NAME

INSTALL — Installation procedure for NetBSD/atari.

CONTENTS

About this Document....2
What is NetBSD?....2
Changes Between The NetBSD 3.0 and 4.0 Releases....2
  Networking....3
  Filesystems....3
  Drivers....3
  Platforms....5
  Kernel subsystems....6
  Security....6
  Userland....7
  Components removed from NetBSD....8
The Future of NetBSD....8
Sources of NetBSD....9
NetBSD 4.0_RC2 Release Contents....9
  NetBSD/atari subdirectory structure....10
  Binary distribution sets....11
NetBSD/atari System Requirements and Supported Devices....13
  Supported devices....13
Getting the NetBSD System on to Useful Media....14
Preparing your System for NetBSD installation....15
  Preparing your hard disk for the NetBSD installation.....15
  Booting the installer on an existing system....16
  Booting the installer on new systems.....17
  Using loadbsd.ttp....17
Installing the NetBSD System....17
  Running the sysinst installation program....18
    Introduction....18
    General....18
    Quick install....18
    Booting NetBSD....19
    Network configuration....19
    Installation drive selection and parameters....19
    Partitioning the disk....19
    Preparing your hard disk....20
    Getting the distribution sets....21
    Installation using ftp....21
    Installation using NFS....21
    Installation from CD-ROM....21
    Installation from an unmounted file system....21
    Installation from a local directory....21
    Extracting the distribution sets....22
    Finalizing your installation....22
Post installation steps....22
Upgrading a previously-installed NetBSD System....25
Compatibility Issues With Previous NetBSD Releases....25
  Issues affecting an upgrade from NetBSD 2.1 and older....25

Issues affecting an upgrade from NetBSD 3.x releases. 26
Using online NetBSD documentation..... 26
Administrivia..... 27
Thanks go to..... 27
We are..... 28
Legal Mumbo-Jumbo..... 36
The End..... 40

DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 4.0_RC2 on the *atari* 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 architectures across fifteen distinct CPU families, and is being ported to more. The NetBSD 4.0_RC2 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 and 4.0 Releases

The NetBSD 4.0 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 more than a year of development that went into the NetBSD 4.0_RC2 release.

The complete list of changes can be found in the CHANGES:

ftp://ftp.NetBSD.org/pub/NetBSD/NetBSD-4.0/CHANGES

and CHANGES-4.0:

ftp://ftp.NetBSD.org/pub/NetBSD/NetBSD-4.0/CHANGES-4.0

files in the top level directory of the NetBSD 4.0 release tree. Some highlights include:

Networking

- agr(4): new pseudo-device driver for link level aggregation.
- IPv6 support was extended with an RFC 3542-compliant API and added for gre(4) tunnels and the tun(4) device.
- A NDIS-wrapper was added to use Windows binary drivers on the i386 platform, see ndiscvt(8).
- The IPv4 source-address selection policy can be set from a number of algorithms. See "IPSRCSEL" in options(4) and in_getifa(9).
- Imported wpa_supplicant(8) and wpa_cli(8). Utilities to connect and handle aspects of 802.11 WPA networks.
- Imported hostapd(8). An authenticator for IEEE 802.11 networks.
- carp(4): imported Common Address Redundancy Protocol to allow multiple hosts to share a set of IP addresses for high availability / redundancy, from OpenBSD.
- ALTQ support for the PF packet filter.
- ftpd(8) can now run in standalone mode, instead of from inetd(8).
- tftp(1) now has support for multicast TFTP operation in open-loop mode, server is in progress.

Filesystems

- scan_ffs(8), scan_lfs(8): Utilities to find FFSv1/v2 and LFS partitions to recover lost disklabels.
- tmpfs: Added a new memory-based file system aimed at replacing mfs. Contrary to mfs, it is not based on a disk file system, so it is more efficient both in overall memory consumption and speed. See mount_tmpfs(8).
- Added UDF support for optical media and block devices, see mount_udf(8). Read-only for now.
- NFS export list handling was changed to be filesystem independent.
- LFS: Lots of stability improvements and new cleaner daemon. It is now also possible to use LFS as root filesystem.
- Support for System V Boot File System was added, see newfs_sysvbfs(8) and mount_sysvbfs(8).

Drivers

- Audio:
  - Support for new models on drivers such as Intel ICH8/6300ESB, NVIDIA nForce 3/4, etc.
  - Added support for AC'97 modems.
  - auich(4): added support to handle the AC'97 modem as audio device, enabled with the kernel option "AUICH_ATTACH_MODEM"
  - azalia(4): added support for S/PDIF.
- Hardware Monitors:
  - amdpm(4): added support for the i2c bus on the AMD-8111 used on many Opteron motherboards and for the Analog Devices ADT7464 hardware monitor chip.

  - adt7467c(4): new driver for Analog Devices ADT7467 and ADM1030 hardware monitor chips.
  - ipmi(4): new driver for motherboards implementing the Intelligent Platform Management Interface 1.5 or 2.0, from OpenBSD.
  - it(4): new driver for iTE 8705F/8712F and SiS 950 hardware monitors.
  - The lm(4) driver was rewritten and support for more chips was added, for example for Winbond W83627HF, W83627THF, W83627DHG and Asus AS99127F.
  - owtemp(4): new driver for the 1-Wire temperature sensors.
  - tmp121temp(4): new driver for the Texas Instruments TMP121 temperature sensor.
  - ug(4): new driver for ASUS Abit uGuru hardware monitor found on newer ASUS motherboards.
- Networking:
  - ath(4): updated HALs with support for WiSOC (AR531x) and 32bit SPARC.
  - bge(4): added support for the following chips: BCM5753, BCM5753M, BCM5715, BCM5754, BCM5755 and BCM5787. Numerous improvements and bugfixes were made too.
  - kse(4): new driver for Micrel KSZ8842/8841 PCI network cards.
  - msk(4): new driver for Marvell Yukon 2 GigE PCI network cards, from OpenBSD.
  - nfe(4): new driver for NVIDIA nForce Ethernet network cards, from OpenBSD.
  - ral(4): new 802.11 driver for PCI/Cardbus Ralink RT2500, RT2501, RT2600, RT2661 and RT2500 USB chipsets, from OpenBSD.
  - rum(4): new 802.11 driver for USB Ralink RT2501 and RT2601 chipsets, from OpenBSD.
  - sip(4): now works on sparc64.
  - tlp(4): added support for ASIX AX88140A and AX88141.
  - vr(4): added support for the VIA Rhine III.
  - wm(4): added support for i8003, ICH8, ICH9 and others.
  - wpi(4): new driver for Intel PRO/Wireless 3945ABG PCI 802.11 network cards, from OpenBSD.
- Security:
  - glxsb(4): new driver for the AMD Geode LX AES Security Block that provides random numbers and AES acceleration, from OpenBSD.
- Power Management:
  - Support for Intel Speedstep SMI on PIIX4 PCI-ISA for i386.
  - Support for AMD PowerNow and Cool'n'Quiet Technology on K7 and K8 CPUs (both in 32 and 64 bit mode), including Athlon Mobile, Athlon64, Opteron or X2.
  - Support for more Enhanced Speedstep CPUs, including VIA C7/Eden and Intel Core Solo/Duo/Duo2.
- Storage:
  - ahcisata(4): new driver for AHCI 1.0 and 1.1 compliant SATA controllers.
  - ataraid(4): added support to handle Adaptec HostRAID and VIA V-Tech software RAID.

  - ciss(4): new driver for HP/Compaq 5th+ generation Smart ARRAY controllers, from OpenBSD.
  - fdc(4): added support for SBus based sparc64 machines and fixed formatting on sparc.
  - gcscide(4): new driver for the AMD Geode CS5535 Companion Device IDE controller.
  - jmide(4): new driver for JMicron Technology JMB36x PCIe to SATA II/PATA controllers.
  - mfi(4): new driver for LSI Logic and Dell MegaRAID SAS controllers, from OpenBSD.
  - njata(4): new driver for Workbit NinjaATA-32 CardBus IDE controller.
  - svwsata(4): new driver for Serverworks K2 SATA controllers, from OpenBSD.
  - viaide(4) added support for the VIA VT8237A SATA controller and AMD CS5536 Companion Device IDE Controller.
- USB:
  - ucycom(4): new driver for Cypress microcontroller based serial devices.
  - uipaq(4): new driver for the iPAQ devices.
  - uslsa(4): new driver for Silicon Labs CP210x series serial adapters.
  - utoppy(4): new driver for the Topfield TF5000PVR range of digital video recorders.

Platforms

- i386:
  - Added support for the for Multiboot specification. This means much improved support for loading the kernel by GRUB, including passing in parameters to the kernel.
  - vesafb(4): added new framebuffer driver that supports VESA BIOS (VBE) 2.0 extensions and up.
  - Added cd9660 file system support to the BIOS bootloader.
- evbarm: New platform support for Arcom Viper PXA255-based single board, Atmark Techno Armadillo-9 and Armadillo-210, Linksys NSLU2 (a.k.a. "Slug") and I-O DATA HDL-G Giga LANDISK NAS devices.
- evbmips: Add support for Alchemy Au1550 processors, DBAu1550 boards, Alchemy Au15XX PCI host, (OMS-AL400/128) and Atheros AR5312 SoC.
- New port ews4800mips: NEC's MIPS based EWS4800 workstations.
- cobalt: Add support from booting off raidframe RAID1 mirrors.
- hpcmips: Added the teliosio(4) driver for the Sharp Telios LCD screen and Battery unit.
- New port landisk: port to the SH4 processor based NAS appliances, supporting models by I-O DATA (USL-5P, HDL-U, HDL-AV, HDL-W and HDLM-U series, SuperTank LAN Tank, UHDL-160U and UHDL-300U) and Plextor PX-EH16L, PX-EH25L and PX-EH40L.
- prep: This port has been modernized, and support for five additional machines has been added, among them the IBM 7024-E20 and 7025-F30 models and Motorola Powerstack E1. Additionally, sysinst support was added, and the bootloader process was improved, allowing easy installation and upgrade to future releases.
- Xen: support for Xen3 domU and dom0, including support for hardware virtualization on CPUs that support it.

Kernel subsystems

- Improved Firewire (IEEE1394) support imported from FreeBSD.
- The midi(4) framework got a complete overhaul for better support of Active Sensing and improved handling of tempo and timebase changes.
- Added a Bluetooth protocol stack including:
  - hardware drivers: ubt(4) for USB controllers, and bt3c(4) for the 3Com Bluetooth PC-Card.
  - socket based access to the HCI, L2CAP, RFCOMM and SCO protocols.
  - pseudo drivers for integrating services on remote Bluetooth devices such as Keyboards, Mice and SCO Audio into the NetBSD device framework.

  See bluetooth(4), bthset(1) and btpin(1).
- Imported the bio(4) framework from OpenBSD, to query/control block device controllers. Currently supporting the mfi(4) driver.
- Kernel uses stateful read-ahead algorithm.
- dkctl(8) can be used to switch buffer queuing strategies on the fly, see also bufq(9).
- fileassoc(9) is used by Veriexec, it adds in-kernel and file-system independent file meta-data association interface.
- firmload(9): An API for loading firmware images used by various hardware devices.
- gpio(4): Imported General Purpose I/O framework from OpenBSD.
- onewire(4): Imported Dallas Semiconductor 1-wire bus framework from OpenBSD.
- The proplib(3) protocol was added for sending property lists to/from the kernel using ioctls.
- spi(4): New SPI (Serial Peripherial Interface) framework.
- timecounter(9) adds a new time-keeping infrastructure along with NTP API 4 nanokernel implementation. Almost all platforms were changed to support this API.
- Start of 32bit-Linux-emulation for amd64 (COMPAT_LINUX32).
- wscons(4) console driver supports splash screens, scrolling, progress bar for kernel and boot messages.

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.

Security

- The FAST_IPSEC IPsec implementation was extended to use hardware acceleration for IPv6, in addition to the hardware accelerated IPv4 that was available before. See fast_ipsec(4) for more information.
- mprotect(2) got restrictions to enforce W^X policies, from PaX. See options(4), sysctl(3), and paxctl(1).
- GCC 4's support for stack smashing protection (SSP) was enabled by adding libssp, see security(8).
- The kernel authorization framework kauth(9) was added, replacing the traditional BSD credential management and privileged operation access control with an abstract layer, allowing the implementation of various security models either as part of the NetBSD distribution or as third-party LKMs.

  NetBSD's kernel authorization is a hybrid clean-room implementation of a similar interface developed by Apple, extending its capabilities and combining concepts of credential inheritance control.

Userland

- 3rd party software updates:
  - BIND 9.4.1-P1
  - OpenSSL 0.9.8d
  - CVS 1.11.21
  - OpenSSH 4.4
  - gettext 0.14.4
  - PF from OpenBSD 3.7
  - (n)awk 20050424
  - Postfix 2.4.5
  - am-utils 6.1.3
  - file 4.21
  - zlib 1.2.3
  - GNU binutils 2.16.1
  - GNU groff 1.19.2
  - IPFilter 4.1.23
  - GNU gcc 4.1.1
  - NTP 4.2.2p2
  - pppd 2.4.4
- `cksum`(1) can now verify checksums.
- `identd`(1): added support for forwarding ident queries and receiving of proxied ident queries.
- `getent`(1): added support for the ethers database.
- iSCSI target (server) code added, see `iscsi-target`(8); Initiator (client) code is underway.
- `lockstat`(8): new command to display a summary of kernel locking events recorded over the lifetime of a called program.
- Various utilities to support Bluetooth were added:
  - `btconfig`(8) for controller configuration.
  - `btdevctl`(8) to manage pseudo devices relating to remote services.
  - `bthcid`(8) and `btpin`(1) for authenticating radio connections.
  - `sdpd`(8) for providing service discovery to remote devices.
  - `sdpquery`(1) for querying services on remote devices.
  - `rfcomm_sppd`(1) to access remote services over RFCOMM via stdio or pty.
  - `bthset`(1) for making connections to Bluetooth headsets.

Besides this list, there there have also been innumerable bug fixes and other miscellaneous enhancements of course.

Components removed from NetBSD

In this release of NetBSD, some software components known from previous releases were removed from the system. In some cases those were components that are not useful anymore or their utility does not justify maintenance overhead. Other components were not working properly and there was lack of interest in fixing them.

- Sushi ...
- Vinum ...
- Sendmail was removed. Postfix is the MTA and provides the `sendmail`(1) command line tool. Postfix has been included with NetBSD since NetBSD 1.5 was released in December 2005. Details about Postfix can be found in the NetBSD Guide:
  http://www.NetBSD.org/docs/guide/en/chap-mail.html.
  For those who need Sendmail, it is available from pkgsrc in the `mail/sendmail` and `mail/sendmail813` packages.
- NETCCITT ...
- NETNS ...
- UUCP was removed. The NetBSD improvements were merged into the pkgsrc version. For those who use UUCP tools, they are available from pkgsrc in the `net/uucp` package. The `cu`(1) command is available as a frontend to `tip`(1).
- The Fortran 77 compiler (g77) has been removed with the transition from GCC 3 to GCC 4, which does not include it. For those who need it, it is available from pkgsrc in the `lang/gcc3-f77` package.
- The evbsh5 port has been removed from NetBSD due to lack of interest, compounded by a lack of available SH5 hardware.

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 4.0_RC2 Release Contents

The root directory of the NetBSD 4.0_RC2 release is organized as follows:

`.../NetBSD-4.0_RC2/`

`CHANGES`	Changes since earlier NetBSD releases.
`LAST_MINUTE`	Last minute changes.
`MIRRORS`	A list of sites that mirror the NetBSD 4.0_RC2 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 4.0_RC2 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 4.0_RC2 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.
37 MB gzipped, 176 MB uncompressed

syssrc This set contains the sources to the NetBSD 4.0_RC2 kernel for all architectures; `config`(1); 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/atari subdirectory structure

The atari-specific portion of the NetBSD 4.0_RC2 release is found in the `atari` subdirectory of the distribution: `.../NetBSD-4.0_RC2/atari/`. 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-ATARITT.gz`
A kernel specifically tuned for the Atari TT030.

`netbsd-BOOT.gz`
A kernel for both the Falcon and TT030. It is kept pretty small, so you can use it to boot the system for installation on memory-tight systems. This is the kernel supplied on the boot.fs floppy.

`netbsd-BOOTX.gz`
Same as the BOOT kernel, but it has slightly more features. You can run X11 with it.

`netbsd-FALCON.gz`
A kernel specifically tuned for the Atari Falcon.

`netbsd-HADES.gz`
A kernel specifically tuned for the Hades.

`netbsd-MILAN-ISAIDE.gz`
A kernel specifically tuned for the MILAN using IDE in ISA mode.

`netbsd-MILAN-PCIIDE.gz`
A kernel specifically tuned for the MILAN using IDE in PCI mode.

`sets/` atari binary distribution sets; see below.

`installation/`

`floppy/` atari boot and installation floppies; see below.

`miniroot/`
atari miniroot file system image; see below.

`misc/` Miscellaneous atari installation utilities; see installation section, below.

Binary distribution sets

The NetBSD atari binary distribution sets contain the binaries which comprise the NetBSD 4.0_RC2 release for the atari. The binary distribution sets can be found in the `atari/binary/sets` subdirectory of the NetBSD 4.0_RC2 distribution tree, and are as follows:

base The NetBSD 4.0_RC2 atari **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.
16 MB gzipped, 46 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.
18 MB gzipped, 69 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, 7 MB uncompressed

kern-BOOT, **kern-HADES**, **kern-MILAN-ISAIDE**, **kern-MILAN-PCIIDE**
These sets contain a NetBSD/atari 4.0_RC2 kernel, named `/netbsd`. You *must* install the kernel that matches your hardware.
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, 17 MB uncompressed

xcomp The extra libraries and include files needed to compile X source code.
10 MB gzipped, 37 MB uncompressed

xfont Fonts needed by the X server and by X clients.
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. Please consult the X specific section in the atari FAQ as to which server you should use.
3 MB gzipped, 7 MB uncompressed

The atari 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.

Additional kernels to those included in the distribution sets may be found in the `atari/binary/kernel` subdirectory of the NetBSD 4.0_RC2 distribution tree. These kernels are generally named something like `netbsd-BOOT.gz` or some other suitable name. Please note that these kernels are simply gzipped and are not in tar archives.

There are six atari floppy images to be found in the `atari/installation/floppies` subdirectory of the NetBSD 4.0_RC2 distribution. Three of them are bootable TOS kernel floppies and the other three are installation floppies. They are described in more detail below. There are gzipped versions of each available, for easier downloading. (The gzipped versions have the `.gz` extension added to their names.)

Bootable Kernel floppies

These TOS disks contains the TOS support programs (like **`loadbsd.ttp`** and **`chg_pid.ttp`** — see below) and a kernel. They are setup such that you can insert them into your floppy drive, and start the programs from GEM.

For the TT030 and Falcon, the (720 KB) floppy is named `boot.fs` and the kernel supplied is `BOOT`. For the Hades, you need the `hades-boot.fs` floppy (1.44 MB), the kernel is `HADES`. For the Milan, you need the `milan-boot.fs` floppy (1.44 MB), the kernel is MILAN-PCIIDE.

Installation floppy:

This disk contains a BSD root file system setup to help you install the rest of NetBSD. This includes formatting and mounting your `/` (root) and `/usr` partitions and getting ready to extract (and possibly first fetching) the distribution sets. There is enough on this file system to allow you to make a slip connection, configure an ethernet, mount an NFS file system or ftp. You can also load distribution sets from a SCSI tape or from one of your existing GEMDOS partitions.

The floppies meant for 720 KB disks are named `miniroot.fs.1` and `miniroot.fs.2`. There is also an image for an 1.44 MB disk: `miniroot.fs`.

There are also TOS utilities in the `atari/installation/misc` subdirectory, which you will need to get NetBSD/atari up-and-running.

- The **gzip.ttp** program allows you to uncompress .gz images. The usage is:

  gzip.ttp -d filename.gz

- The **rawwrite.ttp** program allows you to create the installation floppy disks from the files in the `atari/floppies` directory.
- The **aptck.ttp** program reads the partition tables present on a given disk and tries to interpret then the same way the NetBSD kernel does. If you have a disk on which GEMDOS and NetBSD are to co-exist, It is a good idea to run this before you begin the NetBSD/atari installation just to check that the kernel's view of the partition tables agree with GEMDOS's view. If you have more than 3 partitions defined on a disk you will notice that the NetBSD/atari partition starts one sector after the GEMDOS partition. This is to allow space for the auxiliary root for the 4th and subsequent partitions.
- The **loadbsd.ttp** program loads the NetBSD/atari kernel from TOS (or MiNT, MultiTOS, etc.).
- The **chg_pid.ttp** program can be used to change the id of an AHDI compatible partition. This allows you to reserve a partition for use by NetBSD/atari (id: NBD), or for use as a swap (id: SWP) partition.
- The **file2swp.ttp** program can be used to transfer an installation file system image, like `sysinst.fs` to a partition with id SWP. In this way, you can run the installation from the swap partition instead of a memory disk. This is a necessity for small memory systems.

This utility is used only in a Traditional method installation.

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

NetBSD/atari System Requirements and Supported Devices

NetBSD/atari 4.0_RC2 runs on a TT030, Falcon, Hades and MilanI. An FPU is not required. The minimum amount of RAM required is 4 MB. On the Hades, only the Tseng PCI VGA cards (ET4000/ET6000/ET6100) are supported in the 4.0_RC2 release. When an unsupported video card is present, you can use NetBSD with a serial console only.

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

Partition	Suggested	+ X	Needed	+ X
root (/)	25 MB	25 MB	20 MB	20 MB
/usr	245 MB	270 MB	120 MB	145 MB
/var	20 MB	20 MB	5 MB	5 MB
swap	*2∗RAM below 32 MB, then up to you*			

Anything else is up to you!

In addition of the rule of thumb for the swap size mentioned below, you probably want to make sure that the size of the swap partition does not drop below 20 MB (30 MB for systems with X). Another item is the add-on packages. You might want 20-30M (or more) in `/usr/local` (or added to `/usr`) to store packages from the NetBSD package system. As you may note the recommended size of `/usr` is 125 MB 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. (`GENERIC` is large and bulky to accommodate all people, `BOOT` is small and might not have all the features you want).

Supported devices

- The builtin SCSI host adapter
  - Should support most SCSI-drives.
  - Should support most tape drives.

  - Should support most CD-ROM drives.
  - Should support most ZIP/M-O drives.
- The builtin video controller
- The builtin (720 KB / 1.44 MB) floppy drive
- The serial2/modem2 ports
- The Falcon FX memory expansion
- The Atari mouse
- A 3-button mouse (see build description in the FAQ!)
- The parallel printer
- IDE interface on both Falcon and Hades (includes ATAPI support)
- The serial interface on the first 68901 UART (modem1)
- VME-bus devices (TT030/Hades)
  - BVME410 ethernet
  - Circad Leonardo 24-bit VME graphics adapter
  - Crazy Dots VME et4000 graphics adapter
  - Riebl (and possibly PAM) ethernet cards on the VME bus.
- PCI-bus devices (Hades and Milan only)
  - ET4000/ET6000/ET6100-PCI (VGA console)
  - ESS Technology Inc. Solo-1 Soundcard
  - 3Com 3c59x Network card
- ISA-bus devices (Hades only)
  - Teles S0/16.3-ISA ISDN adapter (with I4B)

This list is incomplete by definition. We can not test all SCSI peripherals, ISA cards or PCI cards. If you have problems with such a peripheral, please contact the `port-atari@NetBSD.org` mailing list.

Getting the NetBSD System on to Useful Media

Installation is supported from several media types, including:

- GEMDOS/TOS HD partitions
- Tape

No matter what you do, however, you'll need to have three disks handy, on which you will put the install and boot floppy images.

All the images are available from the directory `installation/floppies` under the root of the NetBSD/atari tree at your favorite archive site.

If you are using NetBSD/atari to make the floppies, you should use the command `dd`(1) to write the raw floppy images (.fs files) to the disk. As an example, to write the first part of the miniroot file system onto a 720 KB floppy in fd0 use:

```
# dd if=miniroot.fs.1 of=/dev/rfd0b bs=9b
```

If you are using TOS to make the floppies, grab the **rawwrite** utility from the `atari/utils` directory and issue the command:

```
rawwrite boot.fs
```

This will create the boot-floppy on the floppy in drive a. The floppies should be pre-formatted on 720 KB / 1.44 MB for both the **dd** and **rawwrite** commands to work. Pre-formatting can be best done using the desktop format command. Some other utilities seem to be giving problems.

Since the 1.3 release, it is also possible to use HD-floppies. You should than use the floppy device `/dev/rfd0c` or add the **-H** flag to **rawwrite**.

The steps necessary to prepare the distribution sets for installation depend on which method of installation you choose. The various methods are explained below.

GEMDOS To install NetBSD from a GEMDOS partition, you need to get the NetBSD distribution sets you wish to install on your system on to a GEMDOS partition.

Note where you placed the files, you will need this later.

Once you have done this, you can proceed to the next step in the installation process, preparing your hard disk.

Tape To install NetBSD from a tape, you need to somehow get the NetBSD filesets you wish to install on your system on to the appropriate kind of tape. If you make the tape on a UNIX-like system, you can create it as follows:

```
# cd .../NetBSD-4.0_RC2/atari/binary/sets
# T=tape_device
# mt -f $T rewind
# for f in base etc comp games man misc text
    dd if=$f.tgz of=$T conv=osync bs=5k
# done
# mt -f $T rewind
```

where "tape_device" is the name of the (non-rewinding!) tape device that you're using (probably something like `/dev/nrst0`, but we make no guarantees 8-). If you can't figure it out, ask your system administrator.

Once you have done this, you can proceed to the next step in the installation process, preparing your hard disk.

Preparing your System for NetBSD installation

Preparing your hard disk for the NetBSD installation.

Note you will be modifying your HD's if you mess something up here you could lose everything on all the drives that you work with. It is therefore advised that you:

- Write down your current configurations. Do this by writing down all partition info (especially their sizes).
- *Back up the partitions you are keeping.*

If NetBSD has to share the disk with another operating system, you can either take care of partitioning your harddisk before installing NetBSD or delay this until the installer requests you to do it. If you decide to do it now, please create space for at least `/` (root), swap and `/usr` partitions and possibly at least one more for `/local` if you have the space. Whatever you decide, take note of the paragraphs below! You need this info to create bootable disks.

Warning: The AHDI partioning function erases all partions on your harddisk even if they are not changed! We know this is rather stupid, but don't say we didn't warn you.

If you want to use an AHDI partitioning scheme and you want to be able to boot directly into NetBSD, there are some constraints on the partition layout.

As you might know; every hard disk has a 'root sector' that contains information about the size of the hard disk and the partitions on the hard disk. The root sector can only contain the necessary data for four partitions. Nobody thought that this limitation would cause any problems. After all, 640 KByte should be enough. As hard disk grew, it was necessary to define more than four partitions. In order to be more or less compatible with the old format, a new type of partition entry was defined: XGM partions.

An XGM partition is a 'look over there' sign: Another root sector can be found at the start of the XGM partition. This root sector contains the remaining real partitions. And this is the big mystery: Partitions defined in the root sector of the hard disk are called 'primary partitions', partitions defined in the root sector of an XGM partition are called 'extended partitions'.

The bootblock will only work if the first NBD partition is a primary partition. This is not a limitation of NetBSD but a limitation of TOS/AHDI: You can only boot from primary partitions.

If you are creating your partitions with HDX, you'll have to be very careful to fulfill this rule. HDX has some very strange ideas when it comes to extended partitions. Fortunately, you can edit this stuff: The "Edit partition scheme of the unit" dialog box has a button labeled "expert". This button is inactive unless you have defined more than four partitions. Click on it *after* you have defined the sizes of the partitions.

A new dialog box appears on the screen. The left side contains two blocks of partitions; the upper block always contains the first four partitions, the lower block contains the last three partitions. If you have defined less than 7 partitions, some fields of the lower block will contain the string "unused". Some of the partitions will be displayed in reverse video: These are the extended partitions.

The right side contains six possible ranges for the extended partitions. It is not possible to define your own range, you will have to use one of the schemes offered by HDX. To quote from Ghostbusters: Choose and die. The default scheme used by HDX is the first scheme: Extended partitions start with the second partition and end with the second to last partition. If you have defined 7 partitions, partitions #2 to #5 will be extended partitions, while partitions #1, #6 and #7 will be primary partitions.

You can move the extended partition range by clicking on one of the buttons on the right side of the dialog box. Try to find one where your first NetBSD partition is a primary partition. Golden rules:

- If the disk contains no GEMDOS partitions, don't use AHDI. Let NetBSD handle it alone.
- If the disk contains one GEMDOS partition, make it partition #1 and start the extended partition range at partition #3. This allows you to boot from both the GEMDOS and the NetBSD partitions.
- If the disk contains two GEMDOS partitions, use partitions #1 and #2 for GEMDOS, partition #3 for NetBSD-root. Start the extended partition range with partition #4.
- If your disks contains three or more GEMDOS partitions, you are in trouble. Try using partitions #1 and #2 as the first two GEMDOS partitions. Use partition #3 as the first NetBSD partition. Start the extended partition range with partition #4. Put the other NetBSD extended partition range.

Booting the installer on an existing system

If you already have NetBSD installed, it is easy. Just boot into single user state on your current system, or use the **shutdown now** command to shutdown to single-user state. Then copy the installer using **dd**:

```
dd if=sysinst.fs of=/dev/rsd0b
```

where `/dev/rsd0b` should be the device path of the swap partition your system is configured to use. Once the file is copied, reboot back to the booter and use the '-b' option to make the kernel prompt for a root device. Now enter the swap device as your root device to start the installer.

Booting the installer on new systems.

If your system has more than 6MB RAM, you can skip directly to the section about **loadbsd.ttp,** since the amount of RAM is enough to load the installer into.

For new new installations on small memory systems, things are a bit more complicated. The easiest way is to mark an AHDI partition as id 'SWP'. You can either accomplish this with HDdriver or use the **chg_pid.ttp** program supplied on the bootfloppy. To use the fifth partition of your first drive to a swap partition, do the following:

```
chg_pid -w 0 4 SWP
```

As you can see, both the drive and the partition numbers are zero based.

When a swap partition has been created, you can transfer the installer using the **file2swp.ttp** command, which is also on the bootfloppy. This program copies a (gzipped)file to the first AHDI partition with id 'SWP' on the designated disk. To copy sysinst.fs to your first SCSI disk, use:

```
file2swp -w -f sysinst.fs s0
```

Note that **file2swp** automatically detects a gzipped file, there is no need for a .gz extension.

Using loadbsd.ttp

To start the installer, you first need to load a NetBSD kernel. This can be done in a couple ways, both of which currently require GEMDOS. You need either the bootfloppy provided in the distribution or you can copy the **loadbsd.ttp** program and kernel to a boot floppy disk (1.44 MB needed) or put them on a TOS partition. Select the loadbsd program and it will ask for parameters, supply: '**-b netbsd**' (or whatever name you copied the kernel to). You can, of course, also run it from the shell command-line in MiNT:

```
loadbsd -b a:/netbsd
```

You should see the screen clear and some information about your system as the kernel configures the hardware. Then you will be prompted for a root device. If you copied the installer to a swap partition, as explained above, you have to enter the swap partition as the boot device. When you used your first SCSI disk, this will be **sd0b.** On the first IDE drive it would be **wd0b.**

When you didn't copy the installer to swap, need to use the RAMdisk, so remove the GEMDOS kernel boot floppy from the drive if present and insert the NetBSD install floppy 1. Now enter the name of the boot device depending on the floppy type you have inserted. Use:

- **md0a** for the old installer (1MB filesystem) on 720KB floppy's.
- **md1a** for the sysinst installer on 720KB floppy's.
- **md2a** for the sysinst installer on 1.44MB floppy's.

The kernel will load the install file system into RAMdisk. While the kernel is loading, it will show a '.' for each track loaded. After loading 80 tracks, it will ask you to insert the next floppy. At this time, insert the NetBSD install floppy 2 and press any key. The kernel continues loading another 40 tracks before it continues to boot.

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 must have already prepared your hard disk as detailed in the section on preparing your system for install.

The following is a walk-through of the steps necessary to get NetBSD installed on your hard disk.

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. *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.

3. *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).
     - A floppy disk containing a suitable boot.fs and a floppy with the sysinst.fs image. See the "prepare" section about obtaining those.
     - A CD-ROM drive (SCSI or ATAPI), a hard disk and a minimum of 4 MB (TT030/Falcon) or 16 MB (Hades/Milan) of memory installed.
     - The hard disk should have at least 120 + *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
     - Boot the system as described above. You should be at the **sysinst** main menu.

```
.*********************************************.
* NetBSD-4.0_RC2 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. WARNING: If you want your disk to retain an AHDI compatible partitioning, make sure to use the 'existing' disk layout.
- 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/**.

4. *Booting NetBSD*

   Boot the system as described in the "Booting the installer" section above.

   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. You may want to read the boot messages, to notice your disk's name and geometry. Its name will be something like `sd0` or `wd0` and the geometry will be printed on a line that begins with its name. As mentioned above, you may need your disk's geometry when creating NetBSD's partitions. You will also need to know the name, to tell **sysinst** on which disk to install. 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.

   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.

5. *Network configuration*

   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.

6. *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`.

7. *Partitioning the disk*

   - Preparing a disk which will be used for GEM and NetBSD.

You will be prompted if you want an AHDI compatible partitioning on your disk. If you are installing NetBSD on a dedicated drive, just answer 'no' and skip to the next section.

If you answer 'yes', the **ahdilabel** program is started. You can now change the AHDI partition ID's on your root disk. Because NetBSD imposes a special ordering in disk partitions it uses for / (root) and swap. Also, because it wants to guard you against an unwanted demolition of partitions used by other systems, you have to tell it what partitions it is allowed to use. You have to mark the partition you want to use as swap SWP or (deprecated!) NBS and the other partitions as NBD. Note that all the changes you make to the ID's are reversible as long as you remember the original value. ahdilabel is capable of creating or changing an AHDI compatible partitioning on the disk, and in the partition-ID editor, the partitions are shown in the order that AHDI created them. When you leave this editor and continue with **sysinst,** your changes to the ID's do have consequences to the partition order! They will show up as follows:

`a`	the first NBD partition
`b`	the first SWP (or NBS) partition
`d (and up)`	the rest of the partitions in AHDI order

8. *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.

If you want to use NetBSD on an AHDI partitioned disk, you will have to use: **Use Existing**.

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-p`	Available for other use. Traditionally, `d` 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.

9. *Preparing your hard disk*

You are now at the point of no return. Apart from the changes you made with **ahdilabel** nothing has been modified on your disk yet. If you confirm that you want to install NetBSD, the partitions now assigned to NetBSD will be actually written to. 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.

10. *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'.

11. *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.

12. *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.

13. *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.

14. *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.

15. *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.

16. *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 then set a password for the "root" account, to prevent the machine coming up without access restrictions.

17. *Finalizing your installation*

    Congratulations, you have successfully installed NetBSD 4.0_RC2 . 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. Select the proper terminal devices

   You will have to edit the `/etc/ttys` file. If you don't have a Milan, you must disable the `ttyEx` devices. For the Milan, you will have to disable the `ttyex` devices. This is easy, just change 'on' to 'off' on the corresponding lines.

3. 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? [...]`.

4. 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.

5. 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.

6. 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 `4.0_RC2/atari/All` subdir. You can install them with the following commands under `sh`(1):

  ```
  # PKG_PATH=ftp://ftp.NetBSD.org/pub/NetBSD/packages/4.0_RC2/atari/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 firefox
  ...
  ```

  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/4.0_RC2/atari/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 Firefox 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 commands:

  ```
  # 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.

7. 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 4.0_RC2 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 first boot the system as described in the **Booting the installer** section. 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 4.0_RC2 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 4.0_RC2 .

Issues affecting an upgrade from NetBSD 2.1 and older releases.

See the section below on upgrading from NetBSD 3.x as well.

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.

Issues affecting an upgrade from NetBSD 3.x releases.

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/daily`
  - `/etc/weekly`
  - `/etc/monthly`
  - `/etc/security`
  - `/etc/rc.subr`
  - `/etc/rc`
  - `/etc/rc.shutdown`
  - `/etc/rc.d/*`
  - `/etc/envsys.conf`

The following issues need to be resolved manually:

- The users '_proxy' and 'authpf' and the groups '_proxy' and 'rwhod' need to be created and the user 'uucp' needs to be updated.
- A number of things have been removed from the NetBSD 4.0_RC2 release including: the evbsh5 port, the Fortran 77 compiler (g77), NETCCITT, NETNS, Sendmail, Sushi, UUCP, and Vinum. If you were using any of these, then please see the "Components removed from NetBSD" section near the beginning of this document.

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.

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  Ralph Campbell
  Mike Karels
  Marshall Kirk McKusick

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- 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.
- We list the individuals and organizations that have made donations or loans of hardware and/or money, to support NetBSD development, and deserve credit for it at *.:* **http://www.NetBSD.org/donations** (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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