NAME

INSTALL – Installation procedure for NetBSD/mmeye.

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DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 2.0.2 on the *mmeye* 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 2.0.2 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 2.0.1 and 2.0.2 updates

The NetBSD 2.0.2 release is the second security/critical update of the NetBSD 2.0 release branch. This represents a selected subset of fixes deemed critical in nature for stability or security reasons. All of these fixes will also appear on future NetBSD releases (e.g. NetBSD 2.1 , etc) from the NetBSD 2.0 release branch as well.

Specific updates are as follows:

Kernel

- Avoid endless loop in F_CLOSEM fnctl which could be abused for a local DOS.
- Avoid possible security issues on amd64, x86 and xen by properly checking range for copyinstr and copyoutstr.
- Make pmap_map() work on sun4 machines so these are usable again.
- Fix a UVM problem that causes hangs when large processes fork.
- Fix pthreads on sun4c hardware by fixing a problem with detecting faults in atomic load/store instructions.
- Address further pthread issues on sparc and sparc64 by defining a new LWP flag which indicates that we're in the process of doing a context switch.
- Make sun3 port functional again by restoring the definition for MAXPHYS as it is now used rather than MAXBSIZE to limit page cache I/O sizes.
- Prevent lockups/panics if the VOP_LOOKUP() call unlocked the parent directory node.

- Prevent a kernel panic on boot with a PX graphics card on DECstations.
- Fix prep port to be functional by ensuring that the OpenPIC register window is mapped during startup.
- Clear freed memory in `cgd`(4) code to avoid possibly security issues.

Networking

- Disabled the oow test in ipf because it is killing valid packets.
- Prevent deadlock/panic on NFS clients after NFS server reboots and caches aren't in sync.
- Fix an NFS panic caused by truncating a file while another client is writing data to it.
- Avoid infinite loops when getting NFS readdir response without any entries or EOF.
- Fix possible remote DOS via IPSec AH packets.

System administration and user tools

- Teach groff about NetBSD versions that aren't on the branches documentation.
- Add description for Solaris 10 dual boot installation.
- Document PTHREAD_CONCURRENCY.
- Fix bug in binutils which broke Firefox under NetBSD-sparc64.
- Address xpm security problems reported in CAN-2005-0605.

mmeye specific

Changes Between The NetBSD 2.0 release and 2.0.1 update

The NetBSD 2.0.1 release is the first security/critical update of the NetBSD 2.0 release branch. This represents a selected subset of fixes deemed critical in nature for stability or security reasons. All of these fixes will also appear on future NetBSD releases (e.g. NetBSD 2.1 , etc) from the NetBSD 2.0 release branch as well.

Specific updates are as follows:

Kernel

- Prevent panics on powerpc with DIAGNOSTIC kernels and trap handling.
- Make the macppc INSTALL kernel bootable again by moving the load address to the correct location.
- Fix a major issue with sparc64 pmap to prevent crashes under heavy load.
- Fix major performance issue with xen port so idle loop doesn't consume 100% of cpu time.
- Fix xen port so it can reboot cleanly instead of hanging.
- MMU fixes for sh3 based ports to prevent reboots under heavy load.

Networking

- Fix major performance issues with the i82547 Gig-E chip which improves performance with `wm`(4)
- Fix problems with `sk`(4) performance on ASUS A8V motherboards.
- Prevent panics in ipf when receiving IPv6 packets.
- NFS fixes to address incorrect atimes updates and cache coherancy issues.

System administration and user tools

- Fix `swapcontext`(3) for amd64 so that it works correctly.

mmeye specific

Changes Between The NetBSD 1.6 and 2.0 Releases

The NetBSD 2.0 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 over two years of development that went into the NetBSD 2.0.2 release. Some highlights include:

Kernel

- Ports to new platforms including: amd64, evbsh5, and xen.
- Native thread support has been added, based on Scheduler Activations. Applications which support native threads can now take full advantage of the high-performance NetBSD POSIX threads implementation.
- Kernel events notification framework - kqueue kqueue provides a stateful and efficient event notification framework. Currently supported events include socket, file, directory, fifo, pipe, tty and device changes, and monitoring of processes and signals. kqueue is supported by all writable filesystems in the NetBSD tree (with the exception of Coda) and all device drivers supporting poll(2).
- Improvements have been made to NetBSD's Linux emulation to support the latest Sun JDK/JRE for Linux. Testing has shown that it now runs as well as it does on Linux natively.
- NetBSD 2.0 enforces non-executable mappings on many platforms. This means that parts of the stack and heap are made non-executable when they are marked writable. This makes exploiting potential buffer overflows harder.
- For the i386 port it now supports SMP and has a new ACPI and power management framework which takes advantage of Intel's ACPI implementation.
- The macppc port also now supports SMP as well as hardware support for newer G4 models has been added.
- SMP support has been added to the sparc port as well.
- New generic i2c framework, supporting bit-bang and "intelligent" controllers.
- `sysctl`(9) was switched from a static binding to a dynamic implementation.
- Add a new driver `satalink`(4) and move SATA support from other controllers into this along with adding support for new controllers.

Networking

- `ipf`(8) has been upgraded to version 4.1.3.
- `tcp`(4) now implements path MTU discovery blackhole detection (i.e. it will turn off path MTU discovery if the connection is losing).
- Socket buffer insertion is now O(C). This can provide a substantial performance boost to some applications which use large socket buffers.

- `wi`(4) has support for Host-AP mode, allowing Intersil Prism2/2.5/3-based boards to be used to make an 802.11 Access Point.
- Support for `ipf`(8) has been added to `bridge`(4) and `brconfig`(8)
- Change port allocation from linked list to a hash table for better performance.

File system

- FreeBSD's UFS2 has been ported to NetBSD. UFS2 is an extension to FFS, adding 64 bit block pointers and support for extended file storage. Among other enhancements, UFS2 allows for file systems larger than 1Terabyte.
- The cryptographic disk driver (cgd) can be used to encrypt disks or partitions, using some strong encryption algorithms, like AES (Rijndael) and Blowfish. cgd can also be configured to encrypt swap.

Security

- The systrace utility has been added to the system. systrace monitors and controls an application access to the system by enforcing access policies for system calls. The systrace utility might be used to trace an untrusted application's access to the system. In addition, it can be used to protect the system from software bugs (such as buffer overflows) by constraining a daemon's access to the system. The privilege elevation feature of systrace can be used to obviate the need to run large, untrusted programs as root when only one or two system calls require the elevated privilege.
- Verified Exec support has been added in this release. Verified Exec verifies a cryptographic hash before allowing execution of binaries and scripts. This can be used to prevent a system from running binaries or scripts which have been illegally modified or installed. In addition, Verified Exec can also be used to limit the use of script interpreters to authorized scripts only and disallow interactive use.

System administration and user tools

- Switched from the GPL version to a non-GPL version of various tools including gzip and awk.

Miscellaneous

- NetBSD 2.0 supports a new toolchain based on gcc 3.3.3 and binutils 2.14. gcc 3.3.1 adds support for a number of CPU targets and greatly improved support for i386 and other targets. The support for new platforms in gcc 3.3.3 has enabled the porting of NetBSD to even more architectures.
- Updates of most third party packages that are shipped in the base system to the following latest stable releases:
  - bind 8.3.7
  - binutils 2.14
  - cvs 1.11.17
  - diffutils 2.8.1
  - file 4.08
  - gcc 3.3.3
  - gdb 5.3
  - grep 2.5.1
  - groff 1.19
  - less 381
  - openssl 0.9.7d
  - postfix 2.0.19
  - sendmail 8.12.11
  - tcpump 3.7.1

  - texinfo 4.6

- Many new packages in the *pkgsrc* system, including the latest open source desktop KDE3, OpenOffice, perl, Apache and many more. A number of new platforms are supported, including Darwin, FreeBSD, IRIX, Linux, OpenBSD and Solaris. Support for various other platforms (among them AIX, BSD/OS and HP-UX) is currently being worked on thanks to our new, portable bootstrap kit which makes it much simpler to port pkgsrc support to new operating systems. At the time of writing, there are over 4500 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.

mmeye specific

This is a non formal release of NetBSD/mmeye.

NetBSD/mmeye brings the NetBSD operating system to Brains mmEye systems, which uses Hitachi SH-3 CPU.

Important notes about NetBSD 2.0.2

- As noted above, the sendmail third-party program has been upgraded since the last release. The new version of sendmail runs without requiring being set-user-ID to ''root''.

  In order to retain the functionality that a newly installed system can send mail ''out of the box'', the default has changed so that sendmail will now start by default, and listen for host-local connections.

  If this behaviour is not desired, you can either
  1. explicitly set the sendmail variable to ''NO'' in `/etc/rc.conf`,
  2. modify `/etc/mail/submit.cf` to point to another host,
  3. modify `/etc/mailer.conf` to point to something else than sendmail, or
  4. make sendmail set-user-ID to ''root'', remove `/etc/mail/submit.cf`, and set the sendmail_suid variable to ''YES'' in `/etc/rc.conf`.

  The latter method is strongly discouraged.

The Future of NetBSD

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

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

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

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

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

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

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

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

Sources of NetBSD

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

NetBSD 2.0.2 Release Contents

The root directory of the NetBSD 2.0.2 release is organized as follows:

`.../NetBSD-2.0.2/`

`CHANGES`	Changes since earlier NetBSD releases.
`LAST_MINUTE`	Last minute changes.
`MIRRORS`	A list of sites that mirror the NetBSD 2.0.2 distribution.
`README.files`	README describing the distribution's contents.
`TODO`	The NetBSD 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 2.0.2 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 2.0.2 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.
37 MB gzipped, 176 MB uncompressed

syssrc This set contains the sources to the NetBSD 2.0.2 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/mmeye subdirectory structure

The mmeye-specific portion of the NetBSD 2.0.2 release is found in the `mmeye` subdirectory of the distribution: `.../NetBSD-2.0.2/mmeye/`. 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/` mmeye binary distribution sets; see below.

`installation/`
`misc/`

Binary distribution sets

The NetBSD mmeye binary distribution sets contain the binaries which comprise the NetBSD 2.0.2 release for the mmeye. The binary distribution sets can be found in the `mmeye/binary/sets` subdirectory of the NetBSD 2.0.2 distribution tree, and are as follows:

base The NetBSD 2.0.2 mmeye **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.
17 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.
20 MB gzipped, 71 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-GENERIC
This set contains a NetBSD/mmeye 2.0.2 `GENERIC` kernel, named `/netbsd`. You *must* install this distribution set.
-unset- MB gzipped, -unset- 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.
7 MB gzipped, 18 MB uncompressed

xcomp The extra libraries and include files needed to compile X source code.
12 MB gzipped, 39 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.
4 MB gzipped, 8 MB uncompressed

The mmeye 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 mmeye binary distribution also has its own checksum files, just as the source distribution does.

NetBSD/mmeye System Requirements and Supported Devices

NetBSD/mmeye runs on Brains mmEye, with Hitachi SH-3 CPU.

Supported devices

- Console devices
  - On-board Serial port
- Storage devices
  - Flash ATA card, CF card (wd)
- Network interfaces
  - 3Com 3c589 and 3c562 Ethernet (ep)
  - MB8696x based Ethernet (mbe)
  - NE2000-compatible Ethernet (ne)
  - Megahertz Ethernet (sm)
- Input devices
  - On-board serial port
  - PCMCIA Modems
- Miscellaneous
  - Battery-backed real-time clock.

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 `mmeye/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 `mmeye/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 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 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-2.0.2
# cd mmeye/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

Installing the NetBSD System

Installation mechanism is yet to be provided.

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 `2.0.2/mmeye/All` subdir. You can install them with the following commands under `sh`(1):

  ```
  # PKG_PATH=ftp://ftp.NetBSD.org/pub/NetBSD/packages/2.0.2/mmeye/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/2.0.2/mmeye/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 commands:

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

  After extracting, see the `README` and `Packages.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 2.0.2 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 2.0.2 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 2.0.2.

Issues affecting an upgrade from NetBSD 1.6

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

```
mkdir /tmp/upgrade
cd /tmp/upgrade
pax -zrpe -f /path/to/etc.tgz
./etc/postinstall -s `pwd` check
./etc/postinstall -s `pwd` 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/*

- The following files are now obsolete: /etc/rc.d/fsck.sh /etc/rc.d/gated /etc/rc.d/kerberos /etc/rc.d/NETWORK /etc/rc.d/systemfs /etc/rc.d/xntpd and /etc/rc.d/ypset.
- The users and groups 'smmsp', needs to be created, 'news' is no longer part of the system.

The following issues need to be resolved manually:

- postfix(8) configuration files require upgrading.

```
cd /usr/share/examples/postfix
cp post-install postfix-files postfix-script /etc/postfix
postfix check
```

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

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