will report a head, track, and cylinder count, but we have found that on some of our disks, it reports something that makes a smaller disk than we really had.
3. It is possible to have the install script make a partition over your save area AND not make a new file system, thus preserving what is there. Then, later you can make a new file system after you no longer need the stuff there. You will need to do only one boot to get things working from the disk.

The install procedure

1. Adjust your console device settings. The floppy-144.fs kernel will come up with 9600 baud, 7 bits, even parity and one stop bit. Adjust your terminal to match these settings. The monitor's baud rate can be changed with **baud d' 9600**.
2. Get floppy-144.fs and boot the kernel from...

   Floppy From Floppy: (and using the autoboot monitor) If you have a 1.44 meg SCSI floppy drive, you can put floppy-144.fs onto a 3.5" floppy disk. Insert the disk into your floppy drive and use the monitor's boot command to boot the default image from the floppy. The image booted will ask you for a kernel to load. Answer

   sd*X***a:/netbsd**

   Replace *X* with your drive number. For KLONDIKE, *X* would be **2**.

   Tape You will need to load a copy of `floppy-144.fs` into RAM.

   3. load the `floppy-144.fs` at `0x260000`
   4. run at `0x3BE020`

   The boot program will ask you now for a kernel to load. Answer `md0a:/netbsd.gz`

   Serial Line Provided with the distribution is source for program called download (`download.c`). This program when used as "download file" will read the contents of the file and output to standard output a byte sequence used by the pc532 ROM monitor to download a binary file into RAM. Using this program on a computer connected to the pc532, one can load a copy of `floppy-144.fs` into RAM at `0x260000`. The boot sequence is now the same as with tape.

1. The `floppy-144.fs` will run the new **sysinst** utility as the standard setup. It assumes a VT100 compatible terminal. If you don't want to try using **sysinst** or you don't have a VT100, type f followed by the return. Then following these instructions for installation. If you want to use **sysinst**, read the i386 INSTALL instructions to learn about **sysinst**.

   Note: **sysinst** does not support SLIP or PPP connections.

2. Choose a disk geometry. For me, the reported geometry left some sectors 'unallocated'. That is, the autoconfig message said the disk had 2428 cylinders, 9 heads, and 93 sectors/track. This gives a total of 2032236 sectors, but we knew that we had 2053880 sectors.

   To help in this process, there is a program **factor** that is on the `floppy-144.fs`. The usage is **factor number** and it lists the prime factors of number. For example, with the 2053880 sector disk we got:

```
$ factor 2053880
2053880: 2 2 2 5 51347
```

Not many to choose from, so we tried ...

```
$ factor 2053820
2053820: 2 2 5 103 997
```

Now we'd like to get about a megabyte per track:

```
$ echo  2 * 997"|bc"
1994
```

Now we need the number of tracks (or cylinders):

```
$ echo  2 * 5 * 103"|bc"
1030
```

So we ended up choosing 1030 cylinders, 1 head, 1994 sectors/track. We ''lost'' only 60 sectors, but got a ''reasonable'' geometry.

3. Run **install**; it will ask you for the disk geometry and other questions. It will ask you for the geometry and then ask you how many of those sectors you want to use for NetBSD. It also wants to know the size of your boot partition (to be used with the auto-boot monitor), your root partition (/), your swap partition, and then any other partitions you may want. For the 'other' partitions, it will ask for a mount point. The mount point will be ''relative to /'' and should not include the leading '/'. Also, if you do not want the partition to have newfs run on it (that is it might be the last one and have a copy of `floppy-144.fs`) enter '**NO**' to the mount point and it will not run **newfs** on the partition. It will enter the partition into the disklabel.

4. look around, if you want ... and then halt NetBSD.

5. reboot the machine. Using the autoboot monitor, all you should have to do is give the ROM monitor command **boot**. The secondary UFS boot program eventually times out and auto-loads `/netbsd`. You can get it to do it faster by pressing return.

   If you are not using the autoboot monitor, you will have to figure out the starting sector of the boot images partition and manually load the NetBSD boot loader from the disk using the **read** command. If you would rather use the autoboot monitor you can get source and ROM images from the URL
   ftp://ftp.cs.wwu.edu/pub/pc532/mon.auto.tar.gz

6. Now it is time to load all the other files of the distribution: You can do this via -

   - a TCP/IP link (slip, ppp or plip) you have ifconfig, slattach, route, netstat, hostname and ftp on the mini-root. You can even use nfs... Plip is only an option if you have installed a centronics port in your pc532. You do have access to vi to edit your network files. (`/etc/resolv.conf`, `...`)
   - floppy disk
   - tape
   - cd-rom (If you have a CD with NetBSD/pc532, which most likely won't happen for a while after 1.5 release.)

     ```
     mount -rt cd9660 /dev/cd0a /mnt
     ```

     Get the .tgz files from the cd-rom
   - Use the ROM compatable **download** program. The program download is included in the initial installation and can be used as the receive end of the download by using it as **download -r file_to_write**. If the CRC is correct, the file is retained. If the CRC is not correct, the file is

deleted.

7. Load the .tgz files. Choose a place to put them. We suggest making a directory `/gz.files` and put them there. If you are ''short on space,'' you might want to load them and extract them one at a time. A minimum installation is **base** and **etc**. It takes about 32 Megs installed + 20 Megs for the `base.tgz`.

8. Extract the tar files in `/`. For example, if your `*.tgz` files were in a directory `/gz.files`, to extract `base.tgz` you would:

   ```
   cd /
   tar --unlink -zxpf /gz.files/base.tgz
   ```

   Add v to the flags if you want a verbose extract. The **--unlink** is to make sure that the install versions of sh, init, ... are replaced by their proper versons in base.tgz. We think it is wise to include the **--unlink** for other things.

9. Extract at least **base**, **etc** and **kern** for a new installation. For ''update'' extracts, move `/etc` to `/etc.old` and then extract **etc**. You should extract **etc** for upgrades. For ''full'' installations, extract all files.

10. Edit the information in `/etc`

`rc.conf`	Many things can be configured here
`hosts`	host name and address information
`resolv.conf`	which nameserver to use
`ttys`	make sure the console entry has the correct speed
`gettytab`	You may find that ''ap'' instead of ''ep'' in the default entry works better for you.
`fstab`	make sure it includes all partitions you want mounted

    Now you can adjust the kernel's default baud rate to match your monitor's default baud rate. Do the following:

    ```
    # gdb -w /netbsd
    (gdb) set scndefaultrate =  your_baud_rate
    (gdb) quit
    ```

    where *your_baud_rate* is the actual value, 19200, 38400 or something slower than 9600. If you set scndefaultrate to something bogus, you'll probably not be able to reboot... So be carefull!

11. Reboot the machine and it should come up in multi-user mode *if* you got it configured correctly.

12. Enjoy! And help fix bugs and improve NetBSD/pc532!

Post installation steps

Once you've got the operating system running, there are a few things you need to do in order to bring the system into a properly configured state, with the most important ones described below.

1. Configuring `/etc/rc.conf`

   If you or the installation software haven't done any configuration of `/etc/rc.conf`, the system will drop you into single user mode on first reboot with the message

   ```
   /etc/rc.conf is not configured. Multiuser boot aborted.
   ```

   and with the root file system (`/`) mounted read-write. When the system asks you to choose a shell, simply press `RETURN` to get to a prompt. If you are asked for a terminal type, respond with **vt220** (or whatever is appropriate for your terminal type) and press `RETURN`. At this point, you need to configure

at least one file in the /etc directory. Change to the /etc directory and take a look at the /etc/rc.conf file. Modify it to your tastes, making sure that you set rc_configured=YES so that your changes will be enabled and a multi-user boot can proceed. Default values for the various programs can be found in /etc/defaults/rc.conf, where some in-line documentation may be found. More complete documentation can be found in rc.conf(5).

If your /usr directory is on a separate partition and you do not know how to use **ed**, you will have to mount your /usr partition to gain access to **ex** or **vi**. Do the following:

```
# mount /usr
# export TERM=vt220
```

If you have /var on a separate partition, you need to repeat that step for it. After that, you can edit /etc/rc.conf with vi(1). When you have finished, type **exit** at the prompt to leave the single-user shell and continue with the multi-user boot.

Other values that need to be set in /etc/rc.conf for a networked environment are *hostname* and possibly *defaultroute*, furthermore add an *ifconfig_int* for your interface <int>, along the lines of

```
ifconfig_de0="inet 123.45.67.89 netmask 255.255.255.0"
```

or, if you have *myname.my.dom* in /etc/hosts:

```
ifconfig_de0="inet myname.my.dom netmask 255.255.255.0"
```

To enable proper hostname resolution, you will also want to add an /etc/resolv.conf file or (if you are feeling a little more adventurous) run named(8). See resolv.conf(5) or named(8) for more information.

Other files in /etc that may require modification or setting up include /etc/mailer.conf, /etc/nsswitch.conf, and /etc/wscons.conf.

2. Logging in

   After reboot, you can log in as root at the login prompt. There is no initial password, but if you're using the machine in a networked environment, you should create an account for yourself (see below) and protect it and the "root" account with good passwords. Unless you have connected an unusual terminal device as the console you can just press RETURN when it prompts for Terminal type? [...]

3. Adding accounts

   Use the useradd(8) command to add accounts to your system, *do not* edit /etc/passwd directly. See useradd(8) for more information on how to add a new user to the system.

4. The X Window System

   If you have installed the X window system, look at the files in /usr/X11R6/lib/X11/doc for information.

   Don't forget to add /usr/X11R6/bin to your path in your shell's dot file so that you have access to the X binaries.

5. Installing third party packages

   If you wish to install any of the software freely available for UNIX-like systems you are strongly advised to first check the NetBSD package system. This automatically handles any changes necessary to make the software run on NetBSD, retrieval and installation of any other packages on which the software may depend, and simplifies installation (and deinstallation), both from source and precompiled binaries.

- More information on the package system is at
  http://www.netbsd.org/Documentation/software/packages.html
- A browsable listing of available packages is at
  ftp://ftp.netbsd.org/pub/NetBSD/packages/pkgsrc/README.html
- Precompiled binaries can be found at
  ftp://ftp.netbsd.org/pub/NetBSD/packages/
- Package sources for compiling packages can be obtained by retrieving the file
  ftp://ftp.netbsd.org/pub/NetBSD/NetBSD-current/tar_files/pkgsrc.tar.gz
  They are typically extracted into `/usr/pkgsrc` (though other locations work fine), as with the command:

  ```
  # mkdir /usr/pkgsrc; tar -C /usr/pkgsrc -zxpf pkgsrc.tar.gz
  ```

  After extracting, then see the `README` file in the extraction directory (e.g. `/usr/pkgsrc/README`) for more information.

6. Misc
   - Edit `/etc/mail/aliases` to forward root mail to the right place (run `newaliases`(1) afterwards.)
   - The `/etc/mail/sendmail.cf` file will almost definitely need to be adjusted; files aiding in this can be found in `/usr/share/sendmail`. See the README file there for more information.
   - Edit `/etc/rc.local` to run any local daemons you use.
   - Many of the `/etc` files are documented in section 5 of the manual; so just invoking

     ```
     # man 5 filename
     ```

     is likely to give you more information on these files.

Upgrading a previously-installed NetBSD System

The upgrade to NetBSD 1.5 is a binary upgrade; it can be quite difficult to advance to a later version by recompiling from source due primarily to interdependencies in the various components.

To do the upgrade, you must have at least base.tgz on disk and a copy of the proper netbsd.default. It will require quite a bit of disk space to do the upgrade.

Since upgrading involves replacing the kernel, and most of the system binaries, it has the potential to cause data loss. You are strongly advised to BACK UP ANY IMPORTANT DATA ON YOUR DISK, whether on the NetBSD partition or on another operating system's partition, before beginning the upgrade process.

To upgrade your system, follow the following instructions:

- Assuming you have space, load the .tgz files onto disk some place. Then boot the floppy-144.fs image via the method you use. Under the install system, extract the .tgz files as mentioned below or read the i386 INSTALL notes for how to use sysinst.
- Extract the .tgz files. For example, to extract `base.tgz`:

  ```
  # cd /
  # pax -zrvpe -f /gz.files/base.tgz
  ```

- Extract all the .tgz files you want. You should carefully work at upgrading `/etc`. There may be changes to file formats depending on what version of NetBSD/pc532 you are running.

- *Be careful if you are not running with security.* The 1.5 distribution does contain support for password encryption. If you are upgrading from NetBSD 1.0 , it would be reasonable to save a copy of master.passwd and remove all passwords until after you upgrade, as NetBSD 1.0 did not ship with password encryption.
- Place `netbsd.default` in `/` as the file `netbsd`.
- Reboot. (Remember, `netbsd.default` is a 9600 console line kernel. Read the last part of the new installation part of these notes to find out how to change your default speed.)
- After reboot, you should make sure you check your new file systems.

Compatibility Issues With Previous NetBSD Releases

Users upgrading from previous versions of NetBSD may wish to bear the following problems and compatibility issues in mind when upgrading to NetBSD 1.5.

General issues

- `/etc/rc` modified to use `/etc/rc.d/*`

  In previous releases of NetBSD, `/etc/rc` was a traditional BSD style monolithic file. As of NetBSD 1.5, each discrete program or substem from `/etc/rc` and `/etc/netstart` has been moved into separate scripts in `/etc/rc.d/`.

  At system startup, `/etc/rc` uses `rcorder`(8) to build a dependency list of the files in `/etc/rc.d` and then executes each script in turn with an argument of 'start'. Many `rc.d` scripts won't start unless the appropriate `rc.conf`(5) entry in `/etc/rc.conf` is set to 'YES.'

  At system shutdown, `/etc/rc.shutdown` uses `rcorder`(8) to build a dependency list of the files in `/etc/rc.d` that have a "KEYWORD: shutdown" line, reverses the resulting list, and then executes each script in turn with an argument of 'stop'. The following scripts support a specific shutdown method: `cron`, `inetd`, `local`, and `xdm`.

  Local and third-party scripts may be installed into `/etc/rc.d` as necessary. Refer to the other scripts in that directory and `rc`(8) for more information on implementing `rc.d` scripts.

Issues affecting an upgrading from NetBSD 1.4 or later

- `named`(8) leaks version information

  Previous releases of NetBSD disabled a feature of `named`(8) where the version number of the server could be determined by remote clients. This feature has not been disabled in NetBSD 1.5, because there is a `named.conf`(5) option to change the version string:

```
option {
        version "newstring";
};
```

- `sysctl`(8) pathname changed

  `sysctl`(8) is moved from `/usr/sbin/sysctl` to `/sbin/sysctl`. If you have hardcoded references to the full pathname (in shell scripts, for example) please be sure to update those.

- `sendmail`(8) configuration file pathname changed

  Due to `sendmail`(8) upgrade from 8.9.x to 8.10.x, `/etc/sendmail.cf` is moved to `/etc/mail/sendmail.cf`. Also, the default `sendmail.cf`(5) refers different pathnames than before. For example, `/etc/aliases` is now located at `/etc/mail/aliases`, `/etc/sendmail.cw` is now called `/etc/mail/local-host-names`, and so forth. If you have

customized `sendmail.cf`(5) and friends, you will need to move the files to the new locations. See `/usr/share/sendmail/README` for more information.

Using online NetBSD documentation

Documentation is available if you first install the manual distribution set. Traditionally, the ''man pages'' (documentation) are denoted by '`name(section)`'. Some examples of this are

- `intro`(1),
- `man`(1),
- `apropos`(1),
- `passwd`(1), and
- `passwd`(5).

The section numbers group the topics into several categories, but three are of primary interest: user commands are in section 1, file formats are in section 5, and administrative information is in section 8.

The *man* command is used to view the documentation on a topic, and is started by entering **man** [*section*] *topic*. The brackets [ ] around the section should not be entered, but rather indicate that the section is optional. If you don't ask for a particular section, the topic with the lowest numbered section name will be displayed. For instance, after logging in, enter

```
# man passwd
```

to read the documentation for `passwd`(1). To view the documentation for `passwd`(5), enter

```
# man 5 passwd
```

instead.

If you are unsure of what man page you are looking for, enter **apropos** *subject-word*

where *subject-word* is your topic of interest; a list of possibly related man pages will be displayed.

Administrivia

If you've got something to say, do so! We'd like your input. There are various mailing lists available via the mailing list server at `majordomo@netbsd.org`. To get help on using the mailing list server, send mail to that address with an empty body, and it will reply with instructions.

There are various mailing lists set up to deal with comments and questions about this release. Please send comments to: `netbsd-comments@netbsd.org`.

To report bugs, use the `send-pr`(1) command shipped with NetBSD, and fill in as much information about the problem as you can. Good bug reports include lots of details. Additionally, bug reports can be sent by mail to: `netbsd-bugs@netbsd.org`.

Use of `send-pr`(1) is encouraged, however, because bugs reported with it are entered into the NetBSD bugs database, and thus can't slip through the cracks.

There are also port-specific mailing lists, to discuss aspects of each port of NetBSD. Use majordomo to find their addresses, or visit **http://www.netbsd.org/MailingLists/**. If you're interested in doing a serious amount of work on a specific port, you probably should contact the 'owner' of that port (listed below).

If you'd like to help with this effort, and have an idea as to how you could be useful, send us mail or subscribe to: `netbsd-help@netbsd.org`.

As a favor, please avoid mailing huge documents or files to these mailing lists. Instead, put the material you would have sent up for FTP or WWW somewhere, then mail the appropriate list about it, or, if you'd rather not do that, mail the list saying you'll send the data to those who want it.

Thanks go to

- The former members of UCB's Computer Systems Research Group, including (but not limited to):

  Keith Bostic
  Ralph Campbell
  Mike Karels
  Marshall Kirk McKusick

  for their ongoing work on BSD systems, support, and encouragement.

- Also, our thanks go to:

  Mike Hibler
  Rick Macklem
  Jan-Simon Pendry
  Chris Torek

  for answering lots of questions, fixing bugs, and doing the various work they've done.

- UC Berkeley's Experimental Computing Facility provided a home for sun-lamp in the past, people to look after it, and a sense of humor. Rob Robertson, too, has added his unique sense of humor to things, and for a long time provided the primary FTP site for NetBSD.

- Vixie Enterprises for hosting the NetBSD FTP, SUP, and WWW servers.

- Redback Networks, Inc. for hosting the NetBSD mail and GNATS server.

- The Helsinki University of Technology in Finland for hosting the NetBSD CVS server.

- The Internet Research Institute in Japan for hosting the server which runs the CVSweb interface to the NetBSD source tree.

- The many organisations that provide NetBSD mirror sites.

- Without CVS, this project would be impossible to manage, so our hats go off to Brian Berliner, Jeff Polk, and the various other people who've had a hand in making CVS a useful tool.

- Dave Burgess `burgess@cynjut.infonet.net` has been maintaining the 386BSD/NetBSD/FreeBSD FAQ for quite some time, and deserves to be recognized for it.

- The following individuals and organizations (each in alphabetical order) have made donations or loans of hardware and/or money, to support NetBSD development, and deserve credit for it:

  Steve Allen
  Jason Birnschein
  Mason Loring Bliss
  Jason Brazile
  Mark Brinicombe
  David Brownlee
  Simon Burge
  Dave Burgess
  Ralph Campbell
  Brian Carlstrom
  James Chacon
  Bill Coldwell
  Charles Conn
  Tom Coulter
  Charles D. Cranor
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Søren Jørvang
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Herb Peyerl
Mike Price
Dave Rand
Michael Richardson
Heiko W. Rupp
Brad Salai
Chuck Silvers
Thor Lancelot Simon
Bill Sommerfeld
Paul Southworth
Eric and Rosemary Spahr
Ted Spradley
Kimmo Suominen
Jason R. Thorpe
Steve Wadlow
Krister Walfridsson
Jim Wise
Christos Zoulas

AboveNet Communications, Inc.
Advanced System Products, Inc.
Avalon Computer Systems
Bay Area Internet Solutions
Brains Corporation, Japan
Canada Connect Corporation
Co-operative Research Centre for Enterprise Distributed Systems Technology
Demon Internet, UK
Digital Equipment Corporation
Distributed Processing Technology

Easynet, UK
Free Hardware Foundation
Innovation Development Enterprises of America
Internet Software Consortium
MS Macro System GmbH, Germany
Numerical Aerospace Simulation Facility, NASA Ames Research Center
Piermont Information Systems Inc.
Salient Systems Inc.
VMC Harald Frank, Germany
Warped Communications, Inc.
Whitecross Database Systems Ltd.

(If you're not on that list and should be, tell us! We probably were not able to get in touch with you, to verify that you wanted to be listed.)

- Finally, we thank all of the people who've put sweat and tears into developing NetBSD since its inception in January, 1993. (Obviously, there are a lot more people who deserve thanks here. If you're one of them, and would like to mentioned, tell us!)

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This product includes software developed by David Jones and Gordon Ross.

This product includes software developed by Dean Huxley.

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This product includes software developed by Gardner Buchanan.

This product includes software developed by Gordon Ross.

This product includes software developed by Gordon W. Ross and Leo Weppelman.

This product includes software developed by Gordon W. Ross.

This product includes software developed by Hauke Fath.

This product includes software developed by HAYAKAWA Koichi.

This product includes software developed by Hellmuth Michaelis and Joerg Wunsch.

This product includes software developed by Herb Peyerl.

This product includes software developed by Holger Veit and Brian Moore for use with "386BSD" and similar operating systems.

This product includes software developed by Hubert Feyrer for the NetBSD Project.

This product includes software developed by Iain Hibbert.

This product includes software developed by Ian W. Dall.

This product includes software developed by Ignatios Souvatzis for the NetBSD Project.

This product includes software developed by Jason R. Thorpe for And Communications, http://www.and.com/.

This product includes software developed by Joachim Koenig-Baltes.

This product includes software developed by Jochen Pohl for The NetBSD Project.

This product includes software developed by John Polstra.

This product includes software developed by Jonathan Stone and Jason R. Thorpe for the NetBSD Project.

This product includes software developed by Jonathan Stone for the NetBSD Project.

This product includes software developed by Jonathan Stone.

This product includes software developed by Julian Highfield.

This product includes software developed by Kenneth Stailey.

This product includes software developed by Leo Weppelman.

This product includes software developed by Lloyd Parkes.

This product includes software developed by Manuel Bouyer.

This product includes software developed by Marc Horowitz.

This product includes software developed by Mark Brinicombe.

This product includes software developed by Mark Tinguely and Jim Lowe.

This product includes software developed by Markus Wild.

This product includes software developed by Martin Husemann and Wolfgang Solfrank.

This product includes software developed by Mats O Jansson and Charles D. Cranor.

This product includes software developed by Mats O Jansson.

This product includes software developed by Matthias Pfaller.

This product includes software developed by Michael L. Hitch.

This product includes software developed by Niels Provos.

This product includes software developed by Paul Kranenburg.

This product includes software developed by Paul Mackerras.

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