NAME

INSTALL – Installation procedure for NetBSD/next68k

DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 1.4.3 on the *next68k* 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 UN*X-like operating system derived from the Berkeley Networking Release 2 (Net/2), 4.4BSD-Lite, and 4.4BSD-Lite2 sources. NetBSD runs on twenty different system architectures featuring eight distinct families of CPUs, and is being ported to more. The NetBSD 1.4.3 release contains complete binary releases for fifteen different machine types. (The remaining ones 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, 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.

Upgrade path to NetBSD 1.4.3

If you are not installing your system "from scratch" but instead are going to upgrade an existing system already running NetBSD you need to know which versions you can upgrade with NetBSD 1.4.3.

NetBSD 1.4.3 is an upgrade of NetBSD 1.4.2, 1.4.1, NetBSD 1.4 and earlier major and patch releases of NetBSD such as versions 1.3.3, 1.2 etc.

The intermediate development versions of code available on the main trunk in our CVS repository (also known as "NetBSD-current") from *after* the point where the release cycle for 1.4 was started are designated by version identifiers such as 1.4A, 1.4B, 1.4P etc. These identifiers do not designate releases, but indicate major changes in internal kernel APIs. Note that the kernel from NetBSD 1.4.3 can *not* be used to upgrade a system running one of those intermediate development versions. Trying to use the NetBSD 1.4.3 kernel on such a system *will* in all probability result in problems.

Please also note that it is not possible to do a direct "version" comparison between any of the intermediate development versions mentioned above and 1.4.3 to determine if a given feature is present or absent in 1.4.3. The development of 1.4 and the subsequent patch or "point" releases is done on a separate branch in the CVS repository which was created when the release cylcle for 1.4 was started, and during the release cycle of 1.4 and its patch releases, selective fixes have been imported from the main development trunk (the intent is to only import fixes with no or minor impact on the stability of the release branch). So, there are features in 1.4.3 which were not in e.g. 1.4H, but the reverse is also true.

Major Changes Between 1.4.2 and 1.4.3

The complete list of changes between NetBSD 1.4.2 and 1.4.3 can be found in the file CHANGES-1.4.3 in the top directory of the source tree. The following are the highlights only.

- A driver for the Lucent Wavelan (Orinoco) 802.11B wireless Ethernet PCMCIA card has been added, see `wi`(4).
- The PCI Cyclom-4Y and -8Y multiport serial cards are now supported.
- The Macintosh LC Ethernet Adapter is now supported.
- The on-board video on Macintosh Quadra 605 is now supported.
- Bugfixes to the Alteon Gigabit Ethernet driver, `ti`(4).
- Support for several new PCI IDE controllers have been added, see `pciide`(4.)
- The i386 port may now be installed on wd2 or wd3.
- A possible CPU hog problem related to large I/Os has been fixed. Fixes SA#2000-005.
- A denial-of-service problem related to handling of IP options has been fixed. Fixes SA#2000-002.
- A problem with /etc/ftpchroot has been fixed. Fixes SA#2000-006.
- A minor problem related to locking of semaphore resources has been fixed. Fixes SA#2000-004.
- The DHCP software has been updated to ISC 2.0pl3. This also fixes SA#2000-008 -- a security problem in the dhcp client code.
- A problem with use of user-supplied data as a format string in ftpd has been fixed. Fixes SA#2000-009.
- The sparc c++rt0.o code is now compiled with -fPIC. This means that libraries with global constructors (which must link in c++rt0.o on sparc/a.out) must also be compiled -fPIC.
- Most countries can now import the full release without restriction, including the previously restricted *domestic* portion. The only ''problem spots'' are US-embargoed countries. See
  http://www.NetBSD.ORG/Misc/crypto-export.html
  for the full details.
- An extensive audit of the code (and corresponding fixes) has been done to eliminate possible buffer overruns caused by possible user-specified format strings.

In addition, many bugs have been fixed -- more than 40 problems reported through our problem tracking system have been fixed, and some other non-reported problems have also been found and fixed. See the CHANGES-1.4.3 file for the complete list.

Known caveats with 1.4.3

The following are the major known issues with NetBSD 1.4.3.

- Some of the fixes in NetBSD 1.4.3 required the introduction of a new system call, `issetugid`(2). This means that you *will* have to upgrade the kernel before installing the new user-land code.
- The more strict format checking required a minor fix to the C compiler to allow NULL format strings. Thus, you will need to update your compiler before doing a ''make build'' during a source-based upgrade.
- PCMCIA support may require manual adjustment to function properly. See **Possible** PCMCIA **issues** under **Installing the NetBSD System** for more details.

- No major changes have been made to LFS in 1.4.3, so it is still of ‘‘beta test’’ quality.
- The version of the IPF packet filtering software in NetBSD 1.4.3 must be enabled with ‘‘ipf -E’’ before filtering rules can be set. Failure to do so may result in a panic. (Enabling NAT will however auto-enable IPF.)

Major Changes Between 1.4.1 and 1.4.2

The complete list of changes between NetBSD 1.4.1 and 1.4.2 can be found in the file CHANGES-1.4.2 in the top directory of the source tree. The following are the highlights only.

- A driver for the Alteon Gigabit Ethernet cards has been added, see `ti`(4).
- A driver for the Realtek 8129/8239 Fast Ethernet PCI cards have been added, see `rl`(4).
- A driver for the DPT SmartCache and SmartRAID III or IV SCSI adapters has been added, see `dpt`(4).
- A driver for the BOCA IOAT66 6-port ISA serial adapter has been added, see `ioat`(4).
- Support for the X-surf Amiga board has been added.
- Support has been added for ext2fs revision 1, with read-only support for the ‘‘sparse super’’ and the ‘‘filetype’’ options.
- BIND has been upgraded to version 8.2.2-P5.
- The IPF packet filtering software has been updated to version 3.3.6.
- Tcpdump now does hex/ascii dumps of packet contents if asked to do so.
- An implementation of the System V user management utilities has been added.
- The name ‘‘errno’’ is now always a macro which expands to a function call. This is done to ease the integration of thread libraries with the code in both system and third-party libraries. Please include <errno.h> to access the correct definition of ‘‘errno’’.
- A utility for making temporary files for shell scripts has been added, see `mktemp`(1).
- The automounter utility `amd`(8) has been updated to fix a security problem.
- A security problem in procfs has been fixed. Procfs is not used by default in NetBSD.
- The floating point emulation on the ports using the m68k CPU has been reverted to the version in NetBSD 1.4 (the version in 1.4.1 had problems).
- Several subsystems have received substantial work, such as RAIDframe, LFS, and the package tools.

In addition, many, many bugs have been fixed -- more than 100 problems reported through our problem tracking system have been fixed, and many other non-reported problems have also been found and fixed. See the CHANGES-1.4.2 file for the complete list.

Known caveats with 1.4.2

The following are the major known issues with NetBSD 1.4.2.

- The upgrade of `ipf`(8) caused a change of the kernel API. Thus, if you are using `ipf`(8) you need to upgrade both the kernel and the user-land utilities to control that feature in order for it to work.
- As part of fixing a kernel bug, ‘‘struct vfsnode’’ needed to change size. This will unfortunately, and contrary to tradition for patch releases, cause incompatibilities for users of file system LKMs compiled for 1.4 and 1.4.1.

- Although LFS has been improved between 1.4.1 and 1.4.2, it can probably still be characterized as being of ‘‘beta test’’ quality, e.g. filling the file system still gives ‘‘interesting’’ effects. It should probably not be used to store critical data quite yet.
- The version of the IPF packet filtering software in NetBSD 1.4.2 must be enabled with ‘‘ipf -E’’ before filtering or NAT rules can be set. Failure to do so may result in a panic.

Major Changes Between 1.4 and 1.4.1

The complete list of changes between NetBSD 1.4 and 1.4.1 can be found in the file CHANGES-1.4.1 in the top directory of the source tree.

- The NetBSD/alpha port's compatibility for Digital UNIX executables has been greatly improved.
- Many bug fixes and improvements of the installation tools and utilities.
- Support for more PCI serial/parallel cards has been added.
- It is now possible to boot NetBSD/i386 on systems with 1GB of RAM.
- The floating point emulation on the ports using the m68k CPU has been upgraded.
- A fatal problem with /dev/random has been found and fixed.
- Support for Alpha 21264 ev6 based systems has been added to NetBSD/alpha.

Major Changes Between 1.3 and 1.4

The NetBSD 1.4 release is a substantial improvement over its predecessors. We have provided 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 results of these improvements is a stable operating system fit for production use that rivals most commercially available systems.

It is impossible to completely summarize the nearly two years of development that went into the NetBSD 1.4 release. Some highlights include:

- Substantial improvements in the TCP/IP implementation, including numerous performance enhancements and bug fixes by Jason Thorpe and others.
- A new, high efficiency kernel memory pool allocator by Paul Kranenburg. This has been integrated into most kernel subsystems.
- A new, totally rewritten virtual memory subsystem, UVM, created by Chuck Cranor, which is substantially cleaner and better performing than the old Mach derived VM subsystem.
- Improved POSIX and XPG standards compliance.
- Completion of the integration of all remaining 4.4BSD Lite-2 kernel improvements and bug fixes that had not been previously integrated. (Integration of all userland components was completed before NetBSD 1.3)
- Several new ports, including macppc, bebox, sparc64, next68k, and others, have been integrated into the source tree.
- The system compilers have been upgraded to egcs 1.1.1, and the system compiler toolchain now (mostly) uses the latest versions of GNU binutils instead of the obsolete versions left over from 4.4BSD Lite.
- Everyone's favorite `ftp`(1) client has been improved even further. See the man page for details.

- A new architecture independent console driver, `wscons`(4), has been integrated into many ports.
- Numerous improvements have been made to the audio subsystem support, including support for MIDI device drivers.
- Linux compatibility support has been improved.
- A number of scheduler enhancements have yielded dramatic improvements in interactive performance and better control of background tasks.
- Several network tunneling protocols, including GRE and IP in IP, have been implemented.
- Kernel support for the CODA distributed file system has been added.
- Manuel Bouyer completed major changes to the IDE support. It is now architecture independent. Major changes have been made to the IDE code for better error handling, improved ATAPI support, 32 bit data I/O support and bus-master DMA support on PCI IDE controllers.
- Lennart Augustsson has added full USB support, permitting the use of a wide variety of Universal Serial Bus peripherals. The drivers should easily port to any future platforms that support the PCI bus. See `usb`(4) for an overview.
- RAIDframe, version 1.1, from the Parallel Data Laboratory at Carnegie Mellon University, has been integrated. Supports RAID levels 0, 1, 4, 5, and more.
- Luke Mewburn added `nsswitch.conf`(5) functionality to the system to specify the search order for system databases.
- `syslogd`(8) now supports listening on multiple sockets, to make the chrooting of servers easier.
- Most third party packages have been updated to the latest stable release.

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 first public release of NetBSD for the NeXT series of computers.

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. In addition, Anonymous CVS access to the NetBSD source tree has been added since NetBSD 1.4.1; see

http://www.netbsd.org/Changes/#anoncvs-available

We have also added a browsable CVS repository on the web at

http://cvsweb.netbsd.org/cgi-bin/cvsweb.cgi/

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

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

NetBSD 1.4.3 Release Contents

The root directory of the NetBSD 1.4.3 release is organized as follows:

`.../NetBSD-1.4.3/`

`BUGS` Known bugs list (somewhat incomplete and out of date).

`CHANGES` Changes since earlier NetBSD releases.

`LAST_MINUTE` Last minute changes.

`MIRRORS` A list of sites that mirror the NetBSD 1.4.3 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 1.4.3 has a binary distribution. There are also 'README.export-control' files sprinkled liberally throughout the distribution tree, which spell out the current restrictions related to export of this code from the United States of America. Note that these regulations were recently changed so that most countries can import the entire release without significant restrictions. See

http://www.NetBSD.ORG/Misc/crypto-export.html

which contains up-to-date information on this issue.

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:

secrsrc.tgz: This set contains the "domestic" sources. These sources may be subject to United States export regulations.
423K gzipped, 2M uncompressed

gnusrc.tgz: This set contains the "gnu" sources, including the source for the compiler, assembler, groff, and the other GNU utilities in the binary distribution sets.
19M gzipped, 84.3M uncompressed

syssrc.tgz: This set contains the sources to the NetBSD 1.4.3 kernel, config(8), and dbsym(8).
13.9M gzipped, 68.8M uncompressed

sharesrc.tgz: 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.
3.1M gzipped, 11.8M uncompressed

src.tgz: This set contains all of the NetBSD 1.4.3 sources which are not mentioned above.
14.5M gzipped, 67.5M uncompressed

Most of the above source sets are located in the `source/sets` subdirectory of the distribution tree. The secrsrc.tgz set is contained in the `source/security` subdirectory. This set contains the sources normally found in `/usr/src/domestic` – primarily Kerberos (version 4) and other cryptographic security related software. This code can now be exported from the US to most countries. The document on

http://www.NetBSD.ORG/Misc/crypto-export.html

spells out the current (rather lenient) restrictions applicable for the export of this code.

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

`cat set_name.tgz | gunzip | (cd /; tar xpf - )`

The `sets/Split/` and `security/Split/` subdirectories contain 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 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.?? | gunzip | (cd /; tar xpf - )`

In each of the source distribution set directories, there is a file named `CKSUMS` which contains the checksums of the files in that directory, as generated by the `cksum`(1) utility. You can use cksum to check the integrity of the archives, if you suspect that one of the files is corrupt and have access to a cksum binary. Checksums based on other algorithms may also be present – see the `release`(7) man page for details.

NetBSD/next68k Subdirectory Structure

The next68k-specific portion of the NetBSD 1.4.3 release is found in the `next68k` subdirectory of the distribution: `.../NetBSD-1.4.3/next68k/`

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

`binary/`
- `sets/` next68k binary distribution sets; see below.
- `security/` next68k security distribution; see below.

`installation/`

Binary Distribution Sets

The NetBSD next68k binary distribution sets contain the binaries which comprise the NetBSD 1.4.3 release for the next68k. There are eight binary distribution sets and the *security* distribution set. The binary distribution sets can be found in the `next68k/binary/sets` subdirectory of the NetBSD 1.4.3 distribution tree, and are as follows:

base The NetBSD 1.4.3 next68k **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.
12.9M gzipped, 40.1M 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.
13M gzipped, 50M 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.)
56K gzipped, 330K uncompressed

games This set includes the games and their manual pages.
2.8M gzipped, 7M uncompressed

kern This set contains a NetBSD/next68k 1.4.3 GENERIC kernel, named `/netbsd`. You *must* install this distribution set.
532k gzipped, 1.1M 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.
3.9M gzipped, 15.6M uncompressed

misc This set includes the (rather large) system dictionaries, the typesettable document set, and other files from `/usr/share`.
2.2M gzipped, 8.5M uncompressed

text This set includes NetBSD's text processing tools, including `groff`(1), all related programs, and their manual pages.
1.3M gzipped, 4.5M uncompressed

The next68k security distribution set is named **secr** and can be found in the
`next68k/binary/security`
subdirectory of the NetBSD 1.4.3 distribution tree. It contains security-related binaries which depend on cryptographic source code. You do not need this distribution set to use encrypted passwords in your password file; the **base** distribution includes a crypt library which can perform only the one-way encryption function. The security distribution includes a version of the Kerberos IV network security system, and a Kerberized version of `telnet`(1) program. The **secr** distribution set can be found only on those sites which carry the complete NetBSD distribution and which can legally obtain it. Because of United States law, it may not be legal to distribute this set to locations outside of the United States and Canada. See
http://www.NetBSD.ORG/Misc/crypto-export.html
for updated information on this issue.

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.

xcomp The extra libraries and include files needed to compile X source code.

xcontrib Programs that were contributed to X.

xfont Fonts needed by X.

The next68k 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 xfp** command from /.

Note Each directory in the next68k binary distribution also has its own checksum files, just as the source distribution does:

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

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

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

All SYSVSUM files are 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/next68k System Requirements and Supported Devices

NetBSD/next68k 1.4.3 will run on 68040-based non-turbo NeXT workstations. This include the NeXTstation and NeXTstation Color slabs, and the non-Turbo NeXT Cube. NetBSD/next68k does not currently support 68030 machines or Turbo (33 MHz) machines. NetBSD/next68k 1.4.3 does not have complete scsi support, so installations must use a remote NFS filesystem.

The following NeXT hardware is supported:

CPUs:

- 68030-based: none.
- 68040-based: NeXTstation, NeXTstation color, NeXT Cube.

RS232 interfaces:

- built in A and B serial ports (zsc).

Network interfaces:

- built in ethernet (xe).

Displays:
- NeXT monochrome display (nextdisplay).

Input devices:
- NeXT non-adb keyboard (nextkbd).

Miscellaneous:
- Battery-backed real-time clock.

If it's not on this list, there is no official support for it in this release.

Getting the NetBSD System on to Useful Media

Because NetBSD/next68k must run diskless, the distribution must be installed to a remote machine that NFS exports to the NeXT machine. As a result, there is no automated install procedure. Begin by retrieving the netbsd set files onto the serving machine. These can be found at ftp.NetBSD.ORG. You may want to keep the following information handy:

IP Address: ftp.NetBSD.ORG Login: anonymous Password: <your e-mail address> Server path: /pub/NetBSD/NetBSD-_VER/next68k/binary/sets

Preparing your System for NetBSD Installation

No preparation is necessary, since the NetBSD/next68k sets must be installed on a server.

Installing the NetBSD System

Begin by creating an area in the server's filesystem for the NetBSD/next68k image. This area must be exported read-write to the NeXT workstation. In the simplest form of installation, the entire image is exported as a single partition, mounted on / by the target. This corresponds to a local disk install with just one partition. It is also possible to export /usr or other partitions seperately. /usr can be exported read-only, and multiple machines can all share the same /usr partition.

To extract the sets into the exported area:

```
cd /path/to/exported/filesystem
pax -zrvpe -f /path/to/base.tgz
```

and repeat for any other sets you wish to install. You'll almost certainly need the etc.tgz set.

Edit the files in the etc directory to reflect reality. rc.conf and fstab will certainly need to be edited.

cd into the dev directory in the exported area and run

```
sh ./MAKEDEV all
```

to create the various device nodes.

Create an empty swap file, and place it somewhere where it can also be exported to the target.

Edit the server's /etc/exports file to export the root and swap partitions to the target. Both must be read-write, and allow full root privileges.

You'll also need to set up a tftp server and bootp server to enable netbooting. These services don't have to run on the same machine that exports the target image, but it is often convenient to do so. More information on configuring these services can be found at

http://www.netbsd.org/Documentation/network/netboot/

Note that your bootptab requires the tag "vm=auto" for bootpd to work with the NeXT.

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 propperly configured state, with the most important ones described below.

1. Configuring `/etc/rc.conf`

   If you 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 filesystem mounted read-write. When the system asks you to choose a shell, simply hit 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 hit 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. If your `/usr` directory is on a separate partition and you do not know how to use 'ed' or 'ex', you will have to mount your `/usr` partition to gain access to 'vi'. Do the following:
   mount /usr
   export TERM=vt220
   If you have `/var` on a seperate 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 are new to NetBSD 1.4 and 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.

3. Adding accounts

   Use the vipw(8) command to add accounts to your system, *do not* edit `/etc/passwd` directly. See adduser(8) for more information on the process of 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 3rd party packages

   There is a lot of software freely available for Unix-based systems, almost all of which can run on NetBSD. Modifications are usually needed to when transferring programs between different Unix-like systems, so the NetBSD packages collection incorporates any such changes necessary to make that software run on NetBSD, and makes the installation (and deinstallation) of the software packages easy. There's also the option of building a package from source, in case there's no precompiled binary available.

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:

```
cat pkgsrc.tar.gz | gunzip | (mkdir /usr/pkgsrc;
cd /usr/pkgsrc; tar xpf - )
```

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

6. Misc

   - To adjust the system to your local timezone, point the `/etc/localtime` symlink to the appropriate file under `/usr/share/zoneinfo`.
   - Edit `/etc/aliases` to forward root mail to the right place (run `newaliases`(1) afterwards.)
   - The `/etc/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 *filename*

     is likely to give you more information on these files.

Upgrading a previously-installed NetBSD System

NetBSD/next68k does not currently support an upgrade procedure.

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 1.4.3

Note Only issues effecting an upgrade from NetBSD 1.3 or NetBSD 1.3.x are decribed here.

- "machine" directory/link in "/usr/include"

  Description

  Some architecture may fail to install the **comp** set because the

  `/usr/include/machine`

  directory changed to a symbolic link in NetBSD 1.4.

  Fix If this happens, you can use the command

  \# **rm -r /usr/include/machine**

  to remove the old directory and it contents and reinstall the **comp** set.

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),

- apropros(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)m 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. 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 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, WWW and SUP server.
- Redback Networks, Inc. for hosting the NetBSD Mail server.
- 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 organiztions (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
  Christopher G. Demetriou
  Scott Ellis
  Hubert Feyrer
  Castor Fu
  Greg Gingerich
  William Gnadt
  Michael Graff
  Guenther Grau
  Ross Harvey
  Charles M. Hannum
  Michael L. Hitch
  Kenneth Alan Hornstein
  Jordan K. Hubbard
  Soren Jorvang
  Scott Kaplan

Noah M. Keiserman
John Kohl
Chris Legrow
Ted Lemon
Neil J. McRae
Perry E. Metzger
Herb Peyerl
Mike Price
Dave Rand
Michael Richardson
Heiko W. Rupp
Brad Salai
Chuck Silvers
Thor Lancelot Simon
Bill Sommerfeld
Paul Southworth
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
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.
VMC Harald Frank, Germany
Warped Communications, Inc.

(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!)

We are...

(in alphabetical order)

The NetBSD core group:

Alistair Crooks	agc@NetBSD.ORG
Jun-ichiro itojun Hagino	itojun@NetBSD.ORG
Frank van der Linden	fvdl@NetBSD.ORG
Luke Mewburn	lukem@NetBSD.ORG
Christos Zoulas	christos@NetBSD.ORG

The portmasters (and their ports):

Mark Brinicombe	mark@NetBSD.ORG	**arm32**
Jeremy Cooper	jeremy@NetBSD.ORG	**sun3x**
Ross Harvey	ross@NetBSD.ORG	**alpha**
Ignatios Souvatzis	is@NetBSD.ORG	**amiga**
Jun-ichiro itojun Hagino	itojun@NetBSD.ORG	**sh3**
Eduardo Horvath	eeh@NetBSD.ORG	**sparc64**
Paul Kranenburg	pk@NetBSD.ORG	**sparc**
Anders Magnusson	ragge@NetBSD.ORG	**vax**
Tsubai Masanari	tsubai@NetBSD.ORG	**macppc**
Tsubai Masanari	tsubai@NetBSD.ORG	**newsmips**
Minoura Makoto	minoura@NetBSD.ORG	**x68k**
Phil Nelson	phil@NetBSD.ORG	**pc532**
Scott Reynolds	scottr@NetBSD.ORG	**mac68k**
Darrin Jewell	dbj@NetBSD.ORG	**next68k**
Kazuki Sakamoto	sakamoto@NetBSD.ORG	**bebox**
Wolfgang Solfrank	ws@NetBSD.ORG	**ofppc**
Jonathan Stone	jonathan@NetBSD.ORG	**pmax**
Shin Takemura	takemura@NetBSD.ORG	**hpcmips**
Jason Thorpe	thorpej@NetBSD.ORG	**hp300**
Frank van der Linden	fvdl@NetBSD.ORG	**i386**
Leo Weppelman	leo@NetBSD.ORG	**atari**
Nathan Williams	nathanw@NetBSD.ORG	**sun3**
Steve Woodford	scw@NetBSD.ORG	**mvme68k**

The NetBSD 1.4.3 Release Engineering team:

Chris G. Demetriou	cgd@NetBSD.ORG
Havard Eidnes	he@NetBSD.ORG
Ted Lemon	mellon@NetBSD.ORG
Perry Metzger	perry@NetBSD.ORG
Curt Sampson	cjs@NetBSD.ORG

Developers and other contributors:

Steve Allen	wormey@NetBSD.ORG
Julian Assange	proff@NetBSD.ORG
Lennart Augustsson	augustss@NetBSD.ORG
Christoph Badura	bad@NetBSD.ORG
Robert V. Baron	rvb@NetBSD.ORG
Erik Berls	cyber@NetBSD.ORG
John Birrell	jb@NetBSD.ORG
Mason Loring Bliss	mason@NetBSD.ORG
Manuel Bouyer	bouyer@NetBSD.ORG
John Brezak	brezak@NetBSD.ORG
Allen Briggs	briggs@NetBSD.ORG
Aaron Brown	abrown@NetBSD.ORG
David Brownlee	abs@NetBSD.ORG
Frederick Bruckman	fredb@NetBSD.ORG
Jon Buller	jonb@NetBSD.ORG
Simon Burge	simonb@NetBSD.ORG
Dave Burgess	burgess@cynjut.infonet.net
Robert Byrnes	byrnes@NetBSD.org
D'Arcy J.M. Cain	darcy@NetBSD.ORG
Dave Carrel	carrel@NetBSD.ORG
Bill Coldwell	billc@NetBSD.ORG
Julian Coleman	jdc@NetBSD.ORG
Chuck Cranor	chuck@NetBSD.ORG
Aidan Cully	aidan@NetBSD.ORG
Johan Danielsson	joda@NetBSD.ORG
Matt DeBergalis	deberg@NetBSD.ORG
Rob Deker	deker@NetBSD.ORG
Chris G. Demetriou	cgd@NetBSD.ORG
Jaromir Dolecek	jdolecek@NetBSD.ORG
Andy Doran	ad@NetBSD.ORG
Roland Dowdeswell	elric@NetBSD.ORG
Matthias Drochner	drochner@NetBSD.ORG
Jun Ebihara	jun@NetBSD.ORG
Havard Eidnes	he@NetBSD.ORG
Enami Tsugutomo	enami@NetBSD.ORG
Bernd Ernesti	veego@NetBSD.ORG
Erik Fair	fair@NetBSD.ORG
Hubert Feyrer	hubertf@NetBSD.ORG
Thorsten Frueauf	frueauf@NetBSD.ORG
Castor Fu	castor@NetBSD.ORG
Ichiro Fukuhara	ichiro@NetBSD.ORG
Brian R. Gaeke	brg@dgate.org
Thomas Gerner	thomas@NetBSD.ORG
Simon J. Gerraty	sjg@NetBSD.ORG
Justin Gibbs	gibbs@NetBSD.ORG
Adam Glass	glass@NetBSD.ORG
Michael Graff	explorer@NetBSD.ORG

Brian C. Grayson	bgrayson@NetBSD.ORG
Brad Grantham	grantham@tenon.com
Matthew Green	mrg@NetBSD.ORG
Juergen Hannken-Illjes	hannken@NetBSD.ORG
Charles M. Hannum	mycroft@NetBSD.ORG
Eric Haszlakiewicz	erh@NetBSD.ORG
HAYAKAWA Koichi	haya@NetBSD.ORG
Rene Hexel	rh@NetBSD.ORG
Michael L. Hitch	mhitch@NetBSD.ORG
Christian E. Hopps	chopps@NetBSD.ORG
Ken Hornstein	kenh@NetBSD.ORG
Marc Horowitz	marc@NetBSD.ORG
Dean Huxley	dean@netbsd.org
ITOH Yasufumi	itohy@NetBSD.ORG
IWAMOTO Toshihiro	toshii@NetBSD.ORG
Matthew Jacob	mjacob@NetBSD.ORG
Lonhyn T. Jasinskyj	lonhyn@NetBSD.ORG
Chris Jones	cjones@NetBSD.ORG
Soren Jorvang	soren@NetBSD.ORG
Takahiro Kambe	taca@NetBSD.ORG
Antti Kantee	pooka@NetBSD.ORG
Lawrence Kesteloot	kesteloo@cs.unc.edu
Thomas Klausner	wiz@NetBSD.ORG
Klaus Klein	kleink@NetBSD.ORG
John Kohl	jtk@NetBSD.ORG
Kevin Lahey	kml@NetBSD.ORG
Johnny C. Lam	jlam@NetBSD.ORG
Martin J. Laubach	mjl@NetBSD.ORG
Ted Lemon	mellon@NetBSD.ORG
Joel Lindholm	joel@NetBSD.ORG
Mike Long	mikel@NetBSD.ORG
Warner Losh	imp@NetBSD.ORG
Brett Lymn	blymn@NetBSD.ORG
Paul Mackerras	paulus@NetBSD.ORG
Dan McMahill	dmcmahill@NetBSD.ORG
Neil J. McRae	neil@NetBSD.ORG
Perry Metzger	perry@NetBSD.ORG
der Mouse	mouse@NetBSD.ORG
Joseph Myers	jsm@NetBSD.ORG
Ken Nakata	kenn@NetBSD.ORG
Bob Nestor	rnestor@NetBSD.ORG
Tohru Nishimura	nisimura@NetBSD.ORG
Masaru Oki	oki@NetBSD.ORG
Greg Oster	oster@NetBSD.ORG
Herb Peyerl	hpeyerl@NetBSD.ORG
Matthias Pfaller	matthias@NetBSD.ORG
Dante Profeta	dante@NetBSD.ORG
Chris Provenzano	proven@NetBSD.ORG
Waldi Ravens	waldi@moacs.indiv.nl.net

Darren Reed	darrenr@NetBSD.ORG
Michael Richardson	mcr@NetBSD.ORG
Tim Rightnour	garbled@NetBSD.ORG
Gordon Ross	gwr@NetBSD.ORG
Heiko W. Rupp	hwr@NetBSD.ORG
SAITOH Masanobu	msaitoh@NetBSD.ORG
Curt Sampson	cjs@NetBSD.ORG
Wilfredo Sanchez	wsanchez@NetBSD.ORG
Ty Sarna	tsarna@NetBSD.ORG
SATO Kazumi	sato@NetBSD.ORG
Matthias Scheler	tron@NetBSD.ORG
Karl Schilke (rAT)	rat@NetBSD.ORG
Konrad Schroder	perseant@NetBSD.ORG
Tim Shepard	shep@NetBSD.ORG
Takao Shinohara	shin@NetBSD.ORG
Takuya SHIOZAKI	tshiozak@NetBSD.ORG
Chuck Silvers	chs@NetBSD.ORG
Thor Lancelot Simon	tls@NetBSD.ORG
Noriyuki Soda	soda@NetBSD.ORG
Bill Sommerfeld	sommerfeld@NetBSD.ORG
Bill Studenmund	wrstuden@NetBSD.ORG
Kevin Sullivan	sullivan@NetBSD.ORG
SUNAGAWA Keiki	kei@NetBSD.ORG
Kimmo Suominen	kim@NetBSD.ORG
Matt Thomas	matt@NetBSD.ORG
Christoph Toshok	toshok@NetBSD.ORG
Izumi Tsutsui	tsutsui@NetBSD.ORG
UCHIYAMA Yasushi	uch@NetBSD.ORG
Todd Vierling	tv@NetBSD.ORG
Aymeric Vincent	aymeric@NetBSD.ORG
Paul Vixie	vixie@NetBSD.ORG
Krister Walfridsson	kristerw@NetBSD.ORG
Lex Wennmacher	wennmach@NetBSD.ORG
Assar Westerlund	assar@NetBSD.ORG
Rob Windsor	windsor@NetBSD.ORG
Dan Winship	danw@NetBSD.ORG
Jim Wise	jwise@NetBSD.ORG
Colin Wood	ender@NetBSD.ORG

Legal Mumbo-Jumbo

The following notices are required to satisfy the license terms of the software that we have mentioned in this document:

This product includes software developed by Charles D. Cranor and Washington University.

This product includes software developed by Charles D. Cranor.

This product includes software developed by Charles Hannum, by the University of Vermont and State Agricultural College and Garrett A. Wollman, by William F. Jolitz, and by the University of California, Berkeley, Lawrence Berkeley Laboratory, and its contributors.

This product includes software developed by Charles Hannum.

This product includes software developed by Charles M. Hannum.

This product includes software developed by Chris Provenzano.

This product includes software developed by Christian E. Hopps.

This product includes software developed by Christopher G. Demetriou for the NetBSD Project.

This product includes software developed by Christopher G. Demetriou.

This product includes software developed by Christos Zoulas.

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

This product includes software developed by Dean Huxley.

This product includes software developed by Eric S. Hvozda.

This product includes software developed by Ezra Story.

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 Herb Peyerl.

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 Mark Brinicombe.

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 Paul Kranenburg.

This product includes software developed by Paul Mackerras.

This product includes software developed by Peter Galbavy.

This product includes software developed by Philip A. Nelson.

This product includes software developed by Rodney W. Grimes.

This product includes software developed by Scott Bartram.

This product includes software developed by SigmaSoft, Th. Lockert.

This product includes software developed by Terrence R. Lambert.

This product includes software developed by Theo de Raadt and John Brezak.

This product includes software developed by Theo de Raadt.

This product includes software developed by TooLs GmbH.

This product includes software developed by Winning Strategies, Inc.

This product includes software developed by the Center for Software Science at the University of Utah.

This product includes software developed by the University of Calgary Department of Computer Science and its contributors.

This product includes software developed by the University of Vermont and State Agricultural College and Garrett A. Wollman.

This product includes software developed for the FreeBSD project.

This product includes software developed for the Internet Software Consortium by Ted Lemon.

This product includes software developed for the NetBSD Project by Frank van der Linden.

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

This product includes software developed for the NetBSD Project by John M. Vinopal.

This product includes software developed for the NetBSD Project by Matthias Drochner.

This product includes software developed for the NetBSD Project by Matthieu Herrb.

This product includes software developed for the NetBSD Project by Perry E. Metzger.

This product includes software developed for the NetBSD Project by Piermont Information Systems Inc.

This product includes software developed for the NetBSD Project by Ted Lemon.

This product includes software developed by LAN Media Corporation and its contributors.

This product includes software developed by Michael Graff for the NetBSD Project.

This product includes software developed by Niklas Hallqvist, C Stone and Job de Haas.
This product includes software developed by Darrin B. Jewell.

This product includes software developed by Matt DeBergalis.

This product includes software developed by Rolf Grossmann.