NAME

INSTALL — Installation procedure for NetBSD/evbarm.

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DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 3.0.1 on the *evbarm* 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 3.0.1 release contains complete binary releases for many different system architectures. (A few ports are not fully supported at this time and are thus not part of the binary distribution. For information on them, please see the NetBSD web site at .: **http://www.NetBSD.org/**)

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

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

Changes Between The NetBSD 3.0 release and 3.0.1 update

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

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

Specific updates are as follows:

Kernel

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

- Check the "oldlen" argument to `sysctl`(2) before passing it to `vslock`(9). This prevents a local DOS (SA2006-013).
- Use a `pmatch`(9) expression which should catch all present and future seagate drives larger than 200GB for the WD_QUIRK_FORCE_LBA48 quirks.
- Fix the 'audioctl of death' problem (SA2006-014).
- Limit the size of any kernel buffers allocated by the VOP_READDIR routines to MAXBSIZE.

Networking

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

File system

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

Libraries

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

Security

- Improve `rnd`(4) code probing for the Intel hardware RNG to avoid false detections (SA2006-009).
- `mail`(1) creates record file with insecure umask (SA2006-007).
- Fix a remote code execution vulnerability in sendmail (SA2006-010).
- A vulnerability was found in the `fast_ipsec`(4) stack that renders the IPSec anti-replay service ineffective under certain circumstances (SA2006-011).
- Fix a number of small security problems with the games.

- Fix an FPU Information leak on i386/amd64/Xen platforms with AMD CPUs (SA2006-015).
- Fix several integer overflows and NULL-pointer dereferences in freetype2.
- Fix a denial of service vulnerability in sendmail when handling malformed multipart MIME messages (SA2006-017).

Miscellaneous

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

acorn26 specific

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

amiga specific

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

hp300 specific

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

i386 specific

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

m68k specific

- Fix a huge number of pkgsrc build problems.

mips specific

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

powerpc specific

- Avoid pthreads program crashes.

sparc specific

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

xen specific

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

Changes Between The NetBSD 2.0 and 3.0 Releases

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

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

Supported platforms and machines

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

Supported devices

- Added `iteide`(4): driver for ITE 8212 IDE controller.
- Added `ixpide`(4): driver for ATI IXP series chipset IDE controller.
- Added `pdcsata`(4): driver for Promise SATA150 (aka PDC203xx) controllers.
- Added `ipw`(4): driver for Intel PRO/Wireless 2100.
- Added `iwi`(4): driver for Intel PRO/Wireless 2200AG/2915ABG.
- Added `rtw`(4): driver for Realtek RTL8180L IEEE 802.11b wireless network.
- Added `vge`(4): driver for VIA VT612X Gigabit Ethernet controller.

- Added xge(4): driver for Neterion Xframe-I 10 gigabit Ethernet.
- Added cdce(4): driver for CDC USB Ethernet.
- Added atu(4): driver for Atmel AT76C50x based 802.11b wireless network interfaces.
- Added uep(4): driver for eGalax USB touchpanel controller.
- Added ugensa(4): driver for USB generic serial adapter, which currently supports CDMA Wireless PC Card.
- Added auixp(4): driver for ATI IXP series chipset audio controller.
- Added auacer(4): driver for ALi M5455 audio controller.
- Added azalia(4): driver for High Definition Audio controller.
- Added spif(4): driver for Sun SUNW,spif multi-port Sbus card.
- viaide(4) now supports nForce2 Ultra 400, nForce3 250 IDE and SATA, and nForce4 IDE and SATA controllers. viaide(4) also supports VIA VT6421 SATA RAID controller though drives on the controller need to be configured into RAID/JOBS sets via its BIOS.
- siside(4) now supports SiS 180 and 741 SATA controllers.
- artsata(4), which is the Intel i31244 Serial ATA disk controller driver, now supports DPA mode.
- satalink(4) now supports Silicon Image 3512 SATA.
- piixide(4) now supports Intel 82801FB/FR (ICH6/6R) IDE and SATA, 82801FBM SATA, 82801G (ICH7) IDE and SATA, and i6300ESB IDE and SATA controllers. Also added basic support for RAID0 and RAID1 for the Adaptec HostRAID format as found on the Intel 6300ESB on-board RAID.
- stge(4) now works on big-endian machines including sparc64 with hardware checksums.
- aac(4) now supports Adaptec SATA RAID 2810SA.
- mpt(4) now supports LSI Logic FC919x SCSI controllers.
- spc(4) now has support for Fujitsu MB87030-based PCMCIA SCSI controller.
- bge(4) now supports Broadcom BCM5788, BCM5705K, BCM5721, and BCM5751M Gigabit Ethernet controllers, and has 802.3x flow control support.
- gem(4) and hme(4) now have hardware checksums support.
- re(4) and wm(4) now supports TCPv4 hardware transmit segment offload.
- wm(4) now supports more Intel Gigabit Ethernet chips and 64bit PCI DMA transfer,
- re(4) now supports Corega CG-LAPCIGT Gigabit Ethernet, and RTL8169 based CardBus Ethernet interfaces, including NetGear GA-511.
- ex(4) now supports 3Com 3c920B-EMB-WNM Integrated Fast Ethernet.
- sk(4) now supports Belkin Gigabit Desktop Network card.
- bce(4) now supports Broadcom BCM4401-B0 Ethernet.
- tl(4) now supports Compaq Netelligent 10 T/2 PCI UTP/Coax Controller.
- wi(4) now supports SMC2531W-B EliteConnect Wireless Adapter.
- fxp(4) now supports Intel 82801FB (ICH6) 10/100 Ethernet.

- tlp(4) now supports LinkSys PCMPC200 Cardbus Ethernet and ASIX AX88140A/AX88141 chipsets.
- Many improvements for atw(4) ADMtek ADM8211 802.11 wireless network driver.
- auich(4) now supports nForce2 Ultra 400, nForce3 250 MCP-T AC-97, nForce4, Intel ICH7, and Intel 6300ESB audio controllers.
- auvia(4) now supports suspend and resume.
- puc(4) now supports VS-Com PCI-210H 2S/1P card, VScom PCI-200 2S card, and ADDI-DATA APCI-7800 8-port serial adapter.
- uftdi(4) now supports Sealevel Systems' uftdi-based USB-Serial adapter.
- uvscom(4) now supports SUNTAC U-Cable type A4 USB serial adapter.
- pms(4) now supports synaptics touchpad.
- lm(4) now supports iTE IT8705f and Winbond 83627THF environment monitor controllers.
- Many bug fixes and improvements for ehci(4) USB 2.0 controllers.
- Many fixes for uaudio(4) devices.
- uax(4) ASIX AX88172 USB Ethernet driver has been replaced by axe(4) driver derived from FreeBSD.
- vnd(4) pseudo-device now support compressed image.

Kernel

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

Networking

- TCP now supports TCP Selective Acknowledgement Options (RFC 2018) for enhanced performance especially on long distance connections and TCP MD5 signatures (RFC 2385) for enhanced protection against attacks.
- TCP can take advantage of hardware-assisted TCP/IPv4 segmentation on re(4), wm(4) and xge(4) interfaces.

- The OpenBSD Packet Filter has been integrated as alternative packet filter solution.
- IP Filter has been upgraded to version 4.1.8.
- The KAME IPsec stack now supports ESP over NAT connections (RFC 3948).
- IPv4 Protocol Independent Multicast (PIM) routing support has been added.
- ipsec-tools 0.6.3 provide IKE support for ESP over NAT connections (RFC 3947), user authentication via XAuth and automatic network configurations of VPN clients via Mode Config.
- Added RFC 3378 EtherIP support, which makes it possible to add `gif`(4) interface to bridges.
- Added `tap`(4), the virtual Ethernet device.
- `ppp`(4) has been updated to 2.4.3.
- `gre`(4) now supports tunneling of the IPv6 Protocol.

File system

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

Libraries

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

Security

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

System administration and user tools

- Various improvements for the "sysinst" installation program, including Spanish language translation.
- Numerous improvements for `syslogd`(8), mostly from FreeBSD.

- `fsck`(8) now has a progress meter option.
- `dump`(8) now supports file system snapshots.
- Added `sockstat`(1), which lists open sockets.
- Added `seq`(1), a utility which prints a sequence of numbers, derived from Plan 9.

Miscellaneous

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

Kernel interfaces have continued to be refined, and more subsystems and device drivers are shared among the different ports. You can look for this trend to continue.

evbarm specific

This is the third major release of NetBSD/evbarm.

The Future of NetBSD

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

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

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

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

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

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

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

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

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

Sources of NetBSD

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

NetBSD 3.0.1 Release Contents

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

`.../NetBSD-3.0.1/`

`CHANGES`	Changes since earlier NetBSD releases.
`LAST_MINUTE`	Last minute changes.
`MIRRORS`	A list of sites that mirror the NetBSD 3.0.1 distribution.
`README.files`	README describing the distribution's contents.
`TODO`	NetBSD 's todo list (also somewhat incomplete and out of date).
`patches/`	Post-release source code patches.
`source/`	Source distribution sets; see below.

In addition to the files and directories listed above, there is one directory per architecture, for each of the architectures for which NetBSD 3.0.1 has a binary distribution.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

`SYSVSUM` Historic ATT System V UNIX checksums for the various files in that directory, in the format produced by the command:
cksum -o 2 *file*.

The MD5 digest is the safest checksum, followed by the POSIX checksum. The other two checksums are provided only to ensure that the widest possible range of system can check the integrity of the release files.

NetBSD/evbarm subdirectory structure

The evbarm-specific portion of the NetBSD 3.0.1 release is found in the `evbarm` subdirectory of the distribution: `.../NetBSD-3.0.1/evbarm/`. 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/` evbarm binary distribution sets; see below.
`installation/`

```
misc/
```

Binary distribution sets

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

base The NetBSD 3.0.1 evbarm **base** binary distribution. You *must* install this distribution set. It contains the base NetBSD utilities that are necessary for the system to run and be minimally functional. It includes shared library support, and excludes everything described below.
18 MB gzipped, 50 MB uncompressed

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

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

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

kern-INTEGRATOR
(see below)
4 MB gzipped, 10 MB uncompressed

kern-IQ80310
(see below)
20 MB gzipped, 54 MB uncompressed

kern-IQ80321
(see below)
21 MB gzipped, 55 MB uncompressed

kern-TEAMASA_NPWR
12 MB gzipped, 35 MB uncompressed

These sets contain a NetBSD/evbarm 3.0.1 kernel, named `/netbsd`. Some of these sets also contain a binary format kernel named `/netbsd.bin` and an S-record format kernel named `/netbsd.srec` that your firmware may need to boot. You *must* install the kernel that matches your hardware.

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

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

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

NetBSD maintains its own set of sources for the X Window System in order to assure tight integration and compatibility. These sources are based on XFree86, and tightly track XFree86 releases. They are currently equivalent to XFree86 4.4.0. Binary sets for the X Window System are distributed with NetBSD. The sets are:

xbase The basic files needed for a complete X client environment. This does not include the X servers.
6 MB gzipped, 18 MB uncompressed

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

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

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

xserver The X server.
4 MB gzipped, 9 MB uncompressed

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

NetBSD/evbarm System Requirements and Supported Devices

NetBSD 3.0.1 runs on the following ARM architecture evaluation boards:

- Technologic Systems TS-7200
- ARM, Ltd. Integrator
- Intel IQ80310
- Intel IQ80321
- Team ASA, Inc. Npwr
- Intel IXM1200
- Samsung SMDK2800
- ADI Engineering, Inc. BRH ("Big Red Head")

Supported devices (Technologic Systems TS-7200)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- TS-5620 Real Time Clock
- Serial ports

  - On-chip EP9302 UARTs
  - TS-SER1, TS-SER2, TS-SER4 PC/104 serial adapters
  - TS-MODEM, TS-MODEM2 PC/104 land-line/cellular modems
- Ethernet adapters
  - On-chip EP9302 10/100 ethernet
  - TS-ETH10 PC/104 expansion ethernet adapters
- Other on-board functions
  - CompactFlash socket
  - USB OHCI host
  - Text-mode HD44780 LCD display header
  - Matrix keypad/GPIO header
  - Board temperature sensor and watchdog timer

Supported devices (ARM, Ltd. Integrator)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- PrimeCell PL030 Real Time Clock
- Serial ports
  - PrimeCell PL010 UART
- SCSI host adapters
  - Adaptec AHA-2910, 2915, 2920, and 2930C adapters.
  - Adaptec AHA-2x4x[U][2][W] cards and onboard PCI designs using the AIC-7770, AIC-7850, AIC-7860, AIC-7870, AIC-7880 and AIC-789x chipsets.
  - Adaptec AHA-394x[U][W] cards [b]
  - Adaptec AHA-3950U2 cards
  - Adaptec AHA-3960, 19160 and 29160 Ultra-160 adapters
- Ethernet adapters
  - Intel i82557, i82558, i82559, i82550

Supported devices (Intel IQ80310)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- Serial ports
  - On-board ST16c550 UARTs
- Ethernet adapters
  - Intel i82557, i82558, i82559, i82550
- i80312 Companion I/O functions
  - General Purpose I/O unit

Supported devices (Intel IQ80321)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- Serial ports
  - On-board TI 16550 UART

- Ethernet adapters
  - Intel i82542, i82543, i85244 Gigabit Ethernet
- i80321 I/O Processor functions
  - Application Accelerator Unit
  - Watchdog timer

Supported devices (Team ASA Npwr)

The Npwr is a storage appliance based on the Intel IOP310 I/O processor chipset. This is an exhaustive list of devices supported on the Npwr as the Npwr has no expansion capability.

- Serial ports
  - On-board TI 16550 UART
- SCSI host adapters
  - On-board LSI Logic 53c1010 Ultra160 SCSI adapter
- Ethernet adapters
  - On-board Intel i82544 Gigabit Ethernet

Supported devices (Intel IXM1200)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- Serial ports
  - IXP1200 on-chip serial port
- Ethernet adapters
  - Intel i82557, i82558, i82559, i82550

Supported devices (Samsung SMDK2800)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- Serial ports
  - S3C2800 on-chip serial ports

Supported devices (ADI BRH)

For devices that have machine-independent drivers, this is not an exhaustive list, but merely reflects the devices that have been tested on this platform.

- Serial ports
  - On-board TI 16752 DUART
- Ethernet adapters
  - Intel i82557, i82558, i82559, i82550
  - Intel i82544, i82546 Gigabit Ethernet

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 `evbarm/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 `evbarm/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-3.0.1
# cd evbarm/binary
# tar -cf tape_device misc etc kern
```

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

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

Preparing your System for NetBSD installation

First and foremost, before beginning the installation process, *make sure you have a reliable backup* of any data on the target system that you wish to keep. Mistakes in e.g. partitioning your hard disk may lead to data loss.

Preparation for the Technologic Systems TS-7200

The TS-7200 uses RedBoot firmware which supports loading the kernel via serial port and the on-chip Ethernet. These notes assume that the Ethernet will be used to load the kernel. RedBoot can either use TFTP or HTTP to load the kernel via the network.

These notes also assume the the TS-7200 will be run from the CompactFlash; that a FFS filesystem on the CompactFlash card will provide the root file system. The minimum size of the CompactFlash card is 64MB with 512MB being the recommended minimum size if attempting a full installation.

The first step to install NetBSD is to interrupt normal system bootup and drop to the RedBoot prompt by hitting Ctrl-C immediately after applying power. To load both the installation kernel and the generic post-installation TS7200 kernel you will need network connectivity from RedBoot which you will have to configure using the RedBoot fconfig command; see the RedBoot documentation for more information.

A compressed kernel image and loader suitable for placing into flash is provided with the distribution. Use of this image is optional; a kernel that can be directly loaded over the network by RedBoot is also provided.

The image for the TS-7200 can be found under the NetBSD/evbarm 3.0.1 distribution directory in `evbarm/binary/gzimg/gzimg_TS7200_flash_0x60660000.gz`, and corresponds to the kernel in `evbarm/binary/kernel/netbsd-TS7200.gz`. The following steps describe how to copy the compressed kernel image into flash.

1. Uncompress the gzimg file and place it into the TFTP server's download area (note, the kernel inside the gzimg is still compressed after this step).

   ```
   server# gzcat gzimg_TS7200_flash_0x60660000.gz > /tftpboot/gzimg_TS7200_flash_0x60660000
   ```

2. Load the gzimg from the TFTP server.

   ```
   RedBoot load -r -b 0x00200000 gzimg_TS7200_flash_0x60660000
   Raw file loaded 0x00200000-0x00605fe0
   ```

3. Use the RedBoot **fis** command to copy the image into flash. For more information on the RedBoot Flash Image System, see the RedBoot documentation. The factory default Linux image may already be present in flash and must be deleted before continuing.

   ```
   RedBoot fis delete vmlinux
   RedBoot fis create -b 0x00200000 -f 0x60660000 -l 0x00160000 netbsd.gz
   ```

Once the compressed kernel image has been copied into flash, it may be started by jumping to the flash address of the image:

```
RedBoot g 0x60660000
```

Preparation for the Intel IQ80310

The IQ80310 uses RedBoot firmware from Red Hat, Inc. RedBoot supports loading the kernel via the serial port and the on-board Ethernet. These notes assume that the Ethernet will be used to load the kernel. RedBoot uses the Trivial File Transfer Protocol (TFTP) to load the kernel via the network.

These notes also assume that the IQ80310 will be run as a diskless system; that an NFS server will provide the root file system. The NetBSD kernel uses the Dynamic Host Configuration Protocol (DHCP) to obtain network address and root file system information.

The first step is to configure your DHCP, NFS, and TFTP server software. You will need the MAC address for the on-board Ethernet, which RedBoot can provide; see the RedBoot documentation for more information.

The next step is to configure RedBoot to obtain its IP address from your DHCP server; see the RedBoot documentation for more information.

Once your DHCP server and RedBoot are properly configured, you should see information similar to the following when the IQ80310 is reset or powered-up:

```
RedBoot(tm) debug environment - built 17:16:14, Feb 12 2001
Platform: IQ80310 (XScale)
Copyright (C) 2000, Red Hat, Inc.

RAM: 0xa0000000-0xa2000000
FLASH: 0x00000000 - 0x00800000, 64 blocks of 0x00020000 bytes each.
IP: 192.168.0.10, Default server: 192.168.0.1
RedBoot
```

A compressed kernel image and loader suitable for placing into flash is provided with the distribution. Use of this image is optional; a kernel that can be directly loaded over the network by RedBoot is also provided.

The image for the IQ80310 can be found under the NetBSD/evbarm 3.0.1 distribution directory in `evbarm/binary/gzimg/gzimg_IQ80310_flash_0x00080000.gz`, and corresponds to the kernel in `evbarm/binary/kernel/netbsd-IQ80310.gz`. The following steps describe how to copy the compressed kernel image into flash.

1. Uncompress the gzimg file and place it into the TFTP server's download area (note, the kernel inside the gzimg is still compressed after this step).

   ```
   server# gzcat gzimg_IQ80310_flash_0x00080000.gz > /tftpboot/gzimg_IQ80310_flash_0x00080000
   ```

2. Load the gzimg from the TFTP server.

   ```
   RedBoot load -r -b 0xa0200000 gzimg_IQ80310_flash_0x00080000
   Raw file loaded 0xa0200000-0xa0305fe0
   ```

3. Use the RedBoot **fis** command to copy the image into flash. For more information on the RedBoot Flash Image System, see the RedBoot documentation.

   ```
   RedBoot fis create -b 0xa0200000 -f 0x00080000 -l 0x00200000 netbsd.gz
   ... Erase from 0x00080000-0x00280000: ....................
   ... Program from 0xa0200000-0xa0400000 at 0x00080000: .....................
   ... Unlock from 0x007e0000-0x00800000:.
   ... Erase from 0x007e0000-0x00800000:.
   ... Program from 0xa1fd0000-0xa1ff0000 at 0x007e0000:.
   ... Lock from 0x007e0000-0x00800000:.
   ```

Once the compressed kernel image has been copied into flash, it may be started by jumping to the flash address of the image:

```
RedBoot g 0x00080000

 NetBSD/IQ80310 Gzip Boot, Revision 1.1
 (root@tgm, Thu Mar 28 18:32:45 PST 2002)
 RAM 0xa0000000 - 0xaffffffff, heap at 0xaffd0000
 Load address: 0xa0200000
 Image size: 741244
Uncompressing image...done.
Jumping to image @ 0xa0200000...
```

```
NetBSD/evbarm (IQ80310) booting ...
Resetting secondary PCI bus...
initarm: Configuring system ...
physmemory: 65536 pages at 0xa0000000 - 0xaffffffff
init subsystems: stacks vectors undefined pmap irq done.
[ using 155084 bytes of netbsd ELF symbol table ]
Copyright (c) 1996, 1997, 1998, 1999, 2000, 2001, 2002
    The NetBSD Foundation, Inc.  All rights reserved.
Copyright (c) 1982, 1986, 1989, 1991, 1993
    The Regents of the University of California.  All rights reserved.

NetBSD 1.5ZC (IQ80310) #20: Fri Mar 29 10:25:53 PST 2002
    root@tgm:/u1/netbsd/src/sys/arch/evbarm/compile/IQ80310
total memory = 256 MB
avail memory = 232 MB
using 1228 buffers containing 13208 KB of memory
mainbus0 (root)
cpu0 at mainbus0: i80200 step A-0 (XScale core)
cpu0: DC enabled IC enabled WB enabled LABT
cpu0: 32KB/32B 32-way Instruction cache
cpu0: 32KB/32B 32-way write-back-locking Data cache
obio0 at mainbus0: board rev. F, CPLD rev. D, backplane present
com0 at obio0 addr 0xfe810000: ns16550a, working fifo
com0: console
com1 at obio0 addr 0xfe800000: ns16550a, working fifo
iopxs0 at mainbus0: i80312 Companion I/O, acting as PCI host
iopxs0: configuring Secondary PCI bus
pci0 at iopxs0 bus 1
pci0: i/o space, memory space enabled
ppb0 at pci0 dev 7 function 0: Digital Equipment DECchip 21154 PCI-PCI Bridge (rev. 0
pci1 at ppb0 bus 2
pci1: i/o space, memory space enabled
fxp0 at pci1 dev 0 function 0: i82559S Ethernet, rev 9
fxp0: interrupting at iq80310 irq 1
fxp0: Ethernet address 00:80:4d:46:0b:b9
inphy0 at fxp0 phy 1: i82555 10/100 media interface, rev. 4
inphy0: 10baseT, 10baseT-FDX, 100baseTX, 100baseTX-FDX, auto
clock: hz=100 stathz=0 profhz=0
boot device: unknown
root device:
```

Preparation for the Intel IQ80321

The IQ80321 uses RedBoot firmware from Red Hat, Inc. RedBoot supports loading the kernel via the serial port and the on-board Ethernet. These notes assume that the Ethernet will be used to load the kernel. RedBoot uses the Trivial File Transfer Protocol (TFTP) to load the kernel via the network.

These notes also assume that the IQ80321 will be run as a diskless system; that an NFS server will provide the root file system. The NetBSD kernel uses the Dynamic Host Configuration Protocol (DHCP) to obtain network address and root file system information.

The first step is to configure your DHCP, NFS, and TFTP server software. You will need the MAC address for the on-board Ethernet, which RedBoot can provide; see the RedBoot documentation for more information.

The next step is to configure RedBoot to obtain its IP address from your DHCP server; see the RedBoot documentation for more information.

Once your DHCP server and RedBoot are properly configured, you should see information similar to the following when the IQ80321 is reset or powered-up:

```
Ethernet eth0: MAC address 00:07:e9:03:38:40
IP: 192.168.0.11, Default server: 192.168.0.1

RedBoot(tm) bootstrap and debug environment [ROM]
Non-certified release, version UNKNOWN - built 11:21:56, Feb  1 2002

Platform: IQ80321 (XScale)
Copyright (C) 2000, 2001, 2002, Red Hat, Inc.

RAM: 0x00000000-0x08000000, 0x00017008-0x01ddd000 available
FLASH: 0xf0000000 - 0xf0800000, 64 blocks of 0x00020000 bytes each.
RedBoot
```

A compressed kernel image and loader suitable for placing into flash is provided with the distribution. Use of this image is optional; a kernel that can be directly loaded over the network by RedBoot is also provided.

The image for the IQ80321 can be found under the NetBSD/evbarm 3.0.1 distribution directory in `evbarm/binary/gzimg/gzimg_IQ80321_flash_0xf0080000.gz`, and corresponds to the kernel in `evbarm/binary/kernel/netbsd-IQ80321.gz`. The following steps describe how to copy the compressed kernel image into flash.

1. Uncompress the gzimg file and place it into the TFTP server's download area (note, the kernel inside the gzimg is still compressed after this step).

   ```
   server# gzcat gzimg_IQ80321_flash_0xf0080000.gz > /tftpboot/gzimg_IQ80321_flash_0xf0080000
   ```

2. Load the gzimg from the TFTP server.

   ```
   RedBoot load -r -b 0x00200000 gzimg_IQ80321_flash_0xf0080000
   Raw file loaded 0x00200000-0x00305fe4
   ```

3. Use the RedBoot **fis** command to copy the image into flash. For more information on the RedBoot Flash Image System, see the RedBoot documentation.

   ```
   RedBoot fis create -b 0x00200000 -f 0xf0080000 -l 0x00200000 netbsd.gz
   * CAUTION * about to program 'netbsd.gz'
               at 0xf0080000..0xf027ffff from 0x00200000 - are you sure (y/n)? y
   ... Erase from 0xf0080000-0xf0280000: ......................
   ... Program from 0x00200000-0x00400000 at 0xf0080000: ......................
   ... Unlock from 0xf07e0000-0xf0800000:.
   ... Erase from 0xf07e0000-0xf0800000:.
   ... Program from 0x01ddf000-0x01dff000 at 0xf07e0000:.
   ... Lock from 0xf07e0000-0xf0800000:.
   ```

Once the compressed kernel image has been copied into flash, it may be started by jumping to the flash address of the image:

```
RedBoot g 0xf0080000

 NetBSD/IQ80321 Gzip Boot, Revision 1.1
 (root@tgm, Thu Mar 28 18:32:45 PST 2002)
```

```
 RAM 0xa0000000 - 0xa7ffffff, heap at 0xa7fd0000
 Load address: 0xa0200000
 Image size: 739495
Uncompressing image...done.
Jumping to image @ 0xa0200000...

NetBSD/evbarm (IQ80321) booting ...
initarm: Configuring system ...
physmemory: 32768 pages at 0xa0000000 - 0xa7ffffff
init subsystems: stacks vectors undefined pmap irq done.
[ using 155076 bytes of netbsd ELF symbol table ]
Copyright (c) 1996, 1997, 1998, 1999, 2000, 2001, 2002
    The NetBSD Foundation, Inc.  All rights reserved.
Copyright (c) 1982, 1986, 1989, 1991, 1993
    The Regents of the University of California.  All rights reserved.

NetBSD 1.5ZC (IQ80321) #1: Thu Mar 28 18:31:58 PST 2002
    root@tgm:/u1/netbsd/src/sys/arch/evbarm/compile/IQ80321
total memory = 128 MB
avail memory = 113 MB
using 1228 buffers containing 6656 KB of memory
mainbus0 (root)
cpu0 at mainbus0: i80321 step A-0 (XScale core)
cpu0: DC enabled IC enabled WB enabled LABT
cpu0: 32KB/32B 32-way Instruction cache
cpu0: 32KB/32B 32-way write-back-locking Data cache
obio0 at mainbus0
com0 at obio0 addr 0xfe800000: ns16550a, working fifo
com0: console
iopxs0 at mainbus0: i80321 I/O Processor, acting as PCI host
iopxs0: configuring PCI bus
pci0 at iopxs0 bus 0
pci0: i/o space, memory space enabled, rd/line, rd/mult, wr/inv ok
wm0 at pci0 dev 4 function 0: Intel i82544 1000BASE-T Ethernet, rev. 2
wm0: interrupting at iop321 irq 27
wm0: Ethernet address 00:07:e9:03:38:40
makphy0 at wm0 phy 1: Marvell 88E1000 Gigabit PHY, rev. 0
makphy0: 10baseT, 10baseT-FDX, 100baseTX, 100baseTX-FDX, 1000baseT, 1000baseT-FDX, au
clock: hz=100 stathz=0 profhz=0
boot device: unknown
root device:
```

Installing the NetBSD System

Installation for the Technologic Systems TS-7200

The following steps describe how to set up a CompactFlash card for the TS-7200. The TS-7200 can use the interactive installation program sysinst to perform an internet installation from ftp.netbsd.org on the CompactFlash.

1. Place the netbsd-TS7200_INSTALL.bin kernel into the TFTP server's download area. It must be decompressed from the gzipped image in the release directory evbarm/installation/instkernel/netbsd-TS7200_INSTALL.srec.gz

```
server# gunzip netbsd-TS7200_INSTALL.srec.gz
server# cp netbsd-TS7200_INSTALL.srec
/tftpboot/netbsd-TS7200_INSTALL
```

2. Load the kernel from the TFTP server.

```
RedBoot load netbsd-TS7200_INSTALL
```

3. Start the kernel running.

```
RedBoot go
```

The kernel will display boot messages, probe for devices, and invoke the interactive sysinst installation tool. Once sysinst has completed installation, the system will reboot back into RedBoot. If the preparation instructions above have been followed, the post-installation NetBSD kernel will be in the FIS ready to be jumped into. You can have RedBoot automatically start NetBSD by putting the command go 0x60660000 into the RedBoot bootscript using the fconfig command.

Installation for the Intel IQ80310

The following steps describe how to set up an NFS root environment for the IQ80310 and how to boot the IQ80310.

1. Place the kernel into the TFTP server's download area.

RedBoot only loads S-Records, so select a kernel with the ".srec" filename suffix. In this example, we will boot the kernel hard-wired to use the on-board Ethernet as the root device.

```
server# cp netbsd-fxp0.srec /tftpboot/netbsd-iq80310-fxp0
```

2. Unpack the distribution sets into the target's root directory.

```
server# cd /export/client/iq80310
server# gzcat .../base.tgz | tar xvpf -
server# gzcat .../etc.tgz | tar xvpf -
[repeat for all sets you wish to unpack]
```

3. Load the kernel from the TFTP server.

```
RedBoot load netbsd-iq80310-fxp0
Entry point: 0xa0200000, address range: 0xa0200000-0xa035e07c
RedBoot
```

4. Start the kernel running. The kernel will display boot message, probe for devices, and mount the root file system. If you used a kernel hard-wired to use the on-board Ethernet, it will attempt to mount the root file system automatically. Otherwise, it will prompt for the root device to use.

Since the system's run-time environment has not yet been configured, the system should boot into single-user mode.

```
RedBoot go

NetBSD/evbarm (IQ80310) booting ...
Resetting secondary PCI bus...
initarm: Configuring system ...
physmemory: 65536 pages at 0xa0000000 - 0xafffffff
init subsystems: stacks vectors undefined pmap irq done.
[ using 155084 bytes of netbsd ELF symbol table ]
Copyright (c) 1996, 1997, 1998, 1999, 2000, 2001, 2002
    The NetBSD Foundation, Inc.  All rights reserved.
```

```
Copyright (c) 1982, 1986, 1989, 1991, 1993
    The Regents of the University of California.  All rights reserved.

NetBSD 1.5ZC (IQ80310) #20: Fri Mar 29 10:25:53 PST 2002
    root@tgm:/u1/netbsd/src/sys/arch/evbarm/compile/IQ80310
total memory = 256 MB
avail memory = 232 MB
using 1228 buffers containing 13208 KB of memory
mainbus0 (root)
cpu0 at mainbus0: i80200 step A-0 (XScale core)
cpu0: DC enabled IC enabled WB enabled LABT
cpu0: 32KB/32B 32-way Instruction cache
cpu0: 32KB/32B 32-way write-back-locking Data cache
obio0 at mainbus0: board rev. F, CPLD rev. D, backplane present
com0 at obio0 addr 0xfe810000: ns16550a, working fifo
com0: console
com1 at obio0 addr 0xfe800000: ns16550a, working fifo
iopxs0 at mainbus0: i80312 Companion I/O, acting as PCI host
iopxs0: configuring Secondary PCI bus
pci0 at iopxs0 bus 1
pci0: i/o space, memory space enabled
ppb0 at pci0 dev 7 function 0: Digital Equipment DECchip 21154 PCI-PCI Bridge (rev
pci1 at ppb0 bus 2
pci1: i/o space, memory space enabled
fxp0 at pci1 dev 0 function 0: i82559S Ethernet, rev 9
fxp0: interrupting at iq80310 irq 1
fxp0: Ethernet address 00:80:4d:46:0b:b9
inphy0 at fxp0 phy 1: i82555 10/100 media interface, rev. 4
inphy0: 10baseT, 10baseT-FDX, 100baseTX, 100baseTX-FDX, auto
clock: hz=100 stathz=0 profhz=0
boot device: unknown
root on fxp0
nfs_boot: trying DHCP/BOOTP
nfs_boot: DHCP next-server: 192.168.0.1
nfs_boot: my_name=iq80310.lab.wasabisystems.com
nfs_boot: my_domain=wasabisystems.com
nfs_boot: my_addr=192.168.0.10
nfs_boot: my_mask=255.255.255.0
nfs_boot: gateway=192.168.0.254
root on 192.168.0.1:/export/client/iq80310
/etc/rc.conf is not configured.  Multiuser boot aborted.
Enter pathname of shell or RETURN for sh:
```

Installation for the Intel IQ80321

The following steps describe how to set up an NFS root environment for the IQ80321 and how to boot the IQ80321.

1. Place the kernel into the TFTP server's download area.

   RedBoot only loads S-Records, so select a kernel with the ".srec" filename suffix. In this example, we will boot the kernel hard-wired to use the on-board Ethernet as the root device.

```
server# cp netbsd-wm0.srec /tftpboot/netbsd-iq80321-wm0
```

2. Unpack the distribution sets into the target's root directory.

```
server# cd /export/client/iq80321
server# gzcat .../base.tgz | tar xvpf -
server# gzcat .../etc.tgz | tar xvpf -
[repeat for all sets you wish to unpack]
```

3. Load the kernel from the TFTP server.

```
RedBoot load netbsd-iq80321-wm0
Entry point: 0x00200000, address range: 0x00200000-0x00396a40
RedBoot
```

4. Start the kernel running. The kernel will display boot message, probe for devices, and mount the root file system. If you used a kernel hard-wired to use the on-board Ethernet, it will attempt to mount the root file system automatically. Otherwise, it will prompt for the root device to use.

   Since the system's run-time environment has not yet been configured, the system should boot into single-user mode.

```
RedBoot go

NetBSD/evbarm (IQ80321) booting ...
initarm: Configuring system ...
physmemory: 32768 pages at 0xa0000000 - 0xa7ffffff
init subsystems: stacks vectors undefined pmap irq done.
[ using 156468 bytes of netbsd ELF symbol table ]
Copyright (c) 1996, 1997, 1998, 1999, 2000, 2001, 2002
    The NetBSD Foundation, Inc.  All rights reserved.
Copyright (c) 1982, 1986, 1989, 1991, 1993
    The Regents of the University of California.  All rights reserved.

NetBSD 1.5ZC (IQ80321) #1: Thu Mar 28 18:20:34 PST 2002
    root@tgm:/u1/netbsd/src/sys/arch/evbarm/compile/IQ80321
total memory = 128 MB
avail memory = 113 MB
using 1228 buffers containing 6656 KB of memory
mainbus0 (root)
cpu0 at mainbus0: i80321 step A-0 (XScale core)
cpu0: DC enabled IC enabled WB enabled LABT
cpu0: 32KB/32B 32-way Instruction cache
cpu0: 32KB/32B 32-way write-back-locking Data cache
obio0 at mainbus0
com0 at obio0 addr 0xfe800000: ns16550a, working fifo
com0: console
iopxs0 at mainbus0: i80321 I/O Processor, acting as PCI host
iopxs0: configuring PCI bus
pci0 at iopxs0 bus 0
pci0: i/o space, memory space enabled, rd/line, rd/mult, wr/inv ok
wm0 at pci0 dev 4 function 0: Intel i82544 1000BASE-T Ethernet, rev. 2
wm0: interrupting at iop321 irq 27
wm0: Ethernet address 00:07:e9:03:38:40
makphy0 at wm0 phy 1: Marvell 88E1000 Gigabit PHY, rev. 0
```

```
makphy0: 10baseT, 10baseT-FDX, 100baseTX, 100baseTX-FDX, 1000baseT, 1000baseT-FDX,
clock: hz=100 stathz=0 profhz=0
boot device: unknown
root on wm0
nfs_boot: trying DHCP/BOOTP
nfs_boot: DHCP next-server: 192.168.0.1
nfs_boot: my_name=iq80321.lab.wasabisystems.com
nfs_boot: my_domain=wasabisystems.com
nfs_boot: my_addr=192.168.0.11
nfs_boot: my_mask=255.255.255.0
nfs_boot: gateway=192.168.0.254
root on 192.168.0.1:/export/client/iq80321
/etc/rc.conf is not configured.  Multiuser boot aborted.
Enter pathname of shell or RETURN for sh:
```

Post installation steps

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

1. Configuring `/etc/rc.conf`

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

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

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

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

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

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

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

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

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

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

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

```
ifconfig_de0="inet 123.45.67.89 netmask 255.255.255.0"
```

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

```
ifconfig_de0="inet myname.my.dom netmask 255.255.255.0"
```

To enable proper hostname resolution, you will also want to add an `/etc/resolv.conf` file or (if you are feeling a little more adventurous) run `named`(8). See `resolv.conf`(5) or `named`(8) for more information. Instead of manually configuring network and naming service, DHCP can be used by setting `dhclient=YES` in `/etc/rc.conf`.

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

2. Logging in

   After reboot, you can log in as `root` at the login prompt. Unless you've set a password in **`sysinst`**, there is no initial password. If you're using the machine in a networked environment, you should create an account for yourself (see below) and protect it and the "root" account with good passwords. By default, root login from the network is disabled (even via `ssh`(1)). One way to become root over the network is to log in as a different user that belongs to group "wheel" (see `group`(5)) and use `su`(1) to become root.

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

3. Adding accounts

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

4. The X Window System

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

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

5. Installing third party packages

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

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

     ```
     # PKG_PATH=ftp://ftp.NetBSD.org/pub/NetBSD/packages/3.0.1/evbarm/All
     # export PKG_PATH
     # pkg_add -v tcsh
     # pkg_add -v bash
     ```

```
# pkg_add -v perl
# pkg_add -v apache
# pkg_add -v kde
# pkg_add -v mozilla
...
```

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

```
# setenv PKG_PATH ftp://ftp.NetBSD.org/pub/NetBSD/packages/3.0.1/evbarm/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 doc/pkgsrc.txt files in the extraction directory (e.g. /usr/pkgsrc/README) for more information.

6. Misc

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

     ```
     # man 5 filename
     ```

     is likely to give you more information on these files.

Upgrading a previously-installed NetBSD System

There is no previous release of NetBSD/evbarm from which to upgrade.

Compatibility Issues With Previous NetBSD Releases

Users upgrading from previous versions of NetBSD may wish to bear the following problems and compatibility issues in mind when upgrading to NetBSD 3.0.1.

Issues affecting an upgrade from NetBSD 2.1 and older releases.

It is **very important** that you populate the directory /etc/pam.d with appropriate configuration files for the Pluggable Authentication Modules (PAM) because you will not be able to login any more otherwise. Using *postinstall* as described below will take care of this. Please refer to
http://www.netbsd.org/guide/en/chap-pam.html
for documentation about PAM.

The following issues can generally be resolved by extracting the **etc** set into a temporary directory and run-

ning *postinstall*:

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

Issues fixed by *postinstall*:

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

  The following issues need to be resolved manually:

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

Using online NetBSD documentation

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

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

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

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

```
# man passwd
```

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

```
# man 5 passwd
```

instead.

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

apropos *subject-word*

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

Administrivia

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

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

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

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

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

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

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

Thanks go to

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

  Keith Bostic
  Ralph Campbell
  Mike Karels
  Marshall Kirk McKusick

  for their ongoing work on BSD systems, support, and encouragement.
- The Internet Systems Consortium, Inc. for hosting the NetBSD FTP, CVS, AnonCVS, mail, mail archive, GNATS, SUP, Rsync and WWW servers.
- The Internet Research Institute in Japan for hosting the server which runs the CVSweb interface to the NetBSD source tree.
- The Helsinki University of Technology in Finland for hosting the NetBSD backup CVS and backup server.
- SSH Communications Security in Finland for operating the backup server.
- The many organizations that provide NetBSD mirror sites.
- Without CVS, this project would be impossible to manage, so our hats go off to Brian Berliner, Jeff Polk, and the various other people who've had a hand in making CVS a useful tool.
- The following individuals and organizations (each in alphabetical order) have made donations or loans of hardware and/or money, to support NetBSD development, and deserve credit for it:

AMD - Advanced Micro Devices, Inc.
ASA Computers
Aaron Wall
ABE Masayuki
AboveNet Communications, Inc.
Achim Grolms
Adam Kasper
Adaptec
Advanced System Products, Inc.
Akihiro IIJIMA
Alex Poylisher
Algorithmics, Ltd.
Alistair Crooks
Allegro Networks
Aloys Keller
Andreas Berg
Andreas Jellinghaus
Andrew Brown
Andrew Gillham
Andy Hagans
Antonio Larripa
Arend Harrewijne
Armijn Hemel
Atsushi YOKOYAMA
Avalon Computer Systems
Bay Area Internet Solutions
Ben Collver
Benoit Lepage
Bernhard Moellemann
Bill Coldwell
Bill Sommerfeld
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Brad Salai
Brains Corporation, Japan
Brian Carlstrom
Brian McGroarty
Brian Mitchell
Canada Connect Corporation
Carl Shapiro
Castor Fu
Central Iowa (Model) Railroad
Charles Conn
Charles D. Cranor
Charles M. Hannum
Chris Legrow
Chris Townsend
Christer O. Andersson
Christopher G. Demetriou
Christos Zoulas
Chuck Silvers
Cologne Chip AG
Computer und Literatur Verlag

Computertechnik Krienke & Nolte
Computing Services Department, The University of Liverpool
Convert Tools
Co-operative Research Centre for Enterprise Distributed
Curt Sampson
DAYOMON from Japan
Damicon Kraa, Finland
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emuty
Eric and Rosemary Spahr
Erik Berls
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Ernst Lehmann
Espen Randen
Ewald Kicker
Florent Parent
Frank Kardel
Free Hardware Foundation
Front Range ∗BSD User Group
FUKAUMI Naoki
Gan Uesli Starling
Garth R. Patil
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Geert Jan de Groot
GK Meier
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Greg Gingerich
Greg Girczyc
Guenther Grau
HP Sweden
Hanno Wagner
Hans Huebner
Harald Koerfgen
Haroon Khalid
Harry McDonald

Hauke Fath
Heiko W. Rupp
Herb Peyerl
Hernani Marques Madeira
Hidekichi Ookubo
Hideyuki Kido
Hisashi Fujinaka
Holger Weiss
Hubert Feyrer
IBM Corporation
IMAI Kiyoshi
Innovation Development Enterprises of America
Intel
Internet Software Consortium
Internet Users Forever IKI
Interoute Telecommunications, UK
JNUG (raised at JNUG meeting & BOF August 2005)
James Bursa
James Chacon
Jan Joris Vereijken
Jason Birnschein
Jason Brazile
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Korea BSD User Forum
Krister Waldfridsson
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Sylvain Schmitz
Takahiro Kambe
TAKEUCHI Yoji
Tamotsu Kanoh
Tasis Michalakopoulos (Athens, Greece)
Tatoku Ogaito
Ted Lemon
Ted Spradley
The Names Database
The NetBSD Mission
The People's Republic of Ames
Thierry Lacoste
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Thomas Runge
Thor Lancelot Simon
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Warped Communications, Inc.
Wasabi Systems, Inc.
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Worria Affordable Web Hosting
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Yusuke Yokota
Zach Metzinger

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

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

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