**NAME**

**INSTALL** — Installation procedure for NetBSD/hpcmips.

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## DESCRIPTION

### About this Document

This document describes the installation procedure for NetBSD 6.0.3 on the *hpcmips* 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 57 different system architectures (ports) across 15 distinct CPU families, and is being ported to more. The NetBSD 6.0.3 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. Please see the NetBSD web site at **http://www.NetBSD.org/** for information on them.)

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 6.0.2 and 6.0.3 Releases

The complete list of changes can be found in the CHANGES-6.0.3:

**http://ftp.NetBSD.org/pub/NetBSD/NetBSD-6.0.3/CHANGES-6.0.3**

file in the top level directory of the NetBSD 6.0.3 release tree. An abbreviated list is as follows:

*Security Advisory Fixes*

- NetBSD-SA2013-005:
  **http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2013-005.txt.asc**
  bind Denial of Service (CVE-2013-4854)
- NetBSD-SA2013-006:
  **http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2013-006.txt.asc**
  Arbitrary Kernel Read with netstat -P
- NetBSD-SA2013-007:
  **http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2013-007.txt.asc**
  Protocol handling issues in X Window System client libraries

- NetBSD-SA2013-008:
  **http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2013-008.txt.asc**
  Error in authorization check re tcpdrop sysctl
- NetBSD-SA2013-009:
  **http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2013-009.txt.asc**
  user settable small BPF buffer can cause a panic

Advisories prior to NetBSD-SA2013-005 do not affect NetBSD 6.0.3: *.:*
**http://www.NetBSD.org/support/security/patches-6.0.3.html**

*Kernel*

- `virtio`(4): Fixed a panic during shutdown on KVM. (PR#48105): **http://gnats.netbsd.org/48105**
- `uhci`(4): Fixed USB device enumeration in some cases, fixed some ops on big-endian machines. (PR#47522, : **http://gnats.netbsd.org/47522** PR#48237): **http://gnats.netbsd.org/48237**

*Networking*

- Include BRDADDR and NETMASK in the IPv4 ioctls we ban for IPv6.
- Added 4 new sysctls to help avoid IPv6 DoS attacks.
- Prevent a panic in `mpls`(4) due to kmem abuse.
- Fixed a crash destroying `tap`(4) interfaces after deleting the link-local address. (PR#47576): **http://gnats.netbsd.org/47576**

*File Systems*

- nilfs: Fixed a serious file-read problem. (PR#45605): **http://gnats.netbsd.org/45605**
- procfs: Fixed a problem in an error case in procfs_domap(). (PR#48048): **http://gnats.netbsd.org/48048**
- udf: Fixed a problem which could result in garbage after the 4GB limit.

*Miscellaneous*

- `pthread`(3): Fixed error return from pthread_create() in some cases.
- Update tzdata to 2013e.
- Update IPv6 DNS servers in sysinst.
- MAKEDEV: the console major number is not always 0.
- Update some TNF ssh keys in /etc/ssh/ssh_known_hosts.
- i386/amd64: fix some i387/FP issues. (PR#46108): **http://gnats.netbsd.org/46108**
- Fixed build of NetBSD 6.0.x on netbsd-current. (PR#47922): **http://gnats.netbsd.org/47922**
- Fixed vax build issues.
- Fixed an environment issue which could cause crashes in Emacs 24 and certain other applications.
- pkg_install: Fixed installation of signed packages. (PR#48194): **http://gnats.netbsd.org/48194**
- mvme68k: Fixed boot panic. (PR#45915): **http://gnats.netbsd.org/45915**
- Fixed a crash in `curses`(3) for some terminals.

**The NetBSD Foundation**

The NetBSD Foundation is a tax exempt, not-for-profit 501(c)(3) corporation that devotes itself to the traditional goals and Spirit of the NetBSD Project and owns the trademark of the word "NetBSD". It supports the design, development, and adoption of NetBSD worldwide. More information on the NetBSD Foundation, its composition, aims, and work can be found at: **http://www.NetBSD.org/foundation/**

**Sources of NetBSD**

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

**NetBSD 6.0.3 Release Contents**

The root directory of the NetBSD 6.0.3 release is organized as follows:

`.../NetBSD-6.0.3/`

`CHANGES` Changes between the 5.0 and 6.0 releases.

`CHANGES-6.0` Changes between the initial 6.0 branch and final release of 6.0.

`CHANGES-6.0.1`
Changes between the 6.0 and 6.0.1 releases.

`CHANGES-6.0.2`
Changes between the 6.0.1 and 6.0.2 releases.

`CHANGES.prev` Changes in previous NetBSD releases.

`LAST_MINUTE` Last minute changes and notes about the release.

`README.files` README describing the distribution's contents.

`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 6.0.3 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.

**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.

**src** This set contains all of the base NetBSD 6.0.3 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.

**syssrc** This set contains the sources to the NetBSD 6.0.3 kernel for all architectures as well as the `config`(1) utility.

**xsrc** This set contains the sources to the X Window System.

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:

`MD5` MD5 digests in the format produced by the command:
**`cksum -a MD5`** *`file`*.

`SHA512` SHA512 digests in the format produced by the command:
**`cksum -a SHA512`** *`file`*.

The SHA512 digest is safer, but MD5 checksums are provided so that a wider range of operating systems can check the integrity of the release files.

*NetBSD/hpcmips subdirectory structure*

The hpcmips-specific portion of the NetBSD 6.0.3 release is found in the `hpcmips` subdirectory of the distribution: `.../NetBSD-6.0.3/hpcmips/`. 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. This kernel runs on Vr41xx and TX3922 CPUs only.

`netbsd-TX3912.gz`
A kernel for TX3912 machines.

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

`installation/`
`misc/` Miscellaneous hpcmips installation utilities; see installation section below.

*Binary distribution sets*

The NetBSD hpcmips binary distribution sets contain the binaries which comprise the NetBSD 6.0.3 release for hpcmips. The binary distribution sets can be found in the `hpcmips/binary/sets` subdirectory of the NetBSD 6.0.3 distribution tree, and are as follows:

**base** The NetBSD 6.0.3 hpcmips **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.

**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.

**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.

**games** This set includes the games and their manual pages.

**kern-GENERIC**
This set contains a NetBSD/hpcmips 6.0.3 `GENERIC` kernel, named `/netbsd`. You *must* install this distribution set.

**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.

**misc** This set includes the system dictionaries, the typesettable document set, and other files from `/usr/share`.

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

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 X.Org. Binary sets for the X Window System are distributed with NetBSD. The sets are:

**xbase** The basic files needed for a complete X client environment. This does not include the X servers.

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

**xfont** Fonts needed by the X server and by X clients.

**xetc** Configuration files for X which could be locally modified.

**xserver** The X server. This includes the modular Xorg server which supports 256 and 65536 colors, with man pages.

The hpcmips 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 -xzpf`** command from the root directory ( `/` ) of your system.

Additional kernels to those included in the distribution sets may be found in the `hpcmips/binary/kernels` subdirectory of the NetBSD 6.0.3 distribution tree. These kernels are generally named something like `netbsd-GENERIC.gz` or some other suitable name. Please note that these kernels are simply gzipped and are not in tar archives.

The Windows CE-based utilities necessary for installing and running NetBSD can be found in the `hpcmips/installation/` subdirectory of the NetBSD 6.0.3 distribution tree. The important files in this directory are as follows:

`netbsd.gz` NetBSD/hpcmips kernel with system installer (**`sysinst`**). This kernel runs on Vr41xx and TX3922 CPUs only.

`netbsd-TX3912.gz`
NetBSD/hpcmips kernel with system installer (**`sysinst`**). This kernel runs on TX3912 CPU only.

`hpcboot.exe` The NetBSD/hpcmips boot loader utility. This program is used to boot the NetBSD kernel from within Windows CE (version 2.11 and later).
*111 KB*

`pbsdboot.exe` The NetBSD/hpcmips boot loader utility. This program is used to boot the NetBSD kernel from within Windows CE (version 2.0 and later).
*176 KB*

`pbsdboot1.exe` The NetBSD/hpcmips boot loader utility. This program is used to boot the NetBSD kernel from within Windows CE (version 1.01).
*191 KB*

These `*.exe` files are Windows CE binaries. If you need them, the sources for these utilities are in the `src/arch/hpc/stand/` and the `src/arch/hpcmips/stand/` directories.

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

**NetBSD/hpcmips System Requirements and Supported Devices**

A H/PC machine contains a keyboard and a touch screen and generally has 8 MB or more of RAM. The port supports the HPC form factor, as well as the H/PC Pro and PsPC (Palmsized PC) form factors.

*Supported WindowsCE machines*

- CASIO
  - CASSIOPEIA for DoCoMo
  - CASSIOPEIA E-55
- Compaq
  - C Series 2010c (TX3912)
  - C Series 810 (TX3912)
- Everex
  - FreeStyle A-10 (optional memory card required)
  - FreeStyle A-15
  - FreeStyle A-20
- Fujitsu
  - INTERTOP CX300
  - INTERTOP CX310
  - PenCentra 130
- NEC
  - MobileGear MC-CS12
  - MobileGear MC-CS13
  - MobileGearII MC-R300
  - MobileGearII MC-R320
  - MobileGearII MC-R330
  - MobileGearII for DoCoMo (TypeI/II)
  - MobileGearII MC/R430
  - MobileGearII MC-R500
  - MobileGearII MC-R510
  - MobileGearII MC-R520
  - MobileGearII MC/R530
  - MobileGearII MC-R700
  - MobileGearII MC/R730
  - MobilePro 750C
  - MobilePro 770
  - MobilePro 780
  - MobilePro 800
  - MobilePro 880
- IBM
  - WorkPad z50
- Sharp

  - mobilon TRIPAD PV-6000
  - mobilon HC-4100 (TX3912)
  - Telios HC-AJ1 (TX3922)
  - Telios HC-AJ2 (TX3922)
- Vadem
  - Clio C-1000
  - Clio C-1050
- NTT DoCoMo
  - Sigmarion
  - Sigmarion II (experimental)

*Note:* You need 16 MB or larger RAM on a machine for self installation.

*Supported WindowsCE devices*

- CPUs
  - Vr4102-based
  - Vr4111-based
  - Vr4121-based
  - Vr4122-based
  - Vr4131-based
  - TX3912-based: TX3912 machines are not supported with installation kernel and GENERIC kernel. Use special kernel for TX3912 (netbsd-TX3912.gz).
  - TX3922-based
- RAM requirements
  - 8 MB of RAM is required to run NetBSD/hpcmips. 4 MB is insufficient for most purposes.
- Console devices
  - built-in LCD screen
  - built-in keyboard
  - serial port (with boot option '`h`')
- Storage devices
  - Flash ATA card, CF card (wd)
  - SCSI disk (sd)
  - Adaptec APA-1460[Slim SCSI](aic)
- Network interfaces
  - 3Com 3c589 and 3c562 Ethernet (ep)
  - MB8696x based Ethernet (mbe)
  - NE2000-compatible Ethernet (ne)
  - Megahertz Ethernet (sm)
- Input devices
  - Keyboard.
  - Touchscreen.
- Miscellaneous
  - Battery-backed real-time clock.

**Getting the NetBSD System on to Useful Media**

Installation is supported from several media types, including:

- CD-ROM / DVD
- 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 `hpcmips/binary/sets`.

Proceed to the instructions on installation.

*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.

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.

*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 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.

*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 **kern-GENERIC, 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-6.0.3
# cd hpcmips/binary
# tar -cf tape_device kern-GENERIC base etc
```

*Note:* You still need to fill in *tape_device* in the example.

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

**Preparing your System for NetBSD installation**

First and foremost, before beginning the installation process, *make sure you have a reliable backup* of any data on your Windows CE memory and settings that you wish to keep. Sadly, there is no freely available program to accomplish this task, so you must use ActiveSync or another commercially available program to backup your Windows CE machine before installing NetBSD/hpcmips.

**Installing the NetBSD System**

Boot with bootloader and `netbsd` in `installation` directory. **sysinst** will automatically start.

The NetBSD/hpcmips kernel and system install consume about 7 MB of memory. Please configure the Windows CE memory setting to allow this amount of memory to be used. If bootloader failed with a "cannot allocate heap" error, configure more RAM for memory and less for disk with the dialog at [Setting]->[ControlPanel]->[System]->[Memory] under Windows CE.

*Running the sysinst installation program*

1. *Introduction*

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

2. *Possible hardware problems*

   Should you encounter hardware problems during installation, try rebooting after unplugging removable devices you don't need for installation. Non-removable devices can be disabled with **userconf** (use **boot -c** to enter it).

3. *General*

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

4. *Quick install*

   First, let's describe a quick install. The other sections of this document go into the installation procedure in more detail, but you may find that you do not need this. If you want detailed instructions, skip

to the next section. This section describes a basic installation, using a CD-ROM install as an example.

- What you need.
  - The distribution sets (in this example, they are on CD).
  - One 1.44 MB 3.5" floppy.
  - A CD-ROM drive (SCSI), a hard disk and a minimum of of memory installed.
  - The hard disk should have at least + *n* megabytes of space free, where *n* is the number of megabytes of main memory in your system. If you wish to install the X Window System as well, you will need at least 215 MB more.
- The Quick Installation
  - Insert the first boot floppy you just created and boot the computer. After language selection, the main menu will be displayed.

```
.*********************************************.
* NetBSD-6.0.3 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                              *
* f: Config menu                               *
* x: Exit Install System                       *
.*********************************************.
```

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

5. *Booting NetBSD*

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

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

   It will take a while to load the kernel from the floppy, probably around a minute or so, then, the kernel boot messages will be displayed. This may take a little while also, as NetBSD will be probing your sys-

tem to discover which hardware devices are installed. The most important thing to know is that `wd0` is NetBSD's name for your first IDE disk, `wd1` the second, etc. `sd0` is your first SCSI disk, `sd1` the second, etc.

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

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

6. *Network configuration*

   If you do not intend to use networking 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 when asked to provide a server.

7. *Installation drive selection and parameters*

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

   The first thing is to identify the disk on which you want to install NetBSD. **`sysinst`** will report a list of disks it finds and ask you for your selection. You should see disk names like `sd0` or `sd1`.

8. *Selecting which sets to install*

   The next step is to choose which distribution sets you wish to install. Options are provided for full, minimal, and custom installations. If you choose sets on your own, **base**, **etc**, and a kernel must be selected.

9. *Partitioning the disk*

   - Which portion of the disk to use.

     You will be asked if you want to use the entire disk or only part of the disk. If you decide to use the entire disk for NetBSD, **`sysinst`** will check for the presence of other operating systems and you will be asked to confirm that you want to overwrite these.

10. *Editing the NetBSD disklabel*

    The partition table of the NetBSD part of a disk is called a *disklabel*. If your disk already has a disklabel written to it, you can choose **`Use existing partition sizes`**. Otherwise, select **`Set sizes of NetBSD partitions`**.

    After you have chosen your partitions and their sizes (or if you opted to use the existing partitions), you will be presented with the layout of the NetBSD disklabel and given one more 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` The entire disk.

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

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

11. *Preparing your hard disk*

    *You are now at the point of no return*. Nothing has been written to your disk yet, but if you confirm that you want to install NetBSD, your hard drive will be modified. If you are sure you want to proceed, select **yes**.

    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.

12. *Getting the distribution sets*

    The NetBSD distribution consists of a number of *sets* that come in the form of gzipped tarfiles. At this point, 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'.

13. *Installation from CD-ROM*

    When installing from a CD-ROM, you will be asked to specify the device name for your CD-ROM drive (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 using ftp*

    To be able to install using ftp, you first need to configure your network setup if you haven't already done so. **`sysinst`** will do this for you, asking you if you want to use DHCP. If you do not use DHCP, you can enter network configuration details yourself. If you do not have DNS set up for the machine that you are installing on, you can just press `RETURN` in answer to this question, 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, 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.

15. *Installation using NFS*

    To be able to install using NFS, you first need to configure your network setup if you haven't already done so. **`sysinst`** will do this for you, asking you if you want to use DHCP. If you do not use DHCP, you can enter network configuration details yourself. If you do not have DNS set up for the machine that you are installing on, you can just press `RETURN` in answer to this question, 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, you will need to specify an IP address instead of a hostname for the NFS server.

16. *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.

17. *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.

18. *Extracting the distribution sets*

    A progress bar will be displayed while the distribution sets are being extracted.

    After all the files have been extracted, the 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.

19. *Configure additional items*

    The next menu will allow you to select a number of additional items to configure, including the time zone that you're in, to make sure your clock has the right offset from UTC, the root user's shell, and the initial root password.

    You can also enable installation of binary packages, which installs the `pkgin`(1) tool for managing binary packages for third-party software. This will feel familiar to users of other package tools, such as **`apt-get`** or **`yum`**. Or, you can install the `pkgsrc`(7) tree for installing third-party software from source.

    Finally, you can enable some daemons such as `sshd`(8), `ntpd`(8), or `mdnsd`(8).

20. *Finalizing your installation*

    Congratulations, you have successfully installed NetBSD 6.0.3. 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. The most important steps are 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).

When you have finished editing /etc/rc.conf, type **exit** at the prompt to leave the single-user shell and continue with the multi-user boot.

Other values that may need to be set in /etc/rc.conf for a networked environment are *hostname* and possibly *defaultroute*. You may also need to add an *ifconfig_int* for your ⟨int⟩ network interface, along the lines of

```
ifconfig_ne0="inet 192.0.2.123 netmask 255.255.255.0"
```

or, if you have *myname.my.dom* in /etc/hosts:

```
ifconfig_ne0="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. 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.

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 installed the X Window System, you may want to read the chapter about X in the NetBSD Guide:
   **http://netbsd.org/docs/guide/en/chap-x.html**

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, pkgsrc. pkgsrc automatically handles any changes necessary to make the software run on NetBSD. This includes the retrieval and installation of any other packages on which the software may depend.

   - More information on the package system is available at
     **http://www.NetBSD.org/docs/software/packages.html**

- A list of available packages suitable for browsing is at
  **ftp://ftp.NetBSD.org/pub/pkgsrc/current/pkgsrc/README.html**
- Precompiled binaries can be found at
  **ftp://ftp.NetBSD.org/pub/pkgsrc/packages/NetBSD/**
  usually in the `hpcmips/6.0.3/All` subdir. If you installed `pkgin`(1) in the **sysinst** post-installation configuration menu, you can use it to automatically install binary packages over the network. Assuming that `/usr/pkg/etc/pkgin/repositories.conf` is correctly configured, you can install them with the following commands:

  ```
  # pkgin install tcsh
  # pkgin install bash
  # pkgin install perl
  # pkgin install apache
  # pkgin install kde
  # pkgin install firefox
  ...
  ```

  *Note:* Some mirror sites don't mirror the `/pub/pkgsrc` directory.

  The above commands will install the Tenex-csh and Bourne Again shells, the Perl programming language, Apache web server, KDE desktop environment and the Firefox web browser as well as all the packages they depend on.
- If you did not install it from the **sysinst** post-installation configuration menu, the `pkgsrc`(7) framework for compiling packages can be obtained by retrieving the file
  **ftp://ftp.NetBSD.org/pub/pkgsrc/pkgsrc.tar.gz**.
  It is typically extracted into `/usr/pkgsrc` (though other locations work fine) with the commands:

  ```
  # cd /usr
  # tar -zxpf pkgsrc.tar.gz
  ```

  After extracting, see the `doc/pkgsrc.txt` file in the extraction directory (e.g., `/usr/pkgsrc/doc/pkgsrc.txt`) 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/postfix/main.cf` file will almost definitely need to be adjusted. If you prefer a different MTA, then install it using pkgsrc or by hand and 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 easiest way to upgrade to NetBSD 6.0.3 is with binaries, and that is the method documented here.

To do the upgrade, you must have one form of boot media available. You must also have at least the **base** and **kern** binary distribution sets available. 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, boot blocks, 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 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. Also, file systems are checked before unpacking the sets. Fetching the binary sets is done in the same manner as the installation procedure; refer to the installation part of the document for help.

After a new kernel has been copied to your hard disk, your machine is a complete NetBSD 6.0.3 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 6.0.3.

Note that **sysinst** will automatically invoke

```
postinstall fix
```

and thus all issues that are fixed by **postinstall** by default (see below) will be handled.

*Issues affecting an upgrade from NetBSD 5.x releases*

The pthread libraries from previous versions of NetBSD require that the `sysctl`(3) node `kern.no_sa_support` be set to `0`. This affects the following environments:

- Running a 5.0 kernel with an older userland.
- Running an older userland inside a chroot'ed environment on a 5.0 system.
- Running older statically linked pthread applications.

The 5.0 kernel defaults to `0` for `kern.no_sa_support`, which covers the first case. However, please note that a full installation of 5.0 (either from scratch or through an upgrade) will set `kern.no_sa_support` to 1 during the boot process. This means that for the last two cases, you will have to manually set `kern.no_sa_support` to `0`, using either the `sysctl`(8) command or through `sysctl.conf`(5).

The implementation of SHA2-HMAC in KAME_IPSEC as used in NetBSD-5 and before did not comply to current standards. FAST_IPSEC does, with the result that old and new systems cannot communicate over IPSEC, if one of the affected authentication algorithms (hmac_sha256, hmac_sha384, hmac_sha512) is used.

*Issues affecting an upgrade from NetBSD 4.x releases*

The following issues can generally be resolved by running *postinstall* with the **etc** set:

```
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 '_httpd' and '_timedc' and the groups '_httpd' and '_timedc' need to be created.
- Unprivileged use of the `mount`(8) command now requires the *`nosuid`* and *`nodev`* options to be explicitly specified. Previously, these options were automatically enforced even if they were not explicitly specified.
- A number of things have been removed from the NetBSD 6.0.3 release. See the "Components removed from NetBSD" section near the beginning of this document for a list.

**Using online NetBSD documentation**

Documentation is available if you installed 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. See **http://www.NetBSD.org/mailinglists/** for a web interface.

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.

Bugs also can be submitted and queried with the web interface at
**http://www.NetBSD.org/support/send-pr.html**

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-users@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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- 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 be mentioned, tell us!)

**We are...**

(in alphabetical order)

*The NetBSD core group:*

| | |
|---|---|
| Alan Barrett | apb@NetBSD.org |
| Alistair Crooks | agc@NetBSD.org |
| Matthew Green | mrg@NetBSD.org |
| Chuck Silvers | chs@NetBSD.org |
| Matt Thomas | matt@NetBSD.org |
| YAMAMOTO Takashi | yamt@NetBSD.org |
| Christos Zoulas | christos@NetBSD.org |

*The portmasters (and their ports):*

| | | |
|---|---|---|
| Reinoud Zandijk | reinoud | **acorn32** |
| Matt Thomas | matt | **alpha** |
| Ignatios Souvatzis | is | **amiga** |
| Ignatios Souvatzis | is | **amigappc** |
| Noriyuki Soda | soda | **arc** |
| Julian Coleman | jdc | **atari** |
| Matthias Drochner | drochner | **cesfic** |
| Erik Berls | cyber | **cobalt** |
| Antti Kantee | pooka | **emips** |
| Simon Burge | simonb | **evbmips** |
| Steve Woodford | scw | **evbppc** |
| Izumi Tsutsui | tsutsui | **ews4800mips** |
| Izumi Tsutsui | tsutsui | **hp300** |
| Nick Hudson | skrll | **hp700** |
| Valeriy E. Ushakov | uwe | **hpcsh** |
| Matt Thomas | matt | **ibmnws** |
| Gavan Fantom | gavan | **iyonix** |
| Valeriy E. Ushakov | uwe | **landisk** |
| Izumi Tsutsui | tsutsui | **luna68k** |
| Scott Reynolds | scottr | **mac68k** |
| Michael Lorenz | macallan | **macppc** |
| Steve Woodford | scw | **mvme68k** |
| Steve Woodford | scw | **mvmeppc** |
| Matt Thomas | matt | **netwinder** |
| Izumi Tsutsui | tsutsui | **news68k** |
| Tim Rightnour | garbled | **ofppc** |
| Simon Burge | simonb | **pmax** |
| Tim Rightnour | garbled | **prep** |
| Tim Rightnour | garbled | **rs6000** |
| Tohru Nishimura | nisimura | **sandpoint** |
| Simon Burge | simonb | **sbmips** |
| Søren Jørvang | soren | **sgimips** |

| | | |
|---|---|---|
| SAITOH Masanobu | msaitoh | **sh3** |
| Martin Husemann | martin | **sparc64** |
| Anders Magnusson | ragge | **vax** |
| NISHIMURA Takeshi | nsmrtks | **x68k** |
| Manuel Bouyer | bouyer | **xen** |

*The NetBSD 6.0.3 Release Engineering team:*

| | |
|---|---|
| Stephen Borrill | sborrill@NetBSD.org |
| Manuel Bouyer | bouyer@NetBSD.org |
| David Brownlee | abs@NetBSD.org |
| James Chacon | jmc@NetBSD.org |
| Julian Coleman | jdc@NetBSD.org |
| Alistair G. Crooks | agc@NetBSD.org |
| Håvard Eidnes | he@NetBSD.org |
| John Heasley | heas@NetBSD.org |
| Martin Husemann | martin@NetBSD.org |
| Soren Jacobsen | snj@NetBSD.org |
| Phil Nelson | phil@NetBSD.org |
| Jeremy C. Reed | reed@NetBSD.org |
| Jeff Rizzo | riz@NetBSD.org |
| SAITOH Masanobu | msaitoh@NetBSD.org |

*NetBSD Developers:*

| | |
|---|---|
| Nathan Ahlstrom | nra@NetBSD.org |
| Steve Allen | wormey@NetBSD.org |
| Jukka Andberg | jandberg@NetBSD.org |
| Julian Assange | proff@NetBSD.org |
| Lennart Augustsson | augustss@NetBSD.org |
| Zafer Aydogan | zafer@NetBSD.org |
| Christoph Badura | bad@NetBSD.org |
| Marc Balmer | mbalmer@NetBSD.org |
| Bang Jun-Young | junyoung@NetBSD.org |
| Dieter Baron | dillo@NetBSD.org |
| Robert V. Baron | rvb@NetBSD.org |
| Alan Barrett | apb@NetBSD.org |
| Grant Beattie | grant@NetBSD.org |
| Erik Berls | cyber@NetBSD.org |
| Hiroyuki Bessho | bsh@NetBSD.org |
| John Birrell | jb@NetBSD.org |
| Rafal Boni | rafal@NetBSD.org |
| Stephen Borrill | sborrill@NetBSD.org |
| Sean Boudreau | seanb@NetBSD.org |
| Manuel Bouyer | bouyer@NetBSD.org |
| Allen Briggs | briggs@NetBSD.org |
| Mark Brinicombe | mark@NetBSD.org |
| Aaron Brown | abrown@NetBSD.org |
| Andrew Brown | atatat@NetBSD.org |

| | |
|---|---|
| David Brownlee | abs@NetBSD.org |
| Jon Buller | jonb@NetBSD.org |
| Simon Burge | simonb@NetBSD.org |
| Robert Byrnes | byrnes@NetBSD.org |
| Pavel Cahyna | pavel@NetBSD.org |
| D'Arcy J.M. Cain | darcy@NetBSD.org |
| Taylor R. Campbell | riastradh@NetBSD.org |
| Daniel Carosone | dan@NetBSD.org |
| Dave Carrel | carrel@NetBSD.org |
| James Chacon | jmc@NetBSD.org |
| Mihai Chelaru | kefren@NetBSD.org |
| Aleksey Cheusov | cheusov@NetBSD.org |
| Bill Coldwell | billc@NetBSD.org |
| Julian Coleman | jdc@NetBSD.org |
| Marcus Comstedt | marcus@NetBSD.org |
| Jeremy Cooper | jeremy@NetBSD.org |
| Thomas Cort | tcort@NetBSD.org |
| Chuck Cranor | chuck@NetBSD.org |
| Alistair Crooks | agc@NetBSD.org |
| Johan Danielsson | joda@NetBSD.org |
| John Darrow | jdarrow@NetBSD.org |
| Jed Davis | jld@NetBSD.org |
| Matt DeBergalis | deberg@NetBSD.org |
| Arnaud Degroote | degroote@NetBSD.org |
| Rob Deker | deker@NetBSD.org |
| Chris G. Demetriou | cgd@NetBSD.org |
| Tracy Di Marco White | gendalia@NetBSD.org |
| Jaromír Dolecek | jdolecek@NetBSD.org |
| Andy Doran | ad@NetBSD.org |
| Roland Dowdeswell | elric@NetBSD.org |
| Steven Drake | sbd@NetBSD.org |
| Emmanuel Dreyfus | manu@NetBSD.org |
| Matthias Drochner | drochner@NetBSD.org |
| Jun Ebihara | jun@NetBSD.org |
| Håvard Eidnes | he@NetBSD.org |
| Jaime A Fournier | ober@NetBSD.org |
| Stoned Elipot | seb@NetBSD.org |
| Michael van Elst | mlelstv@NetBSD.org |
| Enami Tsugutomo | enami@NetBSD.org |
| Bernd Ernesti | veego@NetBSD.org |
| Erik Fair | fair@NetBSD.org |
| Gavan Fantom | gavan@NetBSD.org |
| Hauke Fath | hauke@NetBSD.org |
| Hubert Feyrer | hubertf@NetBSD.org |
| Jason R. Fink | jrf@NetBSD.org |
| Matt J. Fleming | mjf@NetBSD.org |
| Marty Fouts | marty@NetBSD.org |
| Liam J. Foy | liamjfoy@NetBSD.org |
| Matt Fredette | fredette@NetBSD.org |

| | |
|---|---|
| Thorsten Frueauf | frueauf@NetBSD.org |
| Castor Fu | castor@NetBSD.org |
| Makoto Fujiwara | mef@NetBSD.org |
| Ichiro Fukuhara | ichiro@NetBSD.org |
| Quentin Garnier | cube@NetBSD.org |
| Thomas Gerner | thomas@NetBSD.org |
| Simon J. Gerraty | sjg@NetBSD.org |
| Justin Gibbs | gibbs@NetBSD.org |
| Chris Gilbert | chris@NetBSD.org |
| Eric Gillespie | epg@NetBSD.org |
| Brian Ginsbach | ginsbach@NetBSD.org |
| Oliver V. Gould | ver@NetBSD.org |
| Paul Goyette | pgoyette@NetBSD.org |
| Michael Graff | explorer@NetBSD.org |
| Matthew Green | mrg@NetBSD.org |
| Andreas Gustafsson | gson@NetBSD.org |
| Ulrich Habel | rhaen@NetBSD.org |
| Jun-ichiro itojun Hagino | itojun@NetBSD.org |
| HAMAJIMA Katsuomi | hamajima@NetBSD.org |
| Adam Hamsik | haad@NetBSD.org |
| Juergen Hannken-Illjes | hannken@NetBSD.org |
| Charles M. Hannum | mycroft@NetBSD.org |
| Yorick Hardy | yhardy@NetBSD.org |
| Ben Harris | bjh21@NetBSD.org |
| Eric Haszlakiewicz | erh@NetBSD.org |
| John Hawkinson | jhawk@NetBSD.org |
| Emile Heitor | imil@NetBSD.org |
| John Heasley | heas@NetBSD.org |
| Lars Heidieker | para@NetBSD.org |
| Geert Hendrickx | ghen@NetBSD.org |
| René Hexel | rh@NetBSD.org |
| Iain Hibbert | plunky@NetBSD.org |
| Kouichirou Hiratsuka | hira@NetBSD.org |
| Michael L. Hitch | mhitch@NetBSD.org |
| Ádám Hóka | ahoka@NetBSD.org |
| Jachym Holecek | freza@NetBSD.org |
| David A. Holland | dholland@NetBSD.org |
| Christian E. Hopps | chopps@NetBSD.org |
| Daniel Horecki | morr@NetBSD.org |
| Ken Hornstein | kenh@NetBSD.org |
| Marc Horowitz | marc@NetBSD.org |
| Eduardo Horvath | eeh@NetBSD.org |
| Nick Hudson | skrll@NetBSD.org |
| Shell Hung | shell@NetBSD.org |
| Darran Hunt | darran@NetBSD.org |
| Martin Husemann | martin@NetBSD.org |
| Dean Huxley | dean@NetBSD.org |
| Love Hörnquist Åstrand | lha@NetBSD.org |
| Roland Illig | rillig@NetBSD.org |

| | |
|---|---|
| Bernardo Innocenti | bernie@NetBSD.org |
| Tetsuya Isaki | isaki@NetBSD.org |
| ITOH Yasufumi | itohy@NetBSD.org |
| IWAMOTO Toshihiro | toshii@NetBSD.org |
| Matthew Jacob | mjacob@NetBSD.org |
| Soren Jacobsen | snj@NetBSD.org |
| Lonhyn T. Jasinskyj | lonhyn@NetBSD.org |
| Darrin Jewell | dbj@NetBSD.org |
| Nicolas Joly | njoly@NetBSD.org |
| Søren Jørvang | soren@NetBSD.org |
| Takahiro Kambe | taca@NetBSD.org |
| Antti Kantee | pooka@NetBSD.org |
| Frank Kardel | kardel@NetBSD.org |
| KAWAMOTO Yosihisa | kawamoto@NetBSD.org |
| Min Sik Kim | minskim@NetBSD.org |
| KIYOHARA Takashi | kiyohara@NetBSD.org |
| Thomas Klausner | wiz@NetBSD.org |
| Klaus Klein | kleink@NetBSD.org |
| John Klos | jklos@NetBSD.org |
| Wayne Knowles | wdk@NetBSD.org |
| Takayoshi Kochi | kochi@NetBSD.org |
| Jonathan A. Kollasch | jakllsch@NetBSD.org |
| Radoslaw Kujawa | rkujawa@NetBSD.org |
| Jochen Kunz | jkunz@NetBSD.org |
| Martti Kuparinen | martti@NetBSD.org |
| Arnaud Lacombe | alc@NetBSD.org |
| Kevin Lahey | kml@NetBSD.org |
| David Laight | dsl@NetBSD.org |
| Johnny C. Lam | jlam@NetBSD.org |
| Guillaume Lasmayous | gls@NetBSD.org |
| Martin J. Laubach | mjl@NetBSD.org |
| Greg Lehey | grog@NetBSD.org |
| Ted Lemon | mellon@NetBSD.org |
| Christian Limpach | cl@NetBSD.org |
| Frank van der Linden | fvdl@NetBSD.org |
| Joel Lindholm | joel@NetBSD.org |
| Tonnerre Lombard | tonnerre@NetBSD.org |
| Mike Long | mikel@NetBSD.org |
| Michael Lorenz | macallan@NetBSD.org |
| Warner Losh | imp@NetBSD.org |
| Tomasz Luchowski | zuntum@NetBSD.org |
| Federico Lupi | federico@NetBSD.org |
| Brett Lymn | blymn@NetBSD.org |
| MAEKAWA Masahide | gehenna@NetBSD.org |
| Anders Magnusson | ragge@NetBSD.org |
| John Marino | marino@NetBSD.org |
| Roy Marples | roy@NetBSD.org |
| Cherry G. Mathew | cherry@NetBSD.org |
| David Maxwell | david@NetBSD.org |

| | |
|---|---|
| Gregory McGarry | gmcgarry@NetBSD.org |
| Dan McMahill | dmcmahill@NetBSD.org |
| Jared D. McNeill | jmcneill@NetBSD.org |
| Neil J. McRae | neil@NetBSD.org |
| Julio M. Merino Vidal | jmmv@NetBSD.org |
| Perry Metzger | perry@NetBSD.org |
| Luke Mewburn | lukem@NetBSD.org |
| Jean-Yves Migeon | jym@NetBSD.org |
| Brook Milligan | brook@NetBSD.org |
| Minoura Makoto | minoura@NetBSD.org |
| Simas Mockevicius | symka@NetBSD.org |
| der Mouse | mouse@NetBSD.org |
| Constantine A. Murenin | cnst@NetBSD.org |
| Joseph Myers | jsm@NetBSD.org |
| Tuomo Mäkinen | tjam@NetBSD.org |
| Zoltán Arnold NAGY | zoltan@NetBSD.org |
| Ken Nakata | kenn@NetBSD.org |
| Takeshi Nakayama | nakayama@NetBSD.org |
| Alexander Nasonov | alnsn@NetBSD.org |
| Phil Nelson | phil@NetBSD.org |
| John Nemeth | jnemeth@NetBSD.org |
| NISHIMURA Takeshi | nsmrtks@NetBSD.org |
| Tohru Nishimura | nisimura@NetBSD.org |
| NONAKA Kimihiro | nonaka@NetBSD.org |
| Takehiko NOZAKI | tnozaki@NetBSD.org |
| Tobias Nygren | tnn@NetBSD.org |
| OBATA Akio | obache@NetBSD.org |
| Jesse Off | joff@NetBSD.org |
| Tatoku Ogaito | tacha@NetBSD.org |
| OKANO Takayoshi | kano@NetBSD.org |
| Masaru Oki | oki@NetBSD.org |
| Ryo ONODERA | ryoon@NetBSD.org |
| Atsushi Onoe | onoe@NetBSD.org |
| Greg Oster | oster@NetBSD.org |
| Jonathan Perkin | sketch@NetBSD.org |
| Fredrik Pettai | pettai@NetBSD.org |
| Herb Peyerl | hpeyerl@NetBSD.org |
| Matthias Pfaller | matthias@NetBSD.org |
| Chris Pinnock | cjep@NetBSD.org |
| Adrian Portelli | adrianp@NetBSD.org |
| Chris Provenzano | proven@NetBSD.org |
| Mindaugas Rasiukevicius | rmind@NetBSD.org |
| Michael Rauch | mrauch@NetBSD.org |
| Marc Recht | recht@NetBSD.org |
| Darren Reed | darrenr@NetBSD.org |
| Jeremy C. Reed | reed@NetBSD.org |
| Jens Rehsack | sno@NetBSD.org |
| Antoine Reilles | tonio@NetBSD.org |
| Tyler R. Retzlaff | rtr@NetBSD.org |

| | |
|---|---|
| Scott Reynolds | scottr@NetBSD.org |
| Tim Rightnour | garbled@NetBSD.org |
| Jeff Rizzo | riz@NetBSD.org |
| Hans Rosenfeld | hans@NetBSD.org |
| Steve Rumble | rumble@NetBSD.org |
| Rumko | rumko@NetBSD.org |
| Jukka Ruohonen | jruoho@NetBSD.org |
| Blair J. Sadewitz | bjs@NetBSD.org |
| David Sainty | dsainty@NetBSD.org |
| SAITOH Masanobu | msaitoh@NetBSD.org |
| Kazuki Sakamoto | sakamoto@NetBSD.org |
| Curt Sampson | cjs@NetBSD.org |
| Wilfredo Sanchez | wsanchez@NetBSD.org |
| Ty Sarna | tsarna@NetBSD.org |
| SATO Kazumi | sato@NetBSD.org |
| Jan Schaumann | jschauma@NetBSD.org |
| Matthias Scheler | tron@NetBSD.org |
| Silke Scheler | silke@NetBSD.org |
| Karl Schilke (rAT) | rat@NetBSD.org |
| Amitai Schlair | schmonz@NetBSD.org |
| Konrad Schroder | perseant@NetBSD.org |
| Georg Schwarz | schwarz@NetBSD.org |
| Lubomir Sedlacik | salo@NetBSD.org |
| Christopher SEKIYA | sekiya@NetBSD.org |
| Reed Shadgett | dent@NetBSD.org |
| John Shannon | shannonjr@NetBSD.org |
| Tim Shepard | shep@NetBSD.org |
| Naoto Shimazaki | igy@NetBSD.org |
| Ryo Shimizu | ryo@NetBSD.org |
| Takao Shinohara | shin@NetBSD.org |
| Takuya SHIOZAKI | tshiozak@NetBSD.org |
| Daniel Sieger | dsieger@NetBSD.org |
| Chuck Silvers | chs@NetBSD.org |
| Thor Lancelot Simon | tls@NetBSD.org |
| Jeff Smith | jeffs@NetBSD.org |
| Noriyuki Soda | soda@NetBSD.org |
| Wolfgang Solfrank | ws@NetBSD.org |
| Jörg Sonnenberger | joerg@NetBSD.org |
| Ignatios Souvatzis | is@NetBSD.org |
| T K Spindler | dogcow@NetBSD.org |
| Matthew Sporleder | mspo@NetBSD.org |
| Bill Squier | groo@NetBSD.org |
| Adrian Steinmann | ast@NetBSD.org |
| Bill Studenmund | wrstuden@NetBSD.org |
| Kevin Sullivan | sullivan@NetBSD.org |
| Kimmo Suominen | kim@NetBSD.org |
| Grégoire Sutre | gsutre@NetBSD.org |
| Sergey Svishchev | shattered@NetBSD.org |
| Robert Swindells | rjs@NetBSD.org |

| | |
|---|---|
| Shin Takemura | takemura@NetBSD.org |
| TAMURA Kent | kent@NetBSD.org |
| Shin'ichiro TAYA | taya@NetBSD.org |
| Hasso Tepper | hasso@NetBSD.org |
| Matt Thomas | matt@NetBSD.org |
| Jason Thorpe | thorpej@NetBSD.org |
| Christoph Toshok | toshok@NetBSD.org |
| Greg Troxel | gdt@NetBSD.org |
| Tsubai Masanari | tsubai@NetBSD.org |
| Izumi Tsutsui | tsutsui@NetBSD.org |
| UCHIYAMA Yasushi | uch@NetBSD.org |
| Masao Uebayashi | uebayasi@NetBSD.org |
| Shuichiro URATA | ur@NetBSD.org |
| Valeriy E. Ushakov | uwe@NetBSD.org |
| Todd Vierling | tv@NetBSD.org |
| Aymeric Vincent | aymeric@NetBSD.org |
| Paul Vixie | vixie@NetBSD.org |
| Mike M. Volokhov | mishka@NetBSD.org |
| Krister Walfridsson | kristerw@NetBSD.org |
| Mark Weinem | weinem@NetBSD.org |
| Lex Wennmacher | wennmach@NetBSD.org |
| Leo Weppelman | leo@NetBSD.org |
| Assar Westerlund | assar@NetBSD.org |
| Frank Wille | phx@NetBSD.org |
| Nathan Williams | nathanw@NetBSD.org |
| Rob Windsor | windsor@NetBSD.org |
| Jim Wise | jwise@NetBSD.org |
| Colin Wood | ender@NetBSD.org |
| Steve Woodford | scw@NetBSD.org |
| YAMAMOTO Takashi | yamt@NetBSD.org |
| Yuji Yamano | yyamano@NetBSD.org |
| David Young | dyoung@NetBSD.org |
| Arnaud Ysmal | stacktic@NetBSD.org |
| Reinoud Zandijk | reinoud@NetBSD.org |
| S.P.Zeidler | spz@NetBSD.org |
| Tim Zingelman | tez@NetBSD.org |
| Christos Zoulas | christos@NetBSD.org |

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