NAME

INSTALL — Installation procedure for NetBSD/acorn32.

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DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 3.0.1 on the *acorn32* platform. It is available in four different formats titled `INSTALL.`*`ext`*, where *`.ext`* is one of `.ps`, `.html`, `.more`, or `.txt`:

`.ps` PostScript.

`.html` Standard Internet HTML.

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

`.txt` Plain old ASCII.

You are reading the *PostScript* version.

What is NetBSD?

The NetBSD Operating System is a fully functional Open Source UNIX -like operating system derived from the University of California, Berkeley Networking Release 2 (Net/2), 4.4BSD-Lite, and 4.4BSD-Lite2 sources. NetBSD runs on fifty four different system architectures (ports), featuring seventeen machine archi-

tectures across fifteen distinct CPU families, and is being ported to more. The NetBSD 3.0.1 release contains complete binary releases for many different system architectures. (A few ports are not fully supported at this time and are thus not part of the binary distribution. For information on them, please see the NetBSD web site at .: **http://www.NetBSD.org/**)

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

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

Changes Between The NetBSD 3.0 release and 3.0.1 update

The NetBSD 3.0.1 update is the first security/critical update of the NetBSD 3.0 release branch. This represents a selected subset of fixes deemed critical in nature for stability or security reasons.

These fixes will also appear in future releases (NetBSD 3.1 etc), together with other less-critical fixes and feature enhancements.

Specific updates are as follows:

Kernel

- Hold kernel_lock while calling systrace_exit().
- In systrace_make_msg(), sleep uninterruptibly while waiting for the response from the systrace daemon, so that the message protocol between the kernel and the daemon doesn't get out of sync.
- RAIDframe: mark used spares as failed if they encounter IO errors.
- `wdc`(4): after a reset don't wait for drives to come ready if there are no drives (fixes a 30s hang after resume).
- Fix support in `wd`(4) for 1 and 2TB disks.
- Fix a bug in the fragment cache which could cause kernel panics (SA2006-004).
- Fix a crash caused by `azalia`(4) when a connection list has invalid NIDs.
- `aic`(4): work around an rbus resource allocation problem so cards work again.
- RAIDframe was erroneously re-initializing the Parity Stripe Status pool each time a new array was configured. This causes grief with things like 'vmstat -m' by causing it to loop. Make RAIDframe only initialize PSS bits once.
- `twe`(4): fix a memory leak in the TWEIO_GET_PARAM ioctl.
- Prevent system crashes caused by malformed ELF interpreters (SA2006-008).
- `usb`(4): Allow a NULL pointer as argument to usb_get_next_event(), and don't allocate a "struct usb_event" on stack in usb_add_event().
- Check the "oldlen" argument to `sysctl`(2) before passing it to `vslock`(9). This prevents a local DOS (SA2006-013).
- Use a `pmatch`(9) expression which should catch all present and future seagate drives larger than 200GB for the WD_QUIRK_FORCE_LBA48 quirks.
- Fix the 'audioctl of death' problem (SA2006-014).

- Limit the size of any kernel buffers allocated by the VOP_READDIR routines to MAXBSIZE.

Networking

- Make sure all `bridge`(4) structs are initialized to 0.
- Fix a memory disclosure in `bridge`(4) (SA2006-005).
- Use `sigaction`(2) to setup automatic disposal of child processes after daemonizing `rpc.statd`(8). This is more portable and avoids zombie `rpc.statd`(8) processes after an NFS client running e.g. Mac OS X shuts down.
- Prevent system crash when attempting to gather information about a non-existing alias of a network interface via the SIOCGIFALIAS ioctl (SA2006-012).
- Fix a panic caused by insufficient validation when parsing IPv6 socket options (SA2006-016).

File system

- Change union_unmount() to not play with the fs root vnode explicitly. Let it get recycled along with all of the others. This is important as if the root vnode has already been reclaimed, then we get a panic when we try to vget it.

Libraries

- xdr_rec.c missing a bugfix for an improper security check. The correct way to check for a zero record length is to check for it without the LAST_FRAG marker in it, since it's legal to send a LAST_FRAG marker with 0 bytes of data.
- `pam_nologin`(8): use the class of the user, not then default class, when checking for nologin and ignorelogin login.conf(5) capabilities.
- `pam_unix`(8): fix an uninitialized variable, and remove some unreachable code.
- Make PAM work on NetBSD ports without shared library support.
- Make password aging work again.
- Fix a bug in signal handling which could e.g get the MySQL daemon stuck in a tight loop after receiving a HUP signal.

Security

- Improve `rnd`(4) code probing for the Intel hardware RNG to avoid false detections (SA2006-009).
- `mail`(1) creates record file with insecure umask (SA2006-007).
- Fix a remote code execution vulnerability in sendmail (SA2006-010).
- A vulnerability was found in the `fast_ipsec`(4) stack that renders the IPSec anti-replay service ineffective under certain circumstances (SA2006-011).
- Fix a number of small security problems with the games.
- Fix an FPU Information leak on i386/amd64/Xen platforms with AMD CPUs (SA2006-015).
- Fix several integer overflows and NULL-pointer dereferences in freetype2.
- Fix a denial of service vulnerability in sendmail when handling malformed multipart MIME messages (SA2006-017).

Miscellaneous

- Sync the Nvidia drivers with XFree86's sources as of December 24th, 2005. These changes fix lots of problems (i.e. freezes) with the latest cards (such as a GeForce 6600GT).
- Give systrace its own version of realpath() that does what it wants, call it intercept_realpath(). Unbreaks systrace.
- `login`(1), `pam_securetty`(8): don't issue a different message for root login on an insecure terminal.
- Fix some unpaired sigblocks which possibly leave a process with all signals blocked (esp. apparant under Gnome).
- Fix a NULL pointer dereference in `ftp`(1).
- Make `sh`(1) expand "$@" correctly again.

acorn26 specific

- Avoid panics under NetBSD/acorn26 whenever a process exits.
- Stop NetBSD/acorn26 from allocating eight times as much pool memory as it needs, leading to a rapid exhaustion of physical memory. NetBSD/acorn26 now boots multi-user again.

amiga specific

- Installer: don't ask for the root device before the user had a chance to identify how it's called under NetBSD.

hp300 specific

- Fix the bootloader so it doesn't print garbage to the bitmap console.
- Fix a huge number of pkgsrc build problems.
- Fix boot failure problem on HP400t with fb console.
- Fix a problem with the probe of SCSI disks in the installer.

i386 specific

- Update pciide at pnpbios to work with the last changes to `wdc`(4), especially the deferral of drive probe.

m68k specific

- Fix a huge number of pkgsrc build problems.

mips specific

- Avoid kernel panics caused by binaries compiled with "-mips2" or better.
- Update FPE trapsignal functions for new siginfo.

powerpc specific

- Avoid pthreads program crashes.

sparc specific

- For GCC3 and later, use the __builtin_va* constructs. Avoids a build problem with Firefox.

xen specific

- Avoid dom0 kernel crash when destroying a domain with active I/O going.
- Fix the FPU problems detected by paranoia on a NetBSD/Xen guest.
- Check the destination ethernet address when not in promiscous mode. Fix a problem where packets would be duplicated, possibly looping, when a domU is doing IP routing.
- Avoid panics under high system load.

Changes Between The NetBSD 2.0 and 3.0 Releases

The NetBSD 3.0 release provides numerous significant functional enhancements, including support for many new devices, integration of hundreds of bug fixes, new and updated kernel subsystems, and many user-land enhancements. The result of these improvements is a stable operating system fit for production use that rivals most commercially available systems.

It is impossible to completely summarize a year of development that went into the NetBSD 3.0.1 release. Some highlights include:

Supported platforms and machines

- A port to new platform: iyonix. The iyonix port supports the Iyonix PC, which is a desktop computer from Castle Technology, based on a 600MHz XScale 80321 processor.
- The xen port now supports Xen 2.0, both in privileged and unprivileged mode.
- The evbarm port has support for the TS-7200 single board computer, which is also known as "the NetBSD Controlled Toaster".
- The sgimips port now supports IP12 (Personal Iris 4D/30, 4D/35, and Indigo R3K) machines.
- The PowerPC 601 support has been added, and the prep port now supports IBM RS/6000 60P 7020-011.

Supported devices

- Added `iteide`(4): driver for ITE 8212 IDE controller.
- Added `ixpide`(4): driver for ATI IXP series chipset IDE controller.
- Added `pdcsata`(4): driver for Promise SATA150 (aka PDC203xx) controllers.
- Added `ipw`(4): driver for Intel PRO/Wireless 2100.
- Added `iwi`(4): driver for Intel PRO/Wireless 2200AG/2915ABG.
- Added `rtw`(4): driver for Realtek RTL8180L IEEE 802.11b wireless network.
- Added `vge`(4): driver for VIA VT612X Gigabit Ethernet controller.
- Added `xge`(4): driver for Neterion Xframe-I 10 gigabit Ethernet.
- Added `cdce`(4): driver for CDC USB Ethernet.
- Added `atu`(4): driver for Atmel AT76C50x based 802.11b wireless network interfaces.
- Added `uep`(4): driver for eGalax USB touchpanel controller.

- Added ugensa(4): driver for USB generic serial adapter, which currently supports CDMA Wireless PC Card.
- Added auixp(4): driver for ATI IXP series chipset audio controller.
- Added auacer(4): driver for ALi M5455 audio controller.
- Added azalia(4): driver for High Definition Audio controller.
- Added spif(4): driver for Sun SUNW,spif multi-port Sbus card.
- viaide(4) now supports nForce2 Ultra 400, nForce3 250 IDE and SATA, and nForce4 IDE and SATA controllers. viaide(4) also supports VIA VT6421 SATA RAID controller though drives on the controller need to be configured into RAID/JOBS sets via its BIOS.
- siside(4) now supports SiS 180 and 741 SATA controllers.
- artsata(4), which is the Intel i31244 Serial ATA disk controller driver, now supports DPA mode.
- satalink(4) now supports Silicon Image 3512 SATA.
- piixide(4) now supports Intel 82801FB/FR (ICH6/6R) IDE and SATA, 82801FBM SATA, 82801G (ICH7) IDE and SATA, and i6300ESB IDE and SATA controllers. Also added basic support for RAID0 and RAID1 for the Adaptec HostRAID format as found on the Intel 6300ESB on-board RAID.
- stge(4) now works on big-endian machines including sparc64 with hardware checksums.
- aac(4) now supports Adaptec SATA RAID 2810SA.
- mpt(4) now supports LSI Logic FC919x SCSI controllers.
- spc(4) now has support for Fujitsu MB87030-based PCMCIA SCSI controller.
- bge(4) now supports Broadcom BCM5788, BCM5705K, BCM5721, and BCM5751M Gigabit Ethernet controllers, and has 802.3x flow control support.
- gem(4) and hme(4) now have hardware checksums support.
- re(4) and wm(4) now supports TCPv4 hardware transmit segment offload.
- wm(4) now supports more Intel Gigabit Ethernet chips and 64bit PCI DMA transfer,
- re(4) now supports Corega CG-LAPCIGT Gigabit Ethernet, and RTL8169 based CardBus Ethernet interfaces, including NetGear GA-511.
- ex(4) now supports 3Com 3c920B-EMB-WNM Integrated Fast Ethernet.
- sk(4) now supports Belkin Gigabit Desktop Network card.
- bce(4) now supports Broadcom BCM4401-B0 Ethernet.
- tl(4) now supports Compaq Netelligent 10 T/2 PCI UTP/Coax Controller.
- wi(4) now supports SMC2531W-B EliteConnect Wireless Adapter.
- fxp(4) now supports Intel 82801FB (ICH6) 10/100 Ethernet.
- tlp(4) now supports LinkSys PCMPC200 Cardbus Ethernet and ASIX AX88140A/AX88141 chipsets.
- Many improvements for atw(4) ADMtek ADM8211 802.11 wireless network driver.
- auich(4) now supports nForce2 Ultra 400, nForce3 250 MCP-T AC-97, nForce4, Intel ICH7, and Intel 6300ESB audio controllers.

- auvia(4) now supports suspend and resume.
- puc(4) now supports VS-Com PCI-210H 2S/1P card, VScom PCI-200 2S card, and ADDI-DATA APCI-7800 8-port serial adapter.
- uftdi(4) now supports Sealevel Systems' uftdi-based USB-Serial adapter.
- uvscom(4) now supports SUNTAC U-Cable type A4 USB serial adapter.
- pms(4) now supports synaptics touchpad.
- lm(4) now supports iTE IT8705f and Winbond 83627THF environment monitor controllers.
- Many bug fixes and improvements for ehci(4) USB 2.0 controllers.
- Many fixes for uaudio(4) devices.
- uax(4) ASIX AX88172 USB Ethernet driver has been replaced by axe(4) driver derived from FreeBSD.
- vnd(4) pseudo-device now support compressed image.

Kernel

- The i386 port now supports the Enhanced SpeedStep Technology.
- Added statvfs(2) family of system calls.
- Added ptm(4), pty/98 pty multiplexor device.
- Added swwdog(4), a software watchdog timer facility.
- Autoconfiguration framework is rewritten for device driver LKMs.
- compat_darwin(8) emulation now supports MacOS X.3 binaries.
- sparc64 and shark ports have switched to wscons(9), the machine-independent console framework. Additionally sparc64 port switched to a XFree86 based X server and now supports the cg6, mach64 and ffb/afb framebuffers with acceleration.
- Added new pselect(2) and pollts(2) synchronous I/O multiplexing system calls.
- Added another experimental buffer queue strategy, BUFQ_PRIOCSCAN, Per-priority cyclical scan. Note the existing strategy NEW_BUFQ_STRATEGY is renamed to BUFQ_READPRIO, since that gives priority to issuing read requests over write requests.
- The way to allocate a kernel structure, map entry, was improved so that it doesn't need preliminary knowledge of system load, i.e. users no longer have to define "options MAX_KMAPENT" in their kernel configurations even on busy servers.

Networking

- TCP now supports TCP Selective Acknowledgement Options (RFC 2018) for enhanced performance especially on long distance connections and TCP MD5 signatures (RFC 2385) for enhanced protection against attacks.
- TCP can take advantage of hardware-assisted TCP/IPv4 segmentation on re(4), wm(4) and xge(4) interfaces.
- The OpenBSD Packet Filter has been integrated as alternative packet filter solution.
- IP Filter has been upgraded to version 4.1.8.
- The KAME IPsec stack now supports ESP over NAT connections (RFC 3948).

- IPv4 Protocol Independent Multicast (PIM) routing support has been added.
- ipsec-tools 0.6.3 provide IKE support for ESP over NAT connections (RFC 3947), user authentication via XAuth and automatic network configurations of VPN clients via Mode Config.
- Added RFC 3378 EtherIP support, which makes it possible to add `gif`(4) interface to bridges.
- Added `tap`(4), the virtual Ethernet device.
- `ppp`(4) has been updated to 2.4.3.
- `gre`(4) now supports tunneling of the IPv6 Protocol.

File system

- UFS_DIRHASH support has been added from FreeBSD, which increase lookup performance by maintaining in-core hash tables for large directories on UFS.
- `fss`(4), file system snapshot support has been added.
- Added ptyfs, pseudo-terminal file system.
- CD9660 file system now supports UTF-8 filename on Joliet extension.
- Ext2fs now supports large files (larger than 2G bytes). `fsck_ext2fs`(8) also handles them and supports conversion from old file systems.
- The stability of the LFS file system has been improved.

Libraries

- Added PAM (Pluggable Authentication Modules framework).
- Support wide strings in C++.
- Re-entrant library functions like getpwent_r() have been added.
- Some libc string functions for i386 have been replaced with optimized version.
- Added DCE 1.1 RPC compatible UUID (Universally Unique Identifier) routines to libc.
- Added `memmem`(3) to libc, which is API compatible with the functions in FreeBSD and Linux.

Security

- The Veriexec framework is now using hash tables to store per-file data, resulting in much faster operation. It supports four different enforcement levels and full control over verbosity. Signature files are easier to generate and are more flexible than in the previous version.
- Added SHA2 to libc to provide more secure hashing algorithms and made cksum(1) and mtree(8) support them.

System administration and user tools

- Various improvements for the "sysinst" installation program, including Spanish language translation.
- Numerous improvements for `syslogd`(8), mostly from FreeBSD.
- `fsck`(8) now has a progress meter option.
- `dump`(8) now supports file system snapshots.
- Added `sockstat`(1), which lists open sockets.

- Added `seq`(1), a utility which prints a sequence of numbers, derived from Plan 9.

Miscellaneous

- `audio`(9) interface is improved. Added capability of audio software filter pipeline, which makes it easy for hardware drivers to add encoding support or sample rates support.
- Updates of most third party packages that are shipped in the base system to the following latest stable releases:
  - am-utils 6.1-rc2
  - BIND 9.3.0
  - binutils 2.15-20041204
  - cvs 1.11.20
  - file 4.13
  - gcc 3.3.3
  - groff 1.19.1
  - OpenSSH 3.9
  - OpenSSL 0.9.7d
  - Postfix 2.1.5
  - sendmail 8.13.3
  - tcpdump 3.8.3
  - texinfo 4.7
  - tzdata2005o
  - XFree86 4.5.0
- Many new packages in the *pkgsrc* system, including the latest open source desktop KDE3, OpenOffice, perl, Apache and many more. At the time of writing, there are over 5400 third party packages available in pkgsrc.

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.

acorn32 specific

This is the sixth major release of NetBSD for the acorn32 , although it was known as NetBSD/arm32 prior to NetBSD 1.6.

NetBSD 3.0.1 on acorn32 is, as usual, also fully backward compatible with old NetBSD acorn32 binaries, so you don't need to recompile all your local programs provided you set the appropriate binary compatibility options in your kernel configuration.

The Future of NetBSD

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

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

- providing better organization to keep track of development efforts, including co-ordination with groups working in related fields.
- providing a framework to receive donations of goods and services and to own the resources necessary to run the NetBSD Project.

- providing a better position from which to undertake promotional activities.
- periodically organizing workshops for developers and other interested people to discuss ongoing work.

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

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

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

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

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

Sources of NetBSD

Refer to .: **http://www.NetBSD.org/mirrors/**

NetBSD 3.0.1 Release Contents

The root directory of the NetBSD 3.0.1 release is organized as follows:

`.../NetBSD-3.0.1/`

`CHANGES`	Changes since earlier NetBSD releases.
`LAST_MINUTE`	Last minute changes.
`MIRRORS`	A list of sites that mirror the NetBSD 3.0.1 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 3.0.1 has a binary distribution.

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

gnusrc This set contains the "gnu" sources, including the source for the compiler, assembler, groff, and the other GNU utilities in the binary distribution sets.
79 MB gzipped, 367 MB uncompressed

pkgsrc This set contains the "pkgsrc" sources, which contain the infrastructure to build third-party packages.
24 MB gzipped, 200 MB uncompressed

sharesrc This set contains the "share" sources, which include the sources for the man pages not associated with any particular program; the sources for the typesettable document set; the dictionaries; and more.
5 MB gzipped, 20 MB uncompressed

src This set contains all of the base NetBSD 3.0.1 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.
37 MB gzipped, 176 MB uncompressed

syssrc This set contains the sources to the NetBSD 3.0.1 kernel for all architectures; `config`(8); and `dbsym`(8).
26 MB gzipped, 140 MB uncompressed

xsrc This set contains the sources to the X Window System.
84 MB gzipped, 450 MB uncompressed

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

The source sets are distributed as compressed tar files. Except for the **pkgsrc** set, which is traditionally unpacked into `/usr/pkgsrc`, all sets may be unpacked into `/usr/src` with the command:

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

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

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

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

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

`SYSVSUM` Historic ATT 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/acorn32 subdirectory structure

The acorn32-specific portion of the NetBSD 3.0.1 release is found in the `acorn32` subdirectory of the distribution: `.../NetBSD-3.0.1/acorn32/`. It contains the following files and directories:

`INSTALL.html`
`INSTALL.ps`
`INSTALL.txt`
`INSTALL.more` Installation notes in various file formats, including this file. The `.more` file contains underlined text using the `more`(1) conventions for indicating italic and bold display.
`binary/`
`kernel/`
`netbsd-GENERIC.gz`
A gzipped NetBSD kernel containing code for everything supported in this release.
`sets/` acorn32 binary distribution sets; see below.
`installation/`

```
misc/
```

Binary distribution sets

The NetBSD acorn32 binary distribution sets contain the binaries which comprise the NetBSD 3.0.1 release for the acorn32. The binary distribution sets can be found in the `acorn32/binary/sets` subdirectory of the NetBSD 3.0.1 distribution tree, and are as follows:

base The NetBSD 3.0.1 acorn32 **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.
18 MB gzipped, 50 MB uncompressed

comp Things needed for compiling programs. This set includes the system include files (`/usr/include`) and the various system libraries (except the shared libraries, which are included as part of the **base** set). This set also includes the manual pages for all of the utilities it contains, as well as the system call and library manual pages.
21 MB gzipped, 76 MB uncompressed

etc This distribution set contains the system configuration files that reside in `/etc` and in several other places. This set *must* be installed if you are installing the system from scratch, but should *not* be used if you are upgrading.
1 MB gzipped, 1 MB uncompressed

games This set includes the games and their manual pages.
3 MB gzipped, 8 MB uncompressed

kern-GENERIC
This set contains a NetBSD/acorn32 3.0.1 `GENERIC` kernel, named `/netbsd`. You *must* install this distribution set.
2 MB gzipped, 3 MB uncompressed

man This set includes all of the manual pages for the binaries and other software contained in the **base** set. Note that it does not include any of the manual pages that are included in the other sets.
8 MB gzipped, 30 MB uncompressed

misc This set includes the (rather large) system dictionaries, the typesettable document set, and other files from `/usr/share`.
3 MB gzipped, 9 MB uncompressed

text This set includes NetBSD's text processing tools, including `groff`(1), all related programs, and their manual pages.
2 MB gzipped, 7 MB uncompressed

NetBSD maintains its own set of sources for the X Window System in order to assure tight integration and compatibility. These sources are based on XFree86, and tightly track XFree86 releases. They are currently equivalent to XFree86 4.4.0. 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.
6 MB gzipped, 18 MB uncompressed

xcomp The extra libraries and include files needed to compile X source code.
13 MB gzipped, 44 MB uncompressed

xfont Fonts needed by X.
31 MB gzipped, 39 MB uncompressed

xetc Configuration files for X which could be locally modified.
0.03 MB gzipped, 0.17 MB uncompressed

xserver The X server. This includes Xarm32VIDC and Xprt servers.
4 MB gzipped, 10 MB uncompressed

The acorn32 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 filenames stored in the sets are relative and therefore the files are extracted *below the current directory*. Therefore, if you want to extract the binaries into your system, i.e. replace the system binaries with them, you have to run the **`tar -xpf`** command from the root directory (`/`) of your system. This utility is used only in a Traditional method installation.

Note: Each directory in the acorn32 binary distribution also has its own checksum files, just as the source distribution does.

NetBSD/acorn32 System Requirements and Supported Devices

NetBSD/acorn32 3.0.1 runs on Acorn systems with ARM6 or later processors, with or without FPU coprocessor. The minimal configuration is said to require 8 MB of RAM and 50 MB of disk space, though we do not know of anyone running with a system quite this minimal today. To install the entire system requires much more disk space (the unpacked binary distribution, without sources, requires at least 65 MB without counting space needed for swap space, etc), and to run X or compile the system, more RAM is recommended. (8 MB of RAM will actually allow you to run X and/or compile, but it won't be speedy. Note that until you have around 16 MB of RAM, getting more RAM is more important than getting a faster CPU.)

Supported devices

- RiscPC/A7000(+) floppy controller
- IDE controllers
  - Acorn motherboard IDE
  - Simtec IDE controller
  - RapIDE Issue 2 IDE controller
  - ICS V5 & V6 IDE controller
- SCSI host adapters
  - Cumana SCSI 2
  - PowerTec SCSI 2
  - MCS Connect32 SCSI 2
  - Acorn SCSI
  - Oak SCSI I
  - Morley SCSI I (uncached only)
- VIDC20 video
- RiscPC Motherboard serial port
- RiscPC Motherboard parallel port
- Ethernet adapters
  - Acorn Ether1
  - Atomwide Ether3
  - ANT Ether3

  - ANT Ether5
  - Atomwide EtherA
  - ANT EtherB
  - Acorn EtherH
  - I-cubed EtherH
  - ANT EtherM

- Most SCSI disk drives
- Most SCSI tape drives
- CD-ROM drives
  - Most SCSI CD-ROM drives
  - Most ATAPI CD-ROM drives

    Note: Some low-priced IDE CD-ROM drives are known for being not or not fully ATAPI compliant, and thus requires some hack (generally an entry to a quirk table) to work with NetBSD.

- Mice
  - RiscPC quadrature mouse
  - A7000 PS/2 mouse
- Processors
  - ARM 610
  - ARM 700
  - ARM 700 + FPA11
  - ARM 710
  - ARM 7500
  - ARM 7500FE
  - ARM 810. [∗]
  - SA110
- Motherboards
  - Acorn RiscPC
  - Acorn A7000
  - Acorn A7000+
- Other devices
  - RiscPC keyboard
  - A7000 keyboard
  - RiscPC realtime clock

Drivers for hardware marked with "[∗]" are *not* present in installation kernels.

Support for some devices is limited to particular kernels. eg there is no SA110 support in A7000 kernels.

Unsupported devices

- Acorn/Aleph1 PC cards
- Any SCSI card using a PowerROM
- Podule based serial ports
- Castle SCSI/Ethernet cards

Drivers are planned for some of the above devices.

Getting the NetBSD System on to Useful Media

Note that if you are installing or upgrading from a writable media, the media can be write-protected if you wish. These systems mount a root image from inside the kernel, and will not need to write to the media. If you booted from a floppy, the floppy disk may be removed from the drive after the system has booted.

Installation is supported from several media types, including:

- CD-ROM / DVD
- MS-DOS floppy
- FTP
- Remote NFS partition
- Tape
- Existing NetBSD partitions, if performing an upgrade

The steps necessary to prepare the distribution sets for installation depend upon which installation medium you choose. The steps for the various media are outlined below.

CD-ROM / DVD Find out where the distribution set files are on the CD-ROM or DVD. Likely locations are `binary/sets` and `acorn32/binary/sets`.

Proceed to the instruction on installation.

MS-DOS floppy NetBSD doesn't include split sets to keep the distribution size down. They can be created on a seperate machine using the `split`(1) command, running e.g. **`split -b 235k base.tgz base.`** to split the `base.tgz` file from `acorn32/binary/sets` into files named `base.aa`, `base.ab`, and so on. Repeat this for all `set_name.tgz` files, splitting them into `set_name.`*`xx`* files. Count the number of `set_name.`*`xx`* files that make up the distribution sets you want to install or upgrade. You will need one sixth that number of 1.44 MB floppies.

Format all of the floppies with MS-DOS. Do *not* make any of them bootable MS-DOS floppies, i.e. don't use `format /s` to format them. (If the floppies are bootable, then the MS-DOS system files that make them bootable will take up some space, and you won't be able to fit the distribution set parts on the disks.) If you're using floppies that are formatted for MS-DOS by their manufacturers, they probably aren't bootable, and you can use them out of the box.

Place all of the `set_name.`*`xx`* files on the MS-DOS disks.

Once you have the files on MS-DOS disks, 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.

FTP The preparations for this installation/upgrade method are easy; all you need to do is make sure that there's an FTP site from which you can retrieve the NetBSD distribution when you're about to install or upgrade. If you don't have DHCP available on your network, you will 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. If you don't have access to a functioning nameserver during installation, the IPv4 address of **ftp.NetBSD.org** is `204.152.184.75` and the IPv6 address is `2001:4f8:4:7:2e0:81ff:fe21:6563` (as of June, 2004).

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 prepar-

ing your hard disk, below. If you're upgrading an existing installation, go directly to the section on upgrading.

Note: This method of installation is recommended for those 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.

NFS

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 numeric IP address of the NFS server, and, if you don't have DHCP available on your network and 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.

Note: This method of installation is recommended 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.

Tape

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 UNIX -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 **misc, 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-3.0.1
# cd acorn32/binary
# tar -cf tape_device misc etc kern
```

Note: 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.

Preparing your System for NetBSD installation

First and foremost, before beginning the installation process, *make sure you have a reliable backup* of any data on your hard disk that you wish to keep. Repartitioning your hard disk is an excellent way to destroy important data.

Software requirements

You will need the following RiscOS software:

- A program that will unpack sparchives. We recommend that you get David Pilling's !SparkPlug. A self-extracting version of this can be found at David Pilling's W3 site (**http://pilling.users.netlink.co.uk/free.html**).
- A program that can uncompress gzip files, because the current bootloader can't read gzip'ed kernels (yet!).
  - The included command line gzip program `installation/misc/gzip_ff8` (!) which is a mirror a version that Laurent Domisse has patched to work on SA. This is also available from: .:
    http://www.users.dircon.co.uk/~arcangel/files/index.html
    Just set the type of the file to `ff8`.
  - SparkFS from David Pilling (commercial) (v1.28 for SA-110).
  - !Gzip from HENSA (micros.hensa.ac.uk); is it still alive though?
- A program to report your disk's geometry:
  - Not really needed, you can simply boot the installation kernel and look for the geometry in the boot messages.
  - Sergio Monesi's fsck suite (a good thing to have around anyway). Available from:
    http://cdc8g5.cdc.polimi.it/~pel0015/fsck.html
  - !Zap (The read disk facility). Available from HENSA.
  - The partition software/formatter for your desired installation target:
    - IDE disks on motherboard interface: !HForm
    - IDE disks on Simtec interface: UNKNOWN
    - IDE disks on ICS interface: UNKNOWN
    - IDE disks on RapIDE interface: UNKNOWN
    - Acorn SCSI cards: ScsiDM
    - Power-tec SCSI cards: !PowerMgr
    - Cumana SCSI-2: !SCSIMgr
    - oak SCSI-1 card: UNKNOWN
    - MCS Connect32 SCSI: UNKNOWN
    - Morley SCSI: UNKNOWN
- An installation kernel for your platform:

  RiscPC/A7000(+)/NC's : INSTALL kernel
- The Bootloader and RiscOS tools: `BtNetBSD.tar.gz` or `BtNetBSD.zip` as found in the `installation/misc` directory. (This should be pre-extracted if you're installing from CD-ROM).

- The NetBSD/acorn32 distribution sets (Will be on the CD-ROM, or available from your nearest NetBSD ftp site).
- A hardcopy of this document

Preliminary steps

Unpack your BtNetBSD archive in whatever way, set the type of the `Settype` file in the `BtNetBSD` directory to `Obey` and run it. This will make the files RISC OS typed correctly. This is also explained in a bit more detail in the enclosed `README` file.

Preparing your hard disk

Terms:

Device	The actual physical hard disk
Partition	A section of a device.
File system	A structured partition that is able to hold files.
Disc	A RiscOS file system in a partition. There can be more than one Disc per Device.

You will have to decide which device you wish to install NetBSD on. You will also have to decide whether you want to split the device between one or more RiscOS Discs and NetBSD or dedicate a whole Device for NetBSD.

In making this decision you should consider the possibility that if NetBSD is incorrectly configured on a shared device then your shared data is at risk.

It is still recommended that if you decide to dedicate a device to NetBSD that you set aside a small RISC OS partition at the beginning of the device. This is a useful place to store the RiscOS side of NetBSD, and will make the use of UnixFS easier to configure. If you do decide to create a minimal RiscOS partition at the beginning of the device, a size of 10-20 MB is recommended (some partitioning software has problems with partitions smaller than this).

The point is that you will have to repartition your device to make room for a separate partition after the RISC OS one for NetBSD. This means backing up your device, re-partitioning it and then copying all the data back afterwards. We recommend that you only copy the needed data back and put off installing the rest until you have NetBSD up and running. This way you will save yourself a lot of work if something goes wrong and you have to start all over again.

Sharing your device

2.1.1 Acorn IDE

Use !HForm for this interface. This is a program that is delivered with your computer and is located in the `Utilities` directory on your hard disk.

With this software you only have the possibility of using one partition for RISC OS, so you have to set the rest aside for NetBSD.

Use this procedure to set up your device:

- Start !HForm by double-clicking on its icon.
- Choose the "custom" or "other" option when prompted (usually the last).
- Use the default values for the geometry but do not enter the full number of cylinders. Just enter the number you want to use for RISC OS. Make a note of this number.

- Continue to accept the default answers until you're asked whether you want to format or initialize, choose initialize.
- Go to the section about running **bb_riscbsd**.

2.1.2 Cumana SCSI-2 card

It is recommended that you use a newer version of !SCSIMgr (newer than v1.55) since this will be easier to use when you want to leave part of the device unused by RISC OS. You should check for the latest version of this software at the following URL: **http://www.cumana.demon.co.uk**

You need to create one or more RISC OS partitions, and you do it in in the following way:

- Run !SCSIMgr by double-clicking on it.
- Select the device you wish to repartition.
- Click on the clear icon in the partitions subwindow.
- This will give you a dialogue box where you can specify the size of the RISC OS partitions. Do not select all since you want to use part of it for NetBSD.
- Enter the amount of the device you wish to reserve for RiscOS. This will be the whole device size less the amount you want to reserve for NetBSD. Make a note of this number.
- If you like, split the RISC OS portion of the device into several partition (you should only "see" the RiscOS portion).
- Click on Execute when you are happy with the partitions. This will create your partitions, and wipe your device.
- Go to the section about running **bb_riscbsd**.

2.1.3 Alsystems Power-tec SCSI-2 card

You must use the !PowerMgr program to partition the device.

The RISC OS partitions should be called `RiscOs:`, and the NetBSD one should be called `Empty:`.

Here is the procedure you should use:

- Start !PowerMgr by double-clicking on its icon.
- Click on advanced in the main window
- Click on Define/create partitions
  - Click on the device you want to set up for NetBSD.
  - Set up the RISC OS partitions as `RiscOs:` and the remaining one as `Empty:`.
  - Click on each figure and press RETURN.
  - Click on partition drive.
  - Click on yes to warning as you really want to wipe the device.
  - Click on yes to proceed, this will lead you to the partition init.
- Partition init
  - Set a tick on all `RiscOs:` partitions, give them a name and set LFAU to auto.
  - Unset the tick on your `Empty:` partition.

  - Click on Inititialize selected partitions.
  - Click on yes to proceed init as you want to wipe the selected partitions.
  - Click on yes to proceed to configure.
- Configure
  - Here you should set up the RISC OS partitions as you like them. Normally the default will be ok.
  - Click on configure. This will configure your computer and give you access to the Discs.
- You *must not* run **bb_riscbsd**.

2.1.4 Acorn SCSI card

You can only have one RISC OS partition with this card. The rest has to be set aside for NetBSD.

This card does not have a friendly WIMP-based interface on the SCSI management program, but the command line version is very good. You should run this in a task window (press `CTRL-F12`):

`*dir` *`location_of_scsidm`*
`*scsidm`
You will get the following prompt:

```
scsidm>
```

Now you should enter the following commands:

probe (to see which devices are available)

device *no*
(replace *no* with the no of your device)

section (to divide the device between RISC OS and NetBSD)

- Answer yes to the question:
  `Include RISCiX partitions?`
- Enter the size of the RISC OS area in blocks (sectors)
- SCSIDM will round this up to the nearest cylinder boundary.
- Answer yes to the question:
  `Do you really want to section device` *`no`*?
- This will section the device into two partitions.

quit

Go to the section on running **bb_riscbsd**.

2.1.5 Other interfaces

It may not be possible to partition devices on other interface. If you are using a different interface you have 2 options:

- Try to work out how to partition devices on it
- Use the entire device for NetBSD

Using a whole device for NetBSD

As a safety precaution NetBSD/acorn32 looks for a filecore bootblock at the beginning of any device it labels. If it finds one and it looks as though it is in use then NetBSD/acorn32 will not touch it.

Because of this, if you've ever used your device for RiscOS, you will need to invalidate this bootblock.

To do this you need to:

- Be absolutely sure you want to do this.
- Run **bb_trash** and follow the instructions.

Ensure that this device is now not configured for RiscOS.

You are now ready to boot NetBSD and continue the installation.

Running bb_riscbsd

When you run this program, you will first be asked whether you are installing to an ADFS drive or a SCSI drive. You can just press 'A' or 'S' respectively. (The **bb_riscbsd** program assumes that you are using a non-Acorn SCSI card, so if you are using an Acorn card, then you may have to edit this program and replace `SCSI_DiscOp` with `SCSIFS_DiscOp`.)

Then you will be asked which Disc you want to install NetBSD on. This *must* be the first Disc on the device. **bb_riscbsd** will now scrutinize the device and see how it has been laid out.

It will then tell you how much of the device is occupied by RiscOS in cylinders, and you will then be asked for the NetBSD starting cylinder. Normally you should just enter the number given to you since the RISC OS starting cylinder is 0 and therefore the last cylinder in use is one less than the figure given. If no figure is displayed, then your partitioning software failed to fill in the bootblock completely (it doesn't have to do this for you but most do) or you selected the wrong device. If you are convinced that this is the correct device then you must calculate a cylinder offset using the numbers noted down during partitioning (if it is not a whole number *always* round up, you might waste a little of the device but it'll be safer).

Make a note of this number.

bb_riscbsd will make a backup of the original bootblock, but it can be non-trivial to put it back.

Booting

Now that your device is ready for the installation you need to unpack the bootloader archive. Pick either `BtNetBSD.tgz` or `BtNetBSD.zip` depending on which type of archive you can extract easiest. (If you're installing from CD-ROM then this should be unpacked already), copy the directory to your hard disk. In the archive you'll find the tools mentioned in this document as well as the bootloader `!BtNetBSD` itself.

Configuring the !BtNetBSD bootloader before installation

Open the `!BtNetBSD` application and edit the `fastboot` file to specify the installation kernel location; an example is already given. ~ You can also set other details like tweaking with the amount of memory in the WimpSlot of the bootloader when this is too much. Remember however that this shouldn't be set too low for it can crash the bootloader. ~ When you think you've filled in the proper details save the file again and proceed.

Running !BtNetBSD

Double click on the !BtNetBSD icon (or the !Run file in it) to start it up.

NetBSD should now start to boot, install NetBSD as per the NetBSD installation notes.

When you finish the installation you can restarted the computer as instructed.

Configuring !BtNetBSD after installation

Open the `!BtNetBSD` application again and edit the `fastboot` file again to fill in the normal kernel name.

Specify the device NetBSD NetBSD should be looking for its kernel in. This is the `Run <BtNetBSD$Dir>.native.mountufs ADFS 4` line that is there by default. See this document for other names.

Set the kernel as `UnixFS:$.netbsd`.

Save the file and run !BtNetBSD again (see above).

Finally, when you are happy with your NetBSD installation, do whatever is necessary to restore order to the partition you took space away from. This will most likely involve restoring files, but might involve some other "house-work".

Your hard disk is now prepared to have NetBSD installed on it, and you should proceed with the installation instructions.

Installing the NetBSD System

Running the sysinst installation program

1. *Introduction*

   Using **`sysinst`**, installing NetBSD is a relatively easy process. You still should read this document and have it in hand when doing the installation process. This document tries to be a good guideline for the installation and as such covers many details for the sake of completeness. Do not let this discourage you; the install program is not hard to use.

2. *Possible* PCMCIA *issues*

   Machines with PCMCIA slots may have problems during installation. If you do not have PCMCIA on your machine (PCMCIA is only really used on laptop machines), you can skip this section, and ignore the "[PCMCIA]" notes. If you do have PCMCIA in your machine, you can safely ignore this section and the "[PCMCIA]" the first time, as you are likely to not have problems. Should troubles occur during floppy boot, they may be PCMCIA specific. You should then re-read this section and try again, following the instructions in the "[PCMCIA]" notes.

   This section explains how to work around the installation problem.

   The kernel keeps careful track of what interrupts and I/O ports are in use during autoconfiguration. It then allows the PCMCIA devices to pick unused interrupts and I/O ports. Unfortunately, the `INSTALL` kernel may not detect all devices in your system. This may be because the `INSTALL` kernel only supports the minimum set of devices to install NetBSD on your system, or it may be that NetBSD does not have support for the device causing the conflict.

   For example, suppose your laptop has a soundblaster device built in; the `INSTALL` kernel has no sound support. The PCMCIA code might allocate your soundblaster's IRQ and I/O ports to PCMCIA devices, causing them not to work, or to lock up the system. This is especially bad if one of the devices in question is your ethernet card.

   The kernel attempts to probe for available interrupts that are usable by the PCIC (PCMCIA interrupt controller), which should alleviate interrupt conflicts; however, I/O port conflicts are still possible.

   This problem will impact some, but not all, users of PCMCIA. If this problem is affecting you, watch the "[PCMCIA]" notes that will appear in this document.

3. *General*

The following is a walk-through of the steps you will take while getting NetBSD installed on your hard disk. **sysinst** is a menu driven installation system that allows for some freedom in doing the installation. Sometimes, questions will be asked and in many cases the default answer will be displayed in brackets ("[ ]") after the question. If you wish to stop the installation, you may press CONTROL-C at any time, but if you do, you'll have to begin the installation process again from scratch by running the /sysinst program from the command prompt. It is not necessary to reboot.

4. *Quick install*

First, let's describe a quick install. The other sections of this document go into the installation procedure in more detail, but you may find that you do not need this. If you want detailed instructions, skip to the next section. This section describes a basic installation, using a CD-ROM install as an example.

- What you need.
  - The distribution sets (in this example, they are on CD).
  - One 1.44 MB 3.5" floppy.
  - A CD-ROM drive (SCSI), a hard disk and a minimum of of memory installed.
  - The hard disk should have at least + *n* megabytes of space free, where *n* is the number of megabytes of main memory in your system. If you wish to install the X Window System as well, you will need at least 120 MB more.
- The Quick Installation
  - Insert the first boot floppy you just created. Boot the computer. After language selection, the main menu will be displayed.

```
.*********************************************.
* NetBSD-3.0.1 Install System                    *
*                                               *
*a: Install NetBSD to hard disk                *
* b: Upgrade NetBSD on a hard disk              *
* c: Re-install sets or install additional sets *
* d: Reboot the computer                        *
* e: Utility menu                               *
* x: Exit Install System                        *
.*********************************************.
```

  - If you wish, you can configure some network settings immediately by choosing the **Utility menu** and then **Configure network**. It isn't actually required at this point, but it may be more convenient. Go back to the main menu.
  - Choose **install**.
  - You will be guided through some steps regarding the setup of your disk, and the selection of distributed components to install. When in doubt, refer to the rest of this document for details.
  - After your disk has been prepared, choose **CD-ROM** as the medium. The default values for the path and device should be ok.
  - After all the files have been unpacked, go back to the main menu and select **reboot**, after you have removed the bootfloppy from the drive.
  - NetBSD will now boot. If you haven't already done so in **sysinst**, you should log in as root, and set a password for that account. You are also advised to edit the file /etc/rc.conf to match your system needs.

- Your installation is now complete.
- For configuring the X window system, if installed, see the files in `/usr/X11R6/lib/X11/doc`. Further information can be found on **http://www.xfree86.org/**.

5. *Booting NetBSD*

   [PCMCIA] Unplug your PCMCIA devices, so that they won't be found by NetBSD.

   Boot your machine. The boot loader will start, and will print a countdown and begin booting.

   If the boot loader messages do not appear in a reasonable amount of time, you either have a bad boot floppy or a hardware problem. Try writing the install floppy image to a different disk, and using that.

   It will take a while to load the kernel from the floppy, probably around a minute or so, then, the kernel boot messages will be displayed. This may take a little while also, as NetBSD will be probing your system to discover which hardware devices are installed. The most important thing to know is that `wd0` is NetBSD 's name for your first IDE disk, `wd1` the second, etc. `sd0` is your first SCSI disk, `sd1` the second, etc.

   Note that once the system has finished booting, you need not leave the floppy in the disk drive.

   Once NetBSD has booted and printed all the boot messages, you will be presented with a welcome message and a main menu. It will also include instructions for using the menus.

6. *Network configuration*

   [PCMCIA] You can skip this section, as you will only get data from floppy in the first part of the install.

   If you will not use network operation during the installation, but you do want your machine to be configured for networking once it is installed, you should first go to the **Utility menu**, and select the **Configure network** option. If you only want to temporarily use networking during the installation, you can specify these parameters later. If you are not using the Domain Name System (DNS), you can give an empty response in reply to answers relating to this.

7. *Installation drive selection and parameters*

   To start the installation, select **Install NetBSD to hard disk** from the main menu.

   The first thing is to identify the disk on which you want to install NetBSD. **`sysinst`** will report a list of disks it finds and ask you for your selection. Depending on how many disks are found, you may get a different message. You should see disk names like `sd0` or `sd1`.

8. *Partitioning the disk*

   - Which portion of the disk to use.

     You will be asked if you want to use the entire disk or only part of the disk. If you decide to use the entire disk for NetBSD, it will be checked if there are already other systems present on the disk, and you will be asked to confirm whether you want to overwrite these.

9. *Editing the NetBSD disklabel*

   The partition table of the NetBSD part of a disk is called a *disklabel*. There are 4 layouts for the NetBSD part of the disk that you can pick from: **`Standard`**, **`Standard with X`**, **`Custom`** and **`Use Existing`**. The first two use a set of default values (that you can change) suitable for a normal installation, possibly including X. With the **`Custom`** option you can specify everything yourself. The last option uses the partition info already present on the disk.

You will be presented with the current layout of the NetBSD disklabel, and given a chance to change it. For each partition, you can set the type, offset and size, block and fragment size, and the mount point. The type that NetBSD uses for normal file storage is called **4.2BSD**. A swap partition has a special type called **swap**. Some partitions in the disklabel have a fixed purpose.

`a` Root partition (`/`)

`b` Swap partition.

`c` The NetBSD portion of the disk.

`d`–`h` Available for other use. Traditionally, `e` is the partition mounted on `/usr`, but this is historical practice and not a fixed value.

You will then be asked to name your disk's disklabel. The default response will be ok for most purposes. 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.

10. *Preparing your hard disk*

    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. If you are sure you want to proceed, enter `yes` at the prompt.

    The install program will now label your disk and make the file systems you specified. The file systems will be initialized to contain NetBSD bootstrapping binaries and configuration files. You will see messages on your screen from the various NetBSD disk preparation tools that are running. There should be no errors in this section of the installation. If there are, restart from the beginning of the installation process. Otherwise, you can continue the installation program after pressing the return key.

11. *Getting the distribution sets*

    The NetBSD distribution consists of a number of *sets*, that come in the form of gzipped tarfiles. A few sets must be installed for a working system, others are optional. At this point of the installation, you will be presented with a menu which enables you to choose from one of the following methods of installing the sets. Some of these methods will first load the sets on your hard disk, others will extract the sets directly.

    For all these methods, the first step is making the sets available for extraction, and then do the actual installation. The sets can be made available in a few different ways. The following sections describe each of those methods. After reading the one about the method you will be using, you can continue to the section labeled 'Extracting the distribution sets'.

12. *Installation using ftp*

    To be able to install using ftp, you first need to configure your network setup, if you haven't already at the start of the install procedure. **`sysinst`** will do this for you, asking you if you want to use DHCP, and if not to provide data like IP address, hostname, etc. If you do not have name service set up for the machine that you are installing on, you can just press `RETURN` in answer to these questions, and DNS will not be used.

    You will also be asked to specify the host that you want to transfer the sets from, the directory on that host, the account name and password used to log into that host using ftp, and optionally a proxy server to use. If you did not set up DNS when answering the questions to configure networking, you will need to specify an IP address instead of a hostname for the ftp server.

    `sysinst` will proceed to transfer all the default set files from the remote site to your hard disk.

13. *Installation using NFS*

    To be able to install using NFS, you first need to configure your network setup, if you haven't already at the start of the install procedure. **sysinst** will do this for you, asking you if you want to use DHCP, and if not to provide data like IP address, hostname, etc. If you do not have name service set up for the machine that you are installing on, you can just press RETURN in answer to these questions, and DNS will not be used.

    You will also be asked to specify the host that you want to transfer the sets from, and the directory on that host that the files are in. This directory should be mountable by the machine you are installing on, i.e. correctly exported to your machine.

    If you did not set up DNS when answering the questions to configure networking, you will need to specify an IP address instead of a hostname for the NFS server.

14. *Installation from CD-ROM*

    When installing from a CD-ROM, you will be asked to specify the device name for your CD-ROM player (usually cd0), and the directory name on the CD-ROM where the distribution files are.

    sysinst will then check if the files are indeed available in the specified location, and proceed to the actual extraction of the sets.

15. *Installation from an unmounted file system*

    In order to install from a local file system, you will need to specify the device that the file system resides on (for example sd1e) the type of the file system, and the directory on the specified file system where the sets are located. **sysinst** will then check if it can indeed access the sets at that location.

16. *Installation from a local directory*

    This option assumes that you have already done some preparation yourself. The sets should be located in a directory on a file system that is already accessible. **sysinst** will ask you for the name of this directory.

17. *Extracting the distribution sets*

    After the install sets containing the NetBSD distribution have been made available, you can either extract all the sets (a full installation), or only extract sets that you have selected. In the latter case, you will be shown the currently selected sets, and given the opportunity to select the sets you want. Some sets always need to be installed (**kern, base**) and **etc** they will not be shown in this selection menu.

    Before extraction begins, you can elect to watch the files being extracted; the name of each file that is extracted will be shown. This can slow down the installation process considerably, especially on machines with slow graphics consoles or serial consoles.

    After all the files have been extracted, all the necessary device node files will be created. If you have already configured networking, you will be asked if you want to use this configuration for normal operation. If so, these values will be installed in the network configuration files. The next menu will allow you to select the time zone that you're in, to make sure your clock has the right offset from UTC. Finally you will be asked to select a password encryption algorithm and can than set a password for the "root" account, to prevent the machine coming up without access restrictions.

18. *Finalizing your installation*

    Congratulations, you have successfully installed NetBSD 3.0.1. You can now reboot the machine, and boot NetBSD from hard disk.

Post installation steps

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

1. Configuring `/etc/rc.conf`

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

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

   and with the root file system (`/`) mounted read-only. When the system asks you to choose a shell, simply press `RETURN` to get to a `/bin/sh` prompt. If you are asked for a terminal type, respond with **vt220** (or whatever is appropriate for your terminal type) and press `RETURN`. You may need to type one of the following commands to get your delete key to work properly, depending on your keyboard:

   ```
   # stty erase '^h'
   # stty erase '^?'
   ```

   At this point, you need to configure at least one file in the `/etc` directory. You will need to mount your root file system read/write with:

   ```
   # /sbin/mount -u -w /
   ```

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

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

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

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

   Other values that need to be set in `/etc/rc.conf` for a networked environment are *hostname* and possibly *defaultroute*, furthermore add an *ifconfig_int* for your ⟨int⟩ network interface, 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. Instead of manually configuring network and naming service, DHCP can be used by setting `dhclient=YES` in `/etc/rc.conf`.

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

2. Logging in

   After reboot, you can log in as `root` at the login prompt. Unless you've set a password in **sysinst**, there is no initial password. 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. By

default, root login from the network is disabled (even via ssh(1)). One way to become root over the network is to log in as a different user that belongs to group "wheel" (see group(5)) and use su(1) to become root.

Unless you have connected an unusual terminal device as the console you can just press RETURN when it prompts for `Terminal type? [...]`.

3. Adding accounts

   Use the useradd(8) command to add accounts to your system. Do not edit /etc/passwd directly! See vipw(8) and pwd_mkdb(8) if you want to edit the password database.

4. The X Window System

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

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

5. Installing third party packages

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

   - More information on the package system is at
     http://www.NetBSD.org/Documentation/software/packages.html
   - A list of available packages suitable for browsing is at
     ftp://ftp.NetBSD.org/pub/NetBSD/packages/pkgsrc/README.html
   - Precompiled binaries can be found at ,:
     ftp://ftp.NetBSD.org/pub/NetBSD/packages/
     usually in the 3.0.1/acorn32/All subdir. You can install them with the following commands under sh(1):

     ```
     # PKG_PATH=ftp://ftp.NetBSD.org/pub/NetBSD/packages/3.0.1/acorn32/All
     # export PKG_PATH
     # pkg_add -v tcsh
     # pkg_add -v bash
     # pkg_add -v perl
     # pkg_add -v apache
     # pkg_add -v kde
     # pkg_add -v mozilla
     ...
     ```

     If you are using csh(1) then replace the first two lines with the following:

     ```
     # setenv PKG_PATH ftp://ftp.NetBSD.org/pub/NetBSD/packages/3.0.1/acorn32/All
     ...
     ```

     The above commands will install the Tenex-csh and Bourne Again shell, the Perl programming language, Apache web server, KDE desktop environment and the Mozilla web browser as well as all the packages they depend on.

   - Package sources for compiling packages on your own 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), with the com-

mands:

```
# mkdir /usr/pkgsrc
# ( cd /usr/pkgsrc ; tar -zxpf - )  pkgsrc.tar.gz
```

After extracting, see the `README` and `doc/pkgsrc.txt` files in the extraction directory (e.g. `/usr/pkgsrc/README`) for more information.

6. Misc

   - Edit `/etc/mail/aliases` to forward root mail to the right place. Don't forget to run `newaliases`(1) afterwards.
   - The `/etc/mail/sendmail.cf` file will almost definitely need to be adjusted; files aiding in this can be found in `/usr/share/sendmail`. See the `README` file there for more information. If you prefer postfix as MTA, adjust `/etc/mailer.conf`.
   - Edit `/etc/rc.local` to run any local daemons you use.
   - Many of the `/etc` files are documented in section 5 of the manual; so just invoking

     ```
     # man 5 filename
     ```

     is likely to give you more information on these files.

Upgrading a previously-installed NetBSD System

The upgrade to NetBSD 3.0.1 is a binary upgrade; it can be quite difficult to update the system from an earlier version by recompiling from source, primarily due to interdependencies in the various components.

To do the upgrade, you must have the boot floppy available. You must also have at least the **base** and **kern** binary distribution sets available, so that you can upgrade with them, using one of the upgrade methods described above. Finally, you must have sufficient disk space available to install the new binaries. Since files already installed on the system are overwritten in place, you only need additional free space for files which weren't previously installed or to account for growth of the sets between releases. 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 kernel, the boot blocks on your NetBSD partition, 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 the NetBSD partition or on another operating system's partition on your disk before beginning the upgrade process.

The upgrade procedure using the **sysinst** tool is similar to an installation, but without the hard disk partitioning. **sysinst** will attempt to merge the settings stored in your `/etc` directory with the new version of NetBSD. Getting the binary sets is done in the same manner as the installation procedure; refer to the installation part of the document for how to do this. Also, some sanity checks are done, i.e. file systems are checked before unpacking the sets.

After a new kernel has been copied to your hard disk, your machine is a complete NetBSD 3.0.1 system. However, that doesn't mean that you're finished with the upgrade process. 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
```

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.

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 3.0.1.

Issues affecting an upgrade from NetBSD 2.1 and older releases.

It is **very important** that you populate the directory `/etc/pam.d` with appropriate configuration files for the Pluggable Authentication Modules (PAM) because you will not be able to login any more otherwise. Using *postinstall* as described below will take care of this. Please refer to

http://www.netbsd.org/guide/en/chap-pam.html

for documentation about PAM.

The following issues can generally be resolved by extracting the **etc** set into a temporary directory and running *postinstall*:

```
postinstall -s /path/to/etc.tgz check
postinstall -s /path/to/etc.tgz fix
```

Issues fixed by *postinstall*:

- Various files in `/etc` need upgrading. These include:
  - `/etc/defaults/*`
  - `/etc/mtree/*`
  - `/etc/pam.d/*`
  - `/etc/daily`
  - `/etc/weekly`
  - `/etc/monthly`
  - `/etc/security`
  - `/etc/rc.subr`
  - `/etc/rc`
  - `/etc/rc.shutdown`
  - `/etc/rc.d/*`

The following issues need to be resolved manually:

- The user '_pflogd'
  and the groups '_pflogd' and 'authpf' need to be created.

Using online NetBSD documentation

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

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

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

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

```
# man passwd
```

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

```
# man 5 passwd
```

instead.

If you are unsure of what man page you are looking for, enter

apropos *subject-word*

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

Administrivia

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

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

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

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

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

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

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

Thanks go to

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

  Keith Bostic
  Ralph Campbell
  Mike Karels
  Marshall Kirk McKusick

  for their ongoing work on BSD systems, support, and encouragement.
- The Internet Systems Consortium, Inc. for hosting the NetBSD FTP, CVS, AnonCVS, mail, mail archive, GNATS, SUP, Rsync and WWW servers.
- The Internet Research Institute in Japan for hosting the server which runs the CVSweb interface to the NetBSD source tree.

- The Helsinki University of Technology in Finland for hosting the NetBSD backup CVS and backup server.
- SSH Communications Security in Finland for operating the backup server.
- The many organizations that provide NetBSD mirror sites.
- Without CVS, this project would be impossible to manage, so our hats go off to Brian Berliner, Jeff Polk, and the various other people who've had a hand in making CVS a useful tool.
- The following individuals and organizations (each in alphabetical order) have made donations or loans of hardware and/or money, to support NetBSD development, and deserve credit for it:

  AMD - Advanced Micro Devices, Inc.
  ASA Computers
  Aaron Wall
  ABE Masayuki
  AboveNet Communications, Inc.
  Achim Grolms
  Adam Kasper
  Adaptec
  Advanced System Products, Inc.
  Akihiro IIJIMA
  Alex Poylisher
  Algorithmics, Ltd.
  Alistair Crooks
  Allegro Networks
  Aloys Keller
  Andreas Berg
  Andreas Jellinghaus
  Andrew Brown
  Andrew Gillham
  Andy Hagans
  Antonio Larripa
  Arend Harrewijne
  Armijn Hemel
  Atsushi YOKOYAMA
  Avalon Computer Systems
  Bay Area Internet Solutions
  Ben Collver
  Benoit Lepage
  Bernhard Moellemann
  Bill Coldwell
  Bill Sommerfeld
  Bill Squier
  Brad Salai
  Brains Corporation, Japan
  Brian Carlstrom
  Brian McGroarty
  Brian Mitchell
  Canada Connect Corporation
  Carl Shapiro
  Castor Fu

Central Iowa (Model) Railroad
Charles Conn
Charles D. Cranor
Charles M. Hannum
Chris Legrow
Chris Townsend
Christer O. Andersson
Christopher G. Demetriou
Christos Zoulas
Chuck Silvers
Cologne Chip AG
Computer und Literatur Verlag
Computertechnik Krienke & Nolte
Computing Services Department, The University of Liverpool
Convert Tools
Co-operative Research Centre for Enterprise Distributed
Curt Sampson
DAYOMON from Japan
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Espen Randen
Ewald Kicker
Florent Parent
Frank Kardel
Free Hardware Foundation
Front Range *BSD User Group
FUKAUMI Naoki
Gan Uesli Starling
Garth R. Patil
Geert Hendrickx (ghen)
Geert Jan de Groot

GK Meier
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Greg Girczyc
Guenther Grau
HP Sweden
Hanno Wagner
Hans Huebner
Harald Koerfgen
Haroon Khalid
Harry McDonald
Hauke Fath
Heiko W. Rupp
Herb Peyerl
Hernani Marques Madeira
Hidekichi Ookubo
Hideyuki Kido
Hisashi Fujinaka
Holger Weiss
Hubert Feyrer
IBM Corporation
IMAI Kiyoshi
Innovation Development Enterprises of America
Intel
Internet Software Consortium
Internet Users Forever IKI
Interoute Telecommunications, UK
JNUG (raised at JNUG meeting & BOF August 2005)
James Bursa
James Chacon
Jan Joris Vereijken
Jason Birnschein
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Jorgen Lundman
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Kenneth P. Stox

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Kimmo Suominen
Korea BSD User Forum
Krister Waldfridsson
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Steve Wadlow
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SunROOT# Project
Sylvain Schmitz
Takahiro Kambe
TAKEUCHI Yoji
Tamotsu Kanoh
Tasis Michalakopoulos (Athens, Greece)
Tatoku Ogaito
Ted Lemon
Ted Spradley
The Names Database
The NetBSD Mission
The People's Republic of Ames
Thierry Lacoste

Thierry Laronde
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Warped Communications, Inc.
Wasabi Systems, Inc.
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Worria Affordable Web Hosting
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Yusuke Yokota
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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.)

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

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