NAME

INSTALL – Installation procedure for NetBSD/x68k

DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 1.4J on the *x68k* 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 1.4J release contains complete binary releases for fourteen different machine types. (The six 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, 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 1.4J 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 1.4J 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.
- Import IPv6/IPsec stack, from KAME project. This includes addition of kernel code for IPv6/IPsec, IPv4/v6 dual-stack user applications and supporting libraries. Due to this, shlib major version for `pcap`(3) is incremented and you may need a recompilation of your userland tools. We will be upgrading IPv6 part to unified-ipv6 codebase whenever it becomes ready.

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.

NetBSD 1.4J is the third public major release of NetBSD for the x68k platform.

In addition to above port-independent improvements, many device drivers are reorganized, and some of them now utilize the machine-independent backend.

Also the boot program is improved to load the kernel from any hard drives.

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, we intend to provide Anonymous CVS access to the NetBSD source tree in the near future, so that anyone on the internet can examine the full NetBSD source code repository.

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

NetBSD Mirror Site List

The following sites mirror NetBSD as of July 26, 1999.

If you wish to become a distribution site for NetBSD, contact `mirrors@netbsd.org`.

FTP mirrors

Australia

ftp.au.netbsd.org
RMIT University, Melbourne
ftp://ftp.au.netbsd.org/pub/NetBSD/

ftp2.au.netbsd.org
AARNet Mirror Project, UQ, Brisbane
ftp://ftp2.au.netbsd.org/pub/NetBSD/

Austria

ftp.at.netbsd.org
University of Technology, Vienna
ftp://ftp.at.netbsd.org/pub/NetBSD/

Brazil

ftp.ravel.ufrj.br
Universidade Federal do Rio de Janeiro
ftp://ftp.ravel.ufrj.br/pub/NetBSD/

Denmark

ftp.dk.netbsd.org
Aalborg University
ftp://ftp.dk.netbsd.org/pub/NetBSD/

Finland

ftp.fi.netbsd.org
The Finnish University and Research Network, Espoo
ftp://ftp.fi.netbsd.org/pub/NetBSD/

France

ftp.fr.netbsd.org
Paris University
ftp://ftp.fr.netbsd.org/pub/NetBSD/

ftp2.fr.netbsd.org
Universite Pierre et Marie Curie, Paris 06
ftp://ftp2.fr.netbsd.org/pub/NetBSD/

Germany

ftp.de.netbsd.org
University of Trier
ftp://ftp.de.netbsd.org/pub/NetBSD/

ftp2.de.netbsd.org
University of Erlangen-Nuremberg
ftp://ftp2.de.netbsd.org/pub/NetBSD/

ftp.netbsd.uni-mainz.de
Johannes Gutenberg University, Mainz
ftp://ftp.netbsd.uni-mainz.de/pub/NetBSD/

ftp.uni-regensburg.de
University of Regensburg
ftp://ftp.uni-regensburg.de/pub/comp/os/NetBSD/

Japan

ftp.jp.netbsd.org
Internet Research Institute Inc., Tokyo
ftp://ftp.jp.netbsd.org/pub/NetBSD/

core.ring.gr.jp
Electrotechnical Laboratory
ftp://core.ring.gr.jp/pub/NetBSD/

ftp.dti.ad.jp
Dream Train Internet Inc., Tokyo
ftp://ftp.dti.ad.jp/pub/NetBSD/

mirror.nucba.ac.jp
Nagoya University of Commerce and Business
ftp://mirror.nucba.ac.jp/mirror/NetBSD/

netbsd.tohoku.ac.jp
Tohoku University, Sendai
ftp://netbsd.tohoku.ac.jp/NetBSD/

ring.asahi-net.or.jp
ASAHI Net
ftp://ring.asahi-net.or.jp/pub/NetBSD/

Netherlands

ftp.nl.netbsd.org
University of Amsterdam
ftp://ftp.nl.netbsd.org/pub/NetBSD/

New Zealand

ftp.clear.net.nz
CLEAR Net, Auckland
ftp://ftp.clear.net.nz/pub/NetBSD/

Norway

ftp.no.netbsd.org
Bergen IT Consult AS
ftp://ftp.no.netbsd.org/pub/NetBSD/

ftp.ntnu.no
Norwegian University of Science and Technology
ftp://ftp.ntnu.no/pub/NetBSD/

Russia

ftp.ru.netbsd.org
Landau Institute for Theoretical Physics, Chernogolovka
ftp://ftp.ru.netbsd.org/pub/NetBSD/

South Africa

ftp.za.netbsd.org
UUNET (SA), Cape Town, South Africa
ftp://ftp.za.netbsd.org/pub/NetBSD/

Sweden

ftp.se.netbsd.org
Lulea University of Technology
ftp://ftp.se.netbsd.org/pub/NetBSD/

ftp.stacken.kth.se
Royal Institute of Technology, Stockholm
ftp://ftp.stacken.kth.se/pub/OS/NetBSD/

ftp.sunet.se
Swedish University NETwork, Uppsala
ftp://ftp.sunet.se/pub/os/NetBSD/

UK

ftp.uk.netbsd.org
Domino, London
ftp://ftp.uk.netbsd.org/pub/NetBSD/

sunsite.org.uk
ftp://sunsite.org.uk/packages/netbsd/

USA

ftp.netbsd.org
Silicon Valley, California
ftp://ftp.netbsd.org/pub/NetBSD/

ftp.cs.umn.edu
University of Minnesota
ftp://ftp.cs.umn.edu/pub/NetBSD

ftp.eecs.umich.edu
University of Michigan, Ann Arbor
ftp://ftp.eecs.umich.edu/pub/NetBSD/

ftp.iastate.edu
Iowa State University
ftp://ftp.iastate.edu/pub/netbsd/

ftp.op.net
ftp://ftp.op.net/pub/NetBSD/

netbsd.stevens-tech.edu
ftp://netbsd.stevens-tech.edu/pub/NetBSD/

SUP mirrors

Australia

sup.au.netbsd.org
RMIT University, Melbourne
Instructions: ftp://sup.au.netbsd.org/pub/NetBSD/sup/README.sup

France

sup.fr.netbsd.org
Paris University
Instructions: Similar to sup.netbsd.org

sup2.fr.netbsd.org
Universite Pierre et Marie Curie, Paris 06
Instructions: Similar to sup.netbsd.org

Germany

sup.de.netbsd.org
University of Trier
Instructions: ftp://sup.de.netbsd.org/pub/NetBSD/sup/supfile.example

Japan

sup.jp.netbsd.org
Internet Research Institute Inc., Tokyo
Instructions: ftp://sup.jp.netbsd.org/pub/NetBSD/sup/README.sup

Norway

sup.no.netbsd.org
Norwegian University of Science and Technology
Instructions: See /usr/src/share/examples/supfiles/sup.no.netbsd.org

UK

sup.uk.netbsd.org
Domino, London
Instructions: See ftp://ftp.netbsd.org/pub/NetBSD/sup/README.sup

USA

sup.netbsd.org
Silicon Valley, California
Instructions: See ftp://ftp.netbsd.org/pub/NetBSD/sup/README.sup

ftp.cs.umn.edu
University of Minnesota
Instructions: hostbase=/ftp/ftp/packages/NetBSD, collections are the same as on sup.NetBSD.ORG

AnonCVS mirrors

USA

anoncvs.netbsd.org
Silicon Valley, California
Instructions: for ssh: 'CVSROOT=anoncvs@anoncvs.netbsd.org:/cvsroot; CVS_RSH=ssh'. for pserver: 'CVSROOT=:pserver:anoncvs@anoncvs.netbsd.org:/cvsroot'

AFS mirrors

Sweden

ftp.stacken.kth.se
Royal Institute of Technology, Stockholm
AFS path: /afs/stacken.kth.se/ftp/pub/OS/NetBSD

USA

ftp.iastate.edu
Iowa State University
AFS path: /afs/iastate.edu/public/ftp/pub/netbsd

NFS mirrors

UK

sunsite.org.uk
Instructions: mount -o ro sunsite.org.uk:/public/packages/netbsd /mnt

WWW mirrors

Australia

www.au.netbsd.org
RMIT University, Melbourne
http://www.au.netbsd.org/

Austria

www.at.netbsd.org
University of Technology, Vienna
http://www.at.netbsd.org/

Finland

www.fi.netbsd.org
Global Wire Oy, Lappeenranta
http://www.fi.netbsd.org/

France

www.fr.netbsd.org
Paris University
http://www.fr.netbsd.org/

www2.fr.netbsd.org
Universite Pierre et Marie Curie, Paris 06
http://www2.fr.netbsd.org/

Germany

www.de.netbsd.org
http://www.de.netbsd.org/

Japan

www.jp.netbsd.org
Internet Research Institute Inc., Tokyo
http://www.jp.netbsd.org/

Norway

www.no.netbsd.org
Bergen IT Consult AS
http://www.no.netbsd.org/

USA

www.netbsd.org
Western Washington University
http://www.netbsd.org/

www2.us.netbsd.org
Global Wire Oy, New York
http://www2.us.netbsd.org/

NetBSD 1.4J Release Contents

The root directory of the NetBSD 1.4J release is organized as follows:

`.../NetBSD-1.4J/`

`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 1.4J 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 1.4J 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 (i.e. the 'domestic' portion) that may be subject to export regulations of the United States. 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:

secrsrc.tgz: This set contains the "domestic" sources. These sources may be subject to United States export regulations.
421K 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, 84.2M uncompressed

syssrc.tgz: This set contains the sources to the NetBSD 1.4J kernel, config(8), and dbsym(8).
13.5M gzipped, 66.7M 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.
3M gzipped, 11.9M uncompressed

src.tgz: This set contains all of the NetBSD 1.4J sources which are not mentioned above.
16.1M gzipped, 73.6M 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, which is available only to users in the United States and Canada, contains the sources normally found in `/usr/src/domestic` – primarily kerberos and other cryptographic security related software. (Remember, because of United States law, it may not be legal to distribute this set to locations outside of the United States and Canada.)

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/x68k Subdirectory Structure

The x68k-specific portion of the NetBSD 1.4J release is found in the x68k subdirectory of the distribution: .../NetBSD-1.4J/x68k/

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/ — x68k binary distribution sets; see below.
- security/ — x68k security distribution; see below.

installation/
- floppy/ — x68k boot and installation floppies; see below.
- misc/ — Miscellaneous x68k installation utilities which run on Human68k; see installation section, below.

Binary Distribution Sets

The NetBSD x68k binary distribution sets contain the binaries which comprise the NetBSD 1.4J release for the x68k. There are eight binary distribution sets and the *security* distribution set. The binary distribution sets can be found in the x68k/binary/sets subdirectory of the NetBSD 1.4J distribution tree, and are as follows:

base — The NetBSD 1.4J x68k **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.
10.2M gzipped, 28.8M 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.
8.1M gzipped, 27.3M 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.)
57K gzipped, 340K uncompressed

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

kern This set contains a NetBSD/x68k 1.4J GENERIC kernel, named `/netbsd`. You *must* install this distribution set.
627k gzipped, 1.4M 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.
4M gzipped, 15.9M uncompressed

misc This set includes the (rather large) system dictionaries, the typesettable document set, and other files from `/usr/share`.
2.2M gzipped, 8.4M 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 x68k security distribution set is named **secr** and can be found in the
`x68k/binary/security`
subdirectory of the NetBSD 1.4J 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.

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 3.3.3.1. 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.
2.4M gzippeed, 7.7M uncompressed

xcomp The extra libraries and include files needed to compile X source code.
1.6M gzipped, 6.8M uncompressed

xcontrib Programs that were contributed to X.
179k gzipped, 670k uncompressed

xfont Fonts needed by X.
5.7M gzipped, 7.0M uncompressed

xserver The X68k and Xprt servers with man pages and the runtime configuration file.
1.4M gzipped, 3.4M uncompressed

The x68k 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 x68k 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/x68k System Requirements and Supported Devices

NetBSD/x68k 1.4J runs on the Sharp X68030 series PCs with a *true* MC68030 MPU (not the original MC68EC030). Since the processor of the X68030 series is the MC68EC030, you need to replace it with an MC68030. Simply remove the old chip and put in the new one instead. The largest difficulty might be to open your X68030.

In addition, some accelerators are supported:

- Xellent30 series
- 040turbo
- Jupiter-X (040 / 060)
- 060turbo

This means all models of X680x0 series PC except for CZ-600C and CZ-674C, by using the appropriate accelerator, can run NetBSD!! Note that the processor for the Xellent30 series is MC68EC030, so you need to replace your processor as well as for X68030.

For 68030 systems, installing MC68881 or MC68882 FPCP is highly recommended but not required.

The minimal configuration requires 4M of RAM and about 100M of disk space. To install the entire system requires much more disk space, and to run X or compile the system, more RAM is recommended.

Here is a table of recommended HD partition sizes for a full install:

Partition	Advised	With X	Needed	With X
root (/)	25M	25M	20M	20M
user (/usr)	150M	200M	100M	125M
swap	2*RAM...			
local (/local)	up to you...			

As you may note the recommended size of /usr is 70M greater than needed. This is to leave room for a kernel source and compile tree as you will probably want to compile your own kernel. (ALL is large and bulky to accommodate all people).

Supported devices include:

- Sharp genuine SCSI interface (builtin / optional) * SCSI harddisks, CD-ROM drives, tape drives, scanners,...

- Mankai Seisakusho Mach-2 SCSI interface
- The builtin floppy drives
- The builtin frame buffer (both of the text and graphics screen)
- The builtin serial (RS-232C)
- The builtin parallel (Centronics printer interface)
- The standard keyboard
- The mouse / trackball
- NS16550 serial
- Neptune-X ethernet

Hopefully, the AD-PCM sound device will be supported on the future releases.

Getting the NetBSD System on to Useful Media

Installation is supported from several media types, including:

- Removable SCSI hard disk, or Magneto-Optical disk (MO)
- Tape
- Remote NFS partition
- FTP

You'll need to have a install floppy disk. On the first, you'll put the install floppy image.

If you are using a UN∗X-like system to write the floppy images to disks, you should use the `dd` command to copy the file system images (.fs files) directly to the raw floppy disks. It is suggested that you read the dd(1) manual page or ask your system administrator to determine the correct set of arguments to use; it will be slightly different from system to system, and a comprehensive list of the possibilities is beyond the scope of this document.

If you are using Human68k to write the floppy images to disks, you should use the `rawrite` utility, provided in the `installation/misc` directory of the NetBSD distribution. It will write the file system images (.fs files) to disks.

If you can retrieve `loadbsd.x` utility and `netbsd.INSTALL` file which can be found in `installation/misc` directory into your Human68k disk, you can run installation kernel without preparing the special boot floppy. Simply type:

```
loadbsd netbsd.INSTALL
```

from the Human68k command line, then NetBSD will start the installation sequence.

Obviously, the steps necessary to prepare the distribution sets for installation or upgrade depend on which installation medium you choose. The steps for the various media are outlined below.

Install From Removable SCSI Hard Disk or MO

To install NetBSD from a removable device the media *must* be of the IBM *Super-floppy* format. The Human68k format is not recognized by this release of the NetBSD/x68k. If you have a MS-DOS (or MS-Windows) machine with an MO drive connected, use it. If you don't, and if you have a program to handle IBM format MO for Human68k, copy all the files in the subdirectory `x68k/binaries` and CHANGE THEIR NAMES IN UPPER CASE.

Install From Tape

To install or upgrade NetBSD using a tape, you need to do the following:

To install NetBSD from a tape, you need to make a tape that contains the distribution set files, in "tar" format. If you're making the tape on a UN∗X-like system, the easiest way to do so is probably something like:

```
tar cf tape_device dist_directories
```

where *`tape_device`* is the name of the tape device that describes the tape drive you're using (possibly /dev/rst0, or something similar, but it will vary from system to system. (If you can't figure it out, ask your system administrator.) In the above example, *dist_directories* are the distribution sets' directories, for the distribution sets you wish to place on the tape. For instance, to put the **base** and **etc** distributions on tape (in order to do the absolute minimum installation to a new disk), you would do the following:

```
cd .../NetBSD-1.4J # the top of the tree
cd x68k/binary/sets
tar cf tape_device base.tgz etc.tgz
```

(Note that you still need to fill in *tape_device* in the example.)

Once you have the files on the tape, you can proceed to the next step in the installation or upgrade process. If you're installing NetBSD from scratch, go to the section on preparing your hard disk, below. If you're upgrading an existing installation, go directly to the section on upgrading.

Install From Remote NFS Partition

To install or upgrade NetBSD using a remote partition, mounted via NFS, you must do the following:

Note This method of installation is recommended only for those already familiar with using BSD network configuration and management commands. If you aren't, this documentation should help, but is not intended to be all-encompassing.

Place the NetBSD distribution sets you wish to install into a directory on an NFS server, and make that directory mountable by the machine on which you are installing or upgrading NetBSD. This will probably require modifying the /etc/exports file on of the NFS server and resetting its mount daemon (mountd). (Both of these actions will probably require superuser privileges on the server.)

You need to know the the numeric IP address of the NFS server, and, if the server is not on a network directly connected to the machine on which you're installing or upgrading NetBSD, you need to know the numeric IP address of the router closest to the NetBSD machine. Finally, you need to know the numeric IP address of the NetBSD machine itself.

Once the NFS server is set up properly and you have the information mentioned above, you can proceed to the next step in the installation or upgrade process. If you're installing NetBSD from scratch, go to the section on preparing your hard disk, below. If you're upgrading an existing installation, go directly to the section on upgrading.

Install via FTP

To install or upgrade NetBSD by using FTP to get the installation sets, you must do the following:

Note This method of installation is recommended only for those already familiar with using BSD network configuration and management commands. If you aren't, this documentation should help, but is not intended to be all-encompassing.

The preparations for this installation/upgrade method are easy; all you make sure that there's some FTP site from which you can retrieve the NetBSD distribution when you're about to install or upgrade. You need to know the numeric IP address of that site, and, if it's not on a network directly connected to the machine on which you're installing or upgrading NetBSD, you need to know the numeric IP address of the router closest to the NetBSD machine. Finally, you need to know the numeric IP address of the NetBSD machine itself.

Once you have this information, you can proceed to the next step in the installation or upgrade process. If you're installing NetBSD from scratch, go to the section on preparing your hard disk, below. If you're upgrading an existing installation, go directly to the section on upgrading.

If you are upgrading NetBSD, you also have the option of installing NetBSD by putting the new distribution sets somewhere in your existing file system, and using them from there. To do that, you must do the following:

1. Place the distribution sets you wish to upgrade somewhere in your current file system tree. At a bare minimum, you must upgrade the "base" binary distribution, and so must put the "base.tgz" set somewhere in your file system. If you wish, you can do the other sets, as well, but you should NOT upgrade the "etc" distribution; the "etc" distribution contains system configuration files that you should review and update by hand.
2. Once you have done this, you can proceed to the next step in the upgrade process, actually upgrading your system.

Preparing your System for NetBSD Installation

Note Currently NetBSD/x68k requires a dedicated disk when you install it for the first time. In other words NetBSD/x68k cannot be installed on the hard disk on which Human68k or any other operating systems reside. This is because of the poor installer, and the system itself can share a single disk with other OSs. This problem should be fixed in the next release.

What you have to do to prepare the disk is only to physically format your hard disk by using FORMAT.x utility of Human68k to install the master boot program on your disk. You can now proceed with the installation instructions.

Installing the NetBSD System

Installing NetBSD is a relatively complex process, but if you have this document in hand and are careful to read and remember the information which is presented to you by the install program, it shouldn't be too much trouble.

Before you begin, you should know the geometry of your hard disk, i.e. the sector size (note that sector sizes other than 512 bytes are not currently supported), the number of sectors per track, the number of tracks per cylinder (also known as the number of heads), and the number of cylinders on the disk. The NetBSD kernel will try to discover these parameters on its own, and if it can it will print them at boot time. If possible, you should use the parameters it prints. (You might not be able to because you're sharing your disk with another operating system, or because your disk is old enough that the kernel can't figure out its geometry.)

You should now be ready to install NetBSD. It might be handy for you to have a pencil, some paper, and a calculator handy.

The following is a walk-through of the steps you will take while getting NetBSD installed on your hard disk. If any question has a default answer, it will be displayed in brackets ("[]") after the question. If you wish to stop the installation, you may hit Control-C at any time, but if you do, you'll have to begin the installation process again from scratch.

1. Boot your machine using of boot floppy. If the boot prompt does not appear in a reasonable amount of time, you either have a bad boot floppy or a hardware problem. Try writing the boot floppy image to a different disk, and using that. If it still doesn't work, NetBSD probably can't be run on your hardware. This can probably be considered a bug, so you might want to report it. If you do, please include as many details about your system configuration as you can.

   It will take a while to load the kernel from the floppy, probably around a minute or so.
2. You will then be presented with the NetBSD kernel boot messages. You will want to read them, to determine your disk's name and geometry. Its name will be something like "sd0" and the geometry will be printed on a line that begins with its name. As mentioned above, you will need your disk's geometry when creating NetBSD's partitions. You will also need to know the name, to tell the install tools what

disk to install on.

3. You will be presented with a welcome message and a prompt asking whether you are going to "install" NetBSD or "upgrade" an exisiting system. Select "install" to start installation.

4. You will be presented a prompt asking if you wish to proceed with the installation process. If you wish to proceed, enter "y" and hit return.

5. The install program will then tell you which disks it can install on, and ask you which it should use. Reply with the name of your disk.

6. You will then be asked to name your disk's disklabel. The default response is "mysd", and for most purposes it will be OK. If you choose to name it something different, make sure the name is a single word and contains no special characters. You don't need to remember this name.

7. You will be prompted for your disk's geometry information, i.e. the number of bytes per sector, cylinders on the disk, tracks per cylinder (heads), and sectors per track. Enter them when they are requested. If you make a mistake, hit Control-C and when you get to the shell prompt, restart the install process by running the "install" command. Once you have entered this data, the install program will tell you the total size of your disk, in both sectors, and cylinders. Remember this number; if you're installing on the whole disk, you'll need it again soon.

8. When describing your partitions, you will have the option of entering data about them in units of disk sectors or cylinders. If you choose to enter the information in units of sectors, remember that, for optimal performance, partitions should begin and end on cylinder boundaries. You will be asked about which units you wish to use, and you should reply with "c" for cylinders, or "s" for sectors.

9. You will be asked to enter the size of your NetBSD root partition. It should be at least 20M, but if you are going to be doing development, 25M is a more desirable size. This size should be expressed in units of sectors or cylinders, depending on which you said you wanted to use.

10. Next, you will be asked for the size of your swap partition. You should probably allocate twice as much swap space as you have real memory. Systems that will be heavily used should have more swap space allocated, and systems that will be lightly used can get by with less. If you want the system to be able to save crash dumps when it panics, you will need at least as much swap space as you have RAM. Again, this number should be expressed in units of sectors or cylinders, as appropriate.

11. The install program will then ask you for information about the rest of the partitions you want on your disk. For most purposes, you will want only one more partition, "/usr". (Machines used as servers will probably also want /var as a separate partition. That can be done with these installation tools, but is not covered here.) The install program will tell you how much space there is left to be allocated in the NetBSD area of the disk, and, if you only want one more partition ("/usr"), you should enter it at the prompt when the installer asks you how large the next partition should be. It will then ask you for the name of the mount point for that partition. If you're doing a basic installation, that is "/usr".

12. *You are now at the point of no return*. Nothing has been written to your disk yet, but if you confirm that you want to install NetBSD, your hard drive will be modified, and its contents may be scrambled at the whim of the install program. This is especially likely if you have given the install program incorrect information. If you are sure you want to proceed, enter "yes" at the prompt.

13. The install program will now label your disk and make the file systems you specified. The filesystems will be initialized to contain NetBSD bootstrapping binaries and configuration files. It will also create an /etc/fstab for your system, and mount all of the file systems under /mnt. (In other words, your root partition will be mounted on /mnt, your /usr partition on /mnt/usr, and so on.) There should be no errors in this section of the installation. If there are, restart from the beginning of the installation process.

14. You will be placed at a shell prompt ("#"). The remaining tasks are to copy the kernel from the kernel copy floppy to the hard drive's root filesystem and install the distribution sets. The flow of installation differs depending on your hardware resources, and on what media the distribution sets reside.

To install from removable hard disk

The first thing you should do is pick a temporary directory where the distribution files can be stored. To do this, enter the command "Set_tmp_dir", and enter the name of the temporary directory. (Don't forget that your disk is mounted under `/mnt`; you should probably pick a directory under `/mnt/usr`.) The default is /mnt/usr/distrib.

Insert the media onto the drive. Check the device name of your drive from the boot message. The device name is something like "sd2" depending on the SCSI disk drives connected to your machine. Note that the boot message can be displayed with the command **`more /kern/msgbuf`**.

Mount the disk on the temporary directory with a command like:

`mount -t msdos /dev/sd2c` *`tmp_dir`*

if your removable drive's name is sd2.

Run the **`Extract`** command once for each distribution set you wish to install. For instance, if you wish to install the **base** distribution set, followed by the **kern** distribution set, and finally the **etc** distribution set, use the commands:

```
Extract base
Extract kern
Extract etc
```

For each extraction, it will ask you if the extraction should be verbose. If you reply affirmatively, it will print out the name of each file that's being extracted.

To install from floppy

The first thing you should do is pick a temporary directory where the distribution files can be stored. To do this, enter the command **`Set_tmp_dir`**, and enter the name of the temporary directory. (Don't forget that if your disk is still mounted under /mnt; you should probably pick a directory under /mnt/usr.)

After you have picked a temporary directory, enter the **`Load_fd`** command, to load the distribution sets from your floppies.

You will be asked which floppy drive to use. Enter "0" (zero) if you're using the first floppy drive (i.e. what DOS would call "A:"), or enter "1" if you're using the second.

You will be prompted to insert a floppy into the drive, to have its contents copied to your hard disk. Do so, and hit return to begin copying. When that is done, read the remainder of the floppies that contain the distribution sets that you want to install, one by one. When the last is read, and you are being prompted for another, hit Control-C.

Run the "Extract" command once for each distribution set you wish to install. For instance, if you wish to install the "base" distribution set, followed by the "kern" distribution set, and finally the "etc" distribution set, use the commands:

```
Extract base
Extract kern
Extract etc
```

For each extraction, it will ask you if the extraction should be verbose. If you reply affirmatively, it will print out the name of each file that's being extracted.

Note If you know that you will be running low on disk space when installing NetBSD, you can load and extract one distribution set at a time. To do this, load only the floppies which contain the files for the first distribution set, extract them, and then change to the temporary directory and remove them with the command "rm set_name.??".

Once you are finished extracting all of the sets that you wish to install, you should proceed to the instructions below (after the last install medium type-specific instructions), that explain how you should configure your system.

To install from tape

The first thing you should do is pick a temporary directory where the distribution files can be stored. To do this, enter the command "Set_tmp_dir", and enter the name of the temporary directory. (Don't forget that your disk is mounted under /mnt; you should probably pick a directory under /mnt/usr.) The default is /mnt/usr/distrib.

After you have picked a temporary directory, enter the "Load_tape" command, to load the distribution sets from tape.

You will be asked which tape drive to use. The default is "rst0", which is correct if you're using the SCSI tape drive with the lowest SCSI ID number. (For the SCSI tape drive with the next lowest SCSI ID number, you should use "rst1", and so on.)

You will be prompted to hit return when you have inserted the tape into the tape drive. When you do, the contents of the tape will be extracted into the temporary directory, and the names of the files being extracted will be printed.

After the tape has been extracted, to go the directory containing the first distribution set you wish to install. (Depending on how you made the tape, it's probably a subdirectory of the temporary directory you specified above.) Once there, run the "Set_tmp_dir" command again, and accept its default answer by hitting return at the prompt.

Use the **`Extract`** command to extract the distribution set. For instance, if you're extracting the "base" set, use the command: **`Extract base`** You will be asked if you wish the extraction to be verbose. If you reply affirmatively, the name of each file being extracted will be printed.

Repeat the previous two steps for each distribution set you wish to install. Change to the set's directory, run "Set_tmp_dir", and then run **Extract** *`set_name`* to extract the set.

Once you are finished extracting all of the sets that you wish to install, you should proceed to the instructions below (after the last install medium type-specific instructions), that explain how you should configure your system.

To install via FTP or NFS

The first thing you should do is pick a temporary directory where the distribution files can be stored. To do this, enter the command "Set_tmp_dir", and enter the name of the temporary directory. (Don't forget that your disk is mounted under `/mnt`; you should probably pick a directory under `/mnt/usr`.) The default is `/mnt/usr/distrib`.

Configure the network interface. To use SLIP, type the following command sequence:

```
slattach -h -s speed tty00
ifconfig sl0 my_ipaddr peer_ipaddr
```

where *`speed`* is the network speed, and *`my_ipaddr`* is the numeric IP address of the machine you are going to install NetBSD/x68k, while *`peer_ipaddr`* is the address of the peer machine connected with your machine. You might have to configure the peer SLIP interface with similar sequence (depending on the peer system).

For instance, the sequence

slattach -h -s 38400 tty00

ifconfig sl0 192.168.0.1 192.168.0.10

configures the SLIP interface for the network between your machine (with IP address 192.168.0.1) and the peer (192.168.0.10) with speed 38400 bps. Note that IP addresses 192.168.*.* are the private IP addresses described in RFC 1597.

To use ethernet, do following:

ifconfig ne0 *my_ipaddr*

where *my_ipaddr* is the numeric IP address of the machine you are going to install NetBSD/x68k. ne0 is the interface name which correspond to the Neptune-X or clone.

If you are NFS-mounting the distribution sets, mount them on the temporary directory with a command like:

mount -t nfs *serv_ipaddr:dist_dir tmp_dir*

where *serv_ipaddr* is the server's numeric IP address, *dist_dir* is the path to the distribution files on the server, and *tmp_dir* is the name of the local temporary directory.

Once this is done, proceed as if you had loaded the files from tape, changing to the appropriate directories, running **Set_tmp_dir** and running **Extract** as appropriate.

If you are retrieving the distribution sets using ftp, change into the temporary directory, and execute the command:

ftp *serv_ipaddr*

where

serv_ipaddr

is once again the server's numeric IP address. Get the files with FTP, taking care to use binary mode when transferring the files.

Once you have all of the files for the distribution sets that you wish to install, you can proceed using the instructions above, as if you had installed from a floppy.

Note As with the floppy install, if you're short on disk space, you can transfer only one set at a time, extract it, and then delete it in order to save space.)

Once you have finished extracting all of the distribution sets

that you wish to install, and are back at the "#" prompt, you are ready to configure your system. The configuration utility expects that you have installed the "base" and "etc" distribution sets. If you have not, you will not be able to run it successfully (nor will you have a functional system, in any case). To configure your newly-installed NetBSD system, run the command "Configure". It will ask you for the system's host name, domain name, and other network configuration information. It will set up your configuration files and make the device nodes for the newly-installed system.

Congratulations, you have successfully installed NetBSD 1.4J. When you reboot into NetBSD, you should 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 yourself an account and protect it and the "root" account with good passwords.

Some of the files in the NetBSD 1.4J distribution might need to be tailored for your site. In particular, the `/etc/sendmail.cf` file will almost definitely need to be adjusted, and other files in `/etc` including `/etc/rc.conf` will probably need to be modified, as well. If you are unfamiliar with UN*X-like system administration, it's recommended that you buy a book that discusses it.

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
   and extracting it into `/usr/pkgsrc`. See `/usr/pkgsrc/README` then 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

The upgrade to NetBSD 1.4J 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 the bootable install floppy `boot.fs`, or, `loadbsd.x` utility and `netbsd.INSTALL` file which can be found in `installation/misc in your Human68k disk.` You must also have at least the **base** and **kern** binary distribution sets available, so that you can upgrade with it, using one of the upgrade methods described below. Finally, you must have sufficient disk space available to install the new binaries. Since the old binaries are being overwritten in place, you only need space for the new binaries, which weren't previously on the system. If you have a few megabytes free on each of your root and `/usr` partitions, you should have enough space.

Since upgrading involves replacing the boot blocks on your NetBSD partition, 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:

1. Boot your machine using of the boot.fs floppy, or boot with `loadbsd.x` utility.
2. You will be presented with a welcome message and a prompt asking whether you are going to "install" NetBSD or "upgrade" an exisiting system. Select "upgrade" to start.
3. You will be presented with some information about the upgrade process and a warning message, and will be asked if you wish to proceed with the upgrade process. If you answer negatively, the upgrade process will stop, and your disk will not be modified. If you answer affirmatively, the upgrade process

will begin, and your disk will be modified. You may hit Control-C to stop the upgrade process at any time. However, if you hit it at an inopportune moment, your system may be left in an inconsistent (and possibly unusable) state.

4. You will be asked if you wish to upgrade your file systems to the new file system format. If you do, reply affirmatively. If you don't have your file systems upgraded now, you should probably do it manually after the install process is complete, by using "fsck -c 2". Read the fsck(8) manual page for more details. Note that this step is only important when upgrading from a pre-NetBSD 1.0 release.
5. The upgrade program will then check your root file system, and, if you approved, will upgrade it to the new file system format. It will then mount your root file system on /mnt.
6. If your file systems are being upgraded, the upgrade script will copy the new fsck(8) program to your hard disk and upgrade your remaining file systems.
7. The upgrade program will then automatically replace the boot blocks on your disk with newer versions, and mount all of your file systems under /mnt. (In other words, your root partition will be mounted on /mnt, your /usr partition on /mnt/usr, etc.)
8. If you don't already have the NetBSD distribution sets on your disk, look in the installation section for information on how to transfer them to your disk.
9. If you don't have the disk space to copy all of the distribution onto the hard drive, you can install a kernel on the hard drive as detailed a few paragraphs below, then boot off the hard drive. Now you can copy and install distribution sets incrementally from your lone floppy drive.

   Once the distribution sets are transferred to your disk, continue here. (Obviously, if the NetBSD distribution sets are already on your disk, because you've transferred them before starting the upgrade process, you don't need to transfer them again now!)
10. After the software has been transferred to the machine (or mounted, in the case of upgrading via NFS or CD-ROM), change into the directory containing the "base.tgz" distribution set. Once you are there, run the "Set_tmp_dir" command, and hit return at the prompt to select the default answer for the temporary directory's path name. (It should be the path name of the directory that you're in.)
11. Run the command "Extract kern" to upgrade the kernel.
12. Run the command "Extract base" to upgrade the base distribution.
13. Repeat the above two steps for all of the sets you wish to upgrade. (For each, change into the directory containing the set, run "Set_tmp_dir" and accept the default path name, then run the "Extract <setname>" command.)
14. If you were previously using the security distribution set, you *must* upgrade to the new version, or you will not be able to log in when the upgrade process is complete. Similarly, if you were not previously using the security set, you must *not* upgrade to the new version.
15. When you are done upgrading all of the distribution sets you wish to upgrade, issue the command "Cleanup". It will clean up the installation, by remaking some system databases. When it is complete, all you have to do is to reboot(8) your system.

Your system has now been upgraded to NetBSD 1.4J.

After a new kernel has been copied to your hard disk, your machine is a complete NetBSD 1.4J system. However, that doesn't mean that you're finished with the upgrade process. There are several things that you should do, or might have to do, to insure that the system works properly.

First, if you did not upgrade your file systems to the new file system format during the upgrade process, and you are upgrading from a pre-1.0 NetBSD, you may want to do so now, with "fsck -c 2". If you are unsure about the process, it's suggested that you read the fsck(8) manual page.

Second, you will probably want to get the etc distribution, extract it, and compare its contents with those in your /etc/ directory. You will probably want to replace some of your system configuration files, or incorporate some of the changes in the new versions into yours.

Third, you will probably want to update the set of device nodes you have in /dev. If you've changed the contents of /dev by hand, you will need to be careful about this, but if not, you can just cd into /dev, and run the command "sh MAKEDEV all".

Fourth, you must deal with certain changes in the formats of some of the configuration files. The most notable change is that the "options" given to many of the file systems in /etc/fstab or by hand have changed, and some of the file systems have changed names. ∗IMPORTANT∗: ANY INSTANCES OF "ufs" IN /etc/fstab MUST BE CHANGED TO "ffs". *Important: any instances of* **ufs** *in* `/etc/fstab` *must be changed to* **ffs**. To find out what the new options are, it's suggested that you read the manual page for the file systems' mount commands, for example `mount_nfs`(8) for NFS.

Note The information for mounts of type *ffs*, i.e. Fast File System, is contained in the `mount`(8) man page.

Finally, you will want to delete old binaries that were part of the version of NetBSD that you upgraded from and have since been removed from the NetBSD distribution. If you are upgrading from a pre-1.0 NetBSD, you might also want to recompile any locally-built binaries, to take advantage of the shared libraries. (Note that any new binaries that you build will be dynamically linked, and therefore take advantage of the shared libraries, by default. For information on how to make statically linked binaries, see the cc(1) and ld(1) manual pages.)

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 1.4J

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.

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(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.)

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