NAME

INSTALL — Installation procedure for NetBSD/sparc64.

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DESCRIPTION

About this Document

This document describes the installation procedure for NetBSD 5.1 on the *sparc64* 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.

Quick install notes for the impatient

This section contains some brief notes describing what you need to install NetBSD 5.1 on a machine of the sparc64 architecture.

- Fetch files needed to install NetBSD. This is either a CD image, `sparc64cd-5.1.iso` or the installation kernel and bootloader, `sparc64/binary/kernel/netbsd-INSTALL.gz` and `sparc64/installation/misc/ofwboot` which can be booted from a Solaris or NetBSD partition.

Alternatively, you may netboot the installation kernel. This process is covered below, in detail.

- The actual binary distribution is in the `sparc64/binary/sets/` directory. When you boot the install CD-ROM or installation kernel, the installation program can fetch these files for you (using e.g. ftp) if you have a network connection. There are several other methods to get the binary sets onto your machine.

  You will at a minimum need the following sets: `kern-GENERIC.tgz`, `base.tgz` and `etc.tgz`. In a typical workstation installation you will probably want all the installation sets.

- Burn the CD or put the installation kernel and bootloader at the root level of a bootable Solaris or NetBSD partition.

  The disk(s) you just prepared will be used to boot the installation kernel, which contains all the tools required to install NetBSD.

- You will need to get to the OpenFirmware "**`ok`**" prompt. After your system first powers on and displays some initial information, press the `STOP-A` keys, or send a BREAK if you're on a serial console. At the "**`ok`**" prompt, type the command to boot your system into NetBSD. The command to boot from CD is: "**`boot cdrom`**". The command to boot the NetBSD kernel from a Solaris or NetBSD partition depends on which disk and partition it is on. To boot from the first partition of the first (primary) disk: "**`boot disk:a /ofwboot -a`**". When it asks you for a kernel, specify "**`netbsd-INSTALL.gz`**"

- For third-party programs which are not part of the base NetBSD distribution, you will want to explore the **`pkgsrc`** system with its many thousands of third party software applications.

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 5.1 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. 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.

Dedication

NetBSD 5.1 is dedicated to the memory of Martti Kuparinen, who was the victim of a traffic accident in June 2010.

Martti's technical contributions are too many to list here in full. He created and maintained numerous packages in pkgsrc, updated two packet filter solutions distributed with NetBSD and improved several hardware drivers. Beyond that he was always helpful and friendly. His example encouraged users to contribute to the project and share their work with the community. Some of these users later became NetBSD developers themselves thanks to Martti's efforts.

Changes Between the NetBSD 5.0 and 5.1 Releases

The NetBSD 5.1 release is the first feature update of the NetBSD 5.0 release branch. It represents a selected subset of fixes deemed critical for security or stability reasons, as well as new features and enhancements.

Please note that all fixes in security/critical updates (i.e., NetBSD 5.0.1, 5.0.2, etc.) are cumulative, so the latest update contains all such fixes since the corresponding minor release. These fixes also appear in minor releases (i.e., NetBSD 5.1, 5.2, etc.).

The complete list of changes can be found in the CHANGES-5.1:
http://ftp.NetBSD.org/pub/NetBSD/NetBSD-5.1/CHANGES-5.1
file in the top level directory of the NetBSD 5.1 release tree. An abbreviated list is as follows:

Security Advisory Fixes

- NetBSD-SA2009-004 (NetBSD OpenPAM `passwd`(1) changing weakness):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-004.txt.asc
- NetBSD-SA2009-005 (Plaintext Recovery Attack Against SSH):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-005.txt.asc
- NetBSD-SA2009-006 (Buffer overflows in ntp):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-006.txt.asc
- NetBSD-SA2009-007 (Buffer overflows in `hack`(6)):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-007.txt.asc
- NetBSD-SA2009-008 (OpenSSL ASN1 parsing denial of service and CMS signature verification weakness):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-008.txt.asc
- NetBSD-SA2009-009 (OpenSSL DTLS Memory Exhaustion and DSA signature verification vulnerabilities):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-009.txt.asc
- NetBSD-SA2009-010 (ISC dhclient subnet-mask flag stack overflow):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-010.txt.asc
- NetBSD-SA2009-011 (ISC DHCP server Denial of Service vulnerability):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-011.txt.asc
- NetBSD-SA2009-012 (SHA2 implementation potential buffer overflow):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-012.txt.asc
- NetBSD-SA2009-013 (BIND named dynamic update Denial of Service vulnerability):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2009-013.txt.asc
- NetBSD-SA2010-002 (OpenSSL TLS renegotiation man in the middle vulnerability):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-002.txt.asc
- NetBSD-SA2010-003 (azalia(4)/hdaudio(4) negative mixer index panic):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-003.txt.asc
- NetBSD-SA2010-004 (amd64 per-page No-execute (NX) bit disabled):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-004.txt.asc
- NetBSD-SA2010-005 (NTP server Denial of Service vulnerability):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-005.txt.asc
- NetBSD-SA2010-006 (Buffer length checking errors in CODA):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-006.txt.asc
- NetBSD-SA2010-007 (Integer overflow in libbz2 decompression code):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-007.txt.asc

- NetBSD-SA2010-008 (sftp(1)/ftp(1)/glob(3) related resource exhaustion):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-008.txt.asc
- NetBSD-SA2010-010 (Buffer Length Handling Errors in netsmb):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-010.txt.asc
- NetBSD-SA2010-011 (OpenSSL Double Free Arbitrary Code Execution):
  http://ftp.NetBSD.org/pub/NetBSD/security/advisories/NetBSD-SA2010-011.txt.asc

Advisories prior to NetBSD-SA2009-004 do not affect NetBSD 5.0: *.:*
http://www.NetBSD.org/support/security/patches-5.0.html

Other Security Fixes

- openssl: Fix CVE-2009-4355 and CVE-2010-0740.
- Fix crash in openssl: handshake_dgst[] may be used without being allocated, causing NULL pointer dereference.
- Update BIND server and tools to 9.5.2-P2, fixing CVE-2009-0025, CVE-2009-4022, and CVE-2010-0097.
- `ntpd`(8): Fix CVE-2009-3563.
- expat: Fix SA36425 and CVE-2009-3560.
- `fts`(3): Avoid possible integer overflow on really deep dirs, and subsequent collateral damage. Received from OpenBSD via US-CERT as VU #590371.
- Fix a couple issues with POSIX message queues:
  - An invalid signal number passed to mq_notify() could crash the kernel on delivery -- add a boundary check.
  - A user could set mq_maxmsg (the maximal number of messages in a queue) to a huge value on mq_open(O_CREAT) and later use up all kernel memory by mq_send() -- add a sysctl'able limit which defaults to 16*mq_def_maxmsg.
- `arc4random`(3): Keep arc4_i and arc4_j synchronised after a rekeying. This prevents accidentally ending up in a short ARC4 cycle.
- freetype: Fix CVE-2009-0946.
- `ftpd`(8): Fix a remote crash. PR 43023.
- openldap: Fix CVE-2009-3767.
- Fix an NX regression observed on amd64 kernels, where per-page execution right was disabled (therefore leading to the inability of the kernel to detect fraudulent use of memory mappings marked as not being executable).

Kernel

- Fix random "filesystem full" messages on large FFS file systems.
- Fix a regression in the 4.4BSD scheduler, improving interactive performance under load.
- Remove a race where physio_done() may use memory already freed. PR 39536.
- Fix a crash observed when trying to load a corrupted ELF kernel module.
- Fix PR 41566, where writes on the controlling tty were not being awoken from blocks.

- Various fixes for POSIX message queues.
- Fix a couple deadlocks in the VFS subsystem. PR 41374.
- Fix an issue on some architectures where a softint could fire on the wrong CPU.
- Fixes for POSIX advisory locks.
- A number of other stability fixes.
- Fix a case where `setpriority`(2) returned EACCES instead of EPERM. PR 41489.
- `lockf`(3) passes its arguments through to `fcntl`(2) but is supposed to support -ve lengths (lock area before current offset). Nothing in libc or the kernel allowed for this, so some random part of the file would get locked. PR 41620.
- Fix ktrace of data from iovec based system calls. PR 41819.
- Fix stack size enforcement.

File Systems

- `fsck_ext2fs`(8): Ignore the "-P" option as intended, to make this work with, e.g., "fsck_flags=-pP" in `/etc/rc.conf`. PR 41490.
- UFS quotas: Add missing mutex_destroy() before pool_cache_put(). Prevents a "Mutex error: lockdebug_alloc: already initialized" panic.
- `tunefs`(8): Allow tunefs to clear any type of WAPBL log, not only in-filesystem ones.
- `fsck_ffs`(8): Do some basic checks of the WAPBL journal, and fail if the kernel would refuse to mount the filesystem read/write. Add code to clear the bogus journal when not run in preen (-p) mode.
- `wapbl`(4): If the WAPBL journal can't be read (ffs_wapbl_replay_start() fails), mount the filesystem anyway if MNT_FORCE is present. This allows to still boot single-user a system with a corrupted WAPBL on /, and so get a chance to run fsck to fix it.
- smbfs:
  - Fix some panics while trying to umount a smbfs share.
  - Fix detection of SMB capabilities according to the CIFS spec:
    - SMB_CAP_LARGE_FILES advertises support for 64-bit file offsets.
    - SMB_CAP_LARGE_READX and SMB_CAP_LARGE_WRITEX advertise support for large reads and writes (larger than 64KB). PR 42175.
  - Add support for file sizes greater than 4GB.
  - Prevent malicious local program from causing a kernel crash.
- A number of fixes for ext2fs. PR 28712.
- procfs: Fix memory leak. PR 42053.
- Fix `cp`(1) from NTFS. PR 38531.
- cd9660: Change cd9660_mount, in MNT_UPDATE case, to check dev_t's for equality instead of just vnode pointers. Fixes erroneous "Invalid argument" errors from `mount`(8) with -u against cd9660 root in the presence of mfs or tmpfs `/dev` prepared after initial mountroot.
- A number of fixes to ffs snapshots.

- sysctlfs: Fix a crash while trying to read nodes on amd64. PR 41494.
- Various improvements to UDF.
- xattr: Fix system crash which could be triggered by a malicious command.
- coda: Fix incomplete ioctl parameter verification.
- ffs: Fix a race condition which could lead to data corruption.
- `wapbl`(4): Fix replay problems which could corrupt the fs. PR 43336.

Networking

- `ath`(4): Remove the binary HAL and update to the open source HAL.
- Add the `age`(4) driver for Attansic L1.
- Add the `ale`(4) driver for Atheros AR8121/AR8113/AR8114.
- `brgphy`(4): Add support for BCM5462, BCM54K2 and BCM5722.
- `arp`(4): Don't require the gateway address to have room for both an interface name and address. Fixes a regression in 'arp -s ...' on interfaces such as xennet0 with unusually long names. PR 41878.
- Make tcp msl (max segment life) tunable via sysctl net.inet.tcp.msl.
- Fixed a number of `bge`(4) bugs.
- `ifpci`(4): Fix endianness issues when accessing the B-channel fifos.
- `wm`(4):
  - Numerous fixes for various chips.
  - Add SIOCSIFADDR support for setting the AF_LINK address, necessary for agr to be able to set the mac addresses of each port to the agr address (i.e., so it can receive all intended traffic at the hardware level).
  - Enable hardware VLAN support.
- `re`(4):
  - Detect RTL8169CP, RTL8168D/8111D, and RTL8103E variants.
  - Add hardware checksum support for newer 8168/8111/8102 chips.
  - Fix RX hardware checksum for DESCV2 chips. PR 40605.
- `le`(4): Don't immediately switch UTP/AUI ports on lost carrier.
- `agr`(4): Add vlan support and hardware offload capabilities. Add support for disabling the LACP protocol by setting LINK1 on the agr interface.
- `bnx`(4):
  - Protect against spurious "bnx0: Double mbuf allocation failure!" panics.
  - Add support for BCM5709 and BCM5716.
- Follow exactly the recommendation of draft-ietf-tcpm-tcpsecure-11.txt: Don't check against the last ack received, but the expected sequence number. This makes RST handling independent of delayed ACK.
- `vr`(4): Add suspend/resume support.

- carp(4): Improve logging. PR 38260.
- Give 100BASE-TX full duplex higher priority than 100BASE-T4.
- Fix wpa with ral(4).
- vlan(4): Inherit the parent's TCP segmentation offload capability.
- dhcpcd:
  - Update to 5.1.3.
  - Add an rc.d script.
  - Only start dhcpcd per interface if not running the full dhcpcd daemon. Only stop dhcpcd per interface if it's running for the interface. PR 40320.
- Fix a panic when trying to disable IPFilter before enabling it. PR 41364.
- ping(8): Deal with source route and record route specially giving a meaningful error message when remote side doesn't support record route. PR 41111.
- ifconfig(8): Don't require a "vlan" argument with "-vlanif". "ifconfig vlan0 -vlanif" now works as one would expect.
- tap(4): Fix a potential leak on device close. bpf(4): Prevent malicious bytecode from crashing the kernel with a divide-by-zero trap.
- UDPv6: Prevent local crash by malicious user program.

Miscellaneous Drivers

- ehci(4): Add a workaround for ATI SB600 and SB700 revisions A12 and A13 to avoid a USB subsystem hang when the system has multiple USB devices connected to it or one device is re-connected often.
- uftdi(4): Add support for multiple channel cards, specifically quad channel FT4232H.
- ums(4): Add quirks to make MS Wireless Laser Mouse 6000 work. PR 41737. Add support for USB HID devices that report absolute coordinates instead of relative movement data, e.g. touchpanels. Add support for the Microsoft Natural Ergonomic Desktop 7000 mouse.
- apm(4): Fix suspend/resume.

Audio

- Add hdaudio(4), a standards-compliant driver for Intel High Definition Audio. It will replace azalia(4) eventually.
- Add gcscaudio(4), an AMD Geode CS5536 audio driver.
- Add support for playback- or capture-only devices. PR 42050.
- pad(4): Catch up to audio(4) device_t/softc split to prevent pad from corrupting its child device's softc.
- audio(4): OSS audio allows mixer operations on the dsp device. NetBSD would previously return EINVAL in these circumstances. This can break audio in apps running under Linux emulation. Select whether to call mixer_ioctl() or audio_ioctl() based on whether the command smells like a mixer ioctl or not.

Security

- pam(3): Restore the good old UNIX behavior of root password changing: only root may change the root password.
- racoon(8): Fix a bug where racoon used a wrong IPsec-SA handle that was for another peer if it received an ISAKMP message for IPsec-SA that has the same message-id as the message-id that was received before.
- ipsec(4): Add a missing splx() call. PR 41701.
- opencrypto(9):
  - Extend the API to allow the destination buffer size to be specified when it is not the same size as the input buffer.
  - Add user-space access to compression features.
  - Add software gzip support (CRYPTO_GZIP_COMP).
  - Add the fast version of crc32 from zlib to libkern.
  - Fix PRs 41069 and 41070.

Storage

- Add support for RAIDframe parity maps. Drastically reduces the amount of time spent checking parity after an unclean shutdown by keeping better track of which regions might have had outstanding writes. Enabled by default; can be disabled on a per-set basis, or tuned, with the new raidctl(8) commands.
- Add sdmmc framework.
- Add sdhc(4), a driver for SD controllers following the SD Host Controller Standard Simplified Specification.
- Add wb(4), a driver for Winbond W83L518D SD/MMC readers.
- siisata(4): Sync with HEAD, fixing a number of bugs. PR 41579.
- mfi(4): Fix command list corruption seen on heavy I/O load. Add support for MFI gen2 devices.
- twa(4): Disable completely bogus DIAGNOSTIC check.
- wdc(4): use 8bits access to legacy IDE registers through the SATA interface (except data registers). Stops errors such as the following when probing SATA drives through controllers that offer the legacy pciide interface: viaide1 channel 0: reset failed for drive 0
- piixide(4): Add Intel 3400 support.

Platform specific

- x86 (amd64 and i386)
  - Add a workaround for a bug with some Opteron revisions where locked operations sometimes do not serve as memory barriers, allowing memory references to bleed outside of critical sections.
  - ichlpcib(4): Fix watchdog code:
    - The timer bound constants are in tick, so convert period to tick before checking it against the bounds.
    - For ICH5 or older, fix code that would have always written a 0 period to the register.

- Add CPU topology detection support for AMD processors.
- asus(4):
  - Add experimental cpu fan/voltage switching support (sysctl hw.asus0.*).
  - Add fan sensor.
- Add hw.wake.* sysctl subtree for toggling which devices are allowed to restore the system from sleep. By default, the following devices are enabled for wake: sleep/power buttons, lid switch, pc kbd controller.
- agp(4): Add support for Intel G35, G45, and Q45.
- Cut down on the number of lines used in acpi autoconf messages.
- Extend CPU probe of Intel processors to handle extended-models: new Intel 45nm processors, Core i7, Atom, and the 45nm Xeon MP. Properly decode several new Intel cache descriptors, as listed in the most recent (March 2009) edition of Intel's Application Note 485. PRs 41289 and 41290.
- cpuctl(8): Add newer VIA C7 core and VIA Nano. When printing an unknown VIA CPU, default to 'Unknown IDT/VIA' instead of 'C3'.
- Fix NetBSD under qemu with ACPI enabled. PR 38729.
- acpi(4): If the firmware describes duplicate keyboard controller nodes, don't panic when the driver fails to map registers. PR 39671.
- Fix a bug where mapping the very end of iomem accidentally returns an address in the ISA hole. Fixes ohci on VirtualPC 7 for Mac, which places OHCI at base address 0xfffff000 size 0x1000.
- int 15h/AH=86h (WAIT) doesn't work properly on all hardware and emulators, so for the countdown use the more coarsely grained sleep implementation based on int 1ah/AH=00h (GET SYSTEM TIME).
- Use the TSC and current multiplier to calculate bus clock on VIA C7 Esther.
- Add support for VIA C7 temperature sensors (options VIA_C7TEMP) and enable in i386 GENERIC kernel.
- Fix a regression in the boot loader where pressing a letter not bound to a menu item would select a numeric item.
- Enable cgd(4) support on all amd64 and i386 XEN kernels.

- amd64
  - Handle protection faults properly, returning SIGSEGV instead of SIGBUS.
  - Ensure FP state is reset, if FP is used in a signal handler. PR 39299.
  - Build kernel modules with -mno-red-zone like the kernel is built.
  - On amd64, add a third free list distinct from the default free list, holding RAM between 16Mb and 4Gb. This helps preventing bus_dma(9) memory allocation failures for 32bit DMA on large-memory machines.
- i386
  -
  - The FPU Tag word is a 16bit register, in FPU (387) mode it defines 2-bit tags for each FPU data register, in MMX mode it defines 1-bit tags for each data register. The single bit tags are stored in the lower 8 bits and thus in the first byte of the save frame.

  - Fix a local user crash.

- ARM: Work-around a possible process exit corner case which can leave stale data in the cache after a context-switch. PR 41058.
- sgimips
  - haltwo(4): Set delta value for the mixer's master channel.
  - Add a driver for the Indy's front panel buttons. Power button presses are reported to sysmon, volume control buttons are reported to PMF.
  - Fixes for newport video.
- alpha
  - A number of multiprocessor fixes. PRs 41106 and 42174.
  - Add support for booting off a couple of common RAID adapters found on several models of alpha systems: mlx [Mylex DAC060] and iop [I2O]. PR 25829.
  - Change the kernel text to 0xfffffc0000430000 (which is where Tru64 has its kernel).
  - The tsc(4) bus initialization was using a single statically allocated extent storage for each tsp(4), which caused a LOCKDEBUG kernel to fail because the extent storage contained a mutex which panics when the second mutex_init() is attempted. Put the extent storage into the tsp_config structure so each tsp(4) gets its own. PR 38358.
- amiga
  - Switch amiga to the common m68k pmap.
  - Fix a problem with the timecounter running backwards everytime the hardware counter wraps and the clock-interrupt is not yet serviced by hardclock().
  - Improve precision of small kernel delays.
  - Fix keyboard handshaking problems on Amiga 1200.
- atari
  - Rewrite the `binpatch`(8) utility to add support for ELF binaries, old src/usr.sbin/mdsetimage sources which support misc executable formats without LGPL'ed libbfd.
  - Add a workaround for annoying "WARNING: negative runtime; monotonic clock has gone backwards" message.
  - `fd`(4): Correctly detect the default density.
- hp300: Make install.md probe `cd`(4) devices properly.
- hpcmips: Fix pcic kthread creation timing. PRs 41791 and 41164.
- m68k: Ensure functions like `mmap`(2), `mremap`(2), `shmat`(2) or `sbrk`(2) return -1 in case of an error. A side benefit of this is to fix a segfault caused by jemalloc when `mmap`(2) failed.
- macppc: pbms(4): Avoid an immediate crash during attach, and fix the aspect ratio of the trackpad on the geyser2 model.
- pmax: Make `ksyms`(4) actually work.
- sh3: Fix logic error in copyinstr() when deciding whether to return EFAULT or ENAMETOOLONG.

- sparc64:
  - Fix long double support in 32bit libc. PR 41406.
  - When preparing the initial trap frame for a new forked lwp, explicitly clear condition code. Otherwise we might catch a signal before we ever return to userland. PR 41302.
  - Fix a disk I/O regression under heavy load.
  - Build the sunleo X driver.
  - Add `lom`(4), a driver for LOMlite lights out management hardware monitor and watchdog timer.
  - sab(4): Allow the RSC to be the console on an E250, by checking for RSC-specific properties, and by not changing the port baud rate.
- vax
  - binutils: Allocate relocation section using bfd_zalloc() to ensure no garbage relocations when not all the entries are used. PR 39182.
  - Keep track of the previous ICR value and hardclock_ticks to ensure the 32 bit counter doesn't go backwards. Also, the ICR runs from -10000 to -1, so adjust the value when reading it. Now mfpr works quite nicely on a 4000/90.
- sparc
  - Enable `ddb`(4) in GENERIC-like kernels.
  - Fix a number of issues with floppies.
  - Add apc(4), a driver for the Aurora Personality Chip (APC) found on SPARCstation-4/5, and emulated by qemu to idle the simulator when the CPU is idle. Only the CPU idle part implemented at this time.
- xen
  - Now a XEN3_DOM0 kernel properly updates the CMOS time.
  - Implement DIOCGDISKINFO for xbd disk driver.
  - xbdback: implement and publish "feature-flush-cache". xbd: if feature-flush-cache is present, use it for DIOCCACHESYNC. Should improve WAPBL reliability of Xen guests on a NetBSD dom0.
  - xennet: Write a "feature-rx-notify" to the xenstore, which is used by recent linux dom0 kernels. This reduces packet loss when using a NetBSD domU on such linux dom0.
  - xennetback: Announce feature-rx-copy and feature-rx-flip. Add support for request-rx-copy. PR 40650.
  - Add i368PAE support to Xen3 dom0.
  - Add Xen3 PCI pass-through support.
  - Fix stalled xbdback detach that would stall the whole xenbus thread, preventing new domUs from being created.
  - Make it possible to use netbsd-5 domUs running on a Xen2 hypervisor.

Miscellaneous

- `sh`(1): Make the cd builtin accept and ignore -P. PR 42557.
- `fdisk`(8): Fix issues with large disks.
- `savecore`(8): Instead of exiting with an obscure error message if -N /kernelname isn't specified, blithely assume the kernel will consume around 20 megs.
- `newfs`(8): Issue a better error message if attempting to create a file system on a block device. Inspired by PR 41127.
- `newfs_msdos`(8): Make fs size detection get proper size rather than disk size.
- `termcap`(3): Only add the ZZ capability for termcap entries that are larger than 1023 bytes.
- `dkctl`(8): List the partition types addwedge understands. PR 37252. Make dkctl conform to its man page and print the device name on addwedge when the addition was successful (as well as indicating success).
- If the current locale doesn't define the 'thousands' grouping info then use sane defaults (',' every 3 digits). PR 40714.
- `pthread`(3):
  - Make nanosleep cancelable again.
  - Improve the algorithm used in pthread creation so that it does a better job of reusing dead threads.
  - Make sure thread id is set correctly in case a threaded program forks from a thread other than the main thread. Fixes issues with, e.g., ruby.
- `newsyslog`(8): Reset ziptype on each line. Failure to do this caused any log file to be compressed if it was listed after a line using Z or J flag.
- nvi(1):
  - Fix a problem where the pattern / didn't match a dollar sign. PR 41781.
  - Make :ESC, #+ and #- work again.
  - Rename "expandtabs" to "expandtab" to match documentation.
  - Implement the "et" abbreviation for expandtab.
  - Fix regexp on LP64 systems. PR 41924.
  - Fix format string bug: filenames may contain % characters.
  - Fix ~ on big-endian architecturs.
- `pstat`(8): Distinguish between UFS1 and UFS2 inodes by reading the ufsmount structure, the previous heuristic of comparing the size fields of inode and dinode failed.
- `btpin`(1): Add a -P flag to attempt immediate pairing.
- `ksh`(1): Support 0xnn for hexadecimal constants, as well as 16#nn. PR 40512.
- Add support for fr_*.UTF-8 locale. Setting LANG to fr_*.UTF-8 won't get the message catalog right (they're encoded in iso-8859-1), but other locale functions should work properly.
- Add Solaris-like dlinfo() interface to the ELF dynamic linker. Implement RTLD_DI_LINKMAP which returns a pointer to the linkmap chain at the given object.

- kill(1): Make sure that numerical signals and pids are in range for their types. PR 42143.
- pcap(3): pcap_lookupnet(): reset ifr before SIOCGIFNETMASK. Without it we get back a bogus netmask. PR 41367.
- man(1): Accept a pathname to a man file, e.g., "man ./man.1"
- setlocale(3): Handle nonexistent locales properly. PR 42124.
- amldb(8): Check validity of parent to avoid a potential segfault.
- sort(1): Fix a ton of bugs including but not limited to PR 18614 PR 27257 PR 25551 PR 221 82 PR 31095 PR 30504 PR 36816 PR 37860 PR 39308 PR 42094.
- user(8): Fix -p flag: rm_eo is the first character *after* the match, so no need for a +1. Blowfish hashes are only 53 chars long, not 54.
- Update libevent to 1.4.11-stable.
- hunt(6): Fix possible remote DoS of a running hunt game, and prevent a possible theoretical attack involving >= 1 billion ammo.
- systat(1): Fix problems with SIGWINCH. PR 42161.
- gzip(1):
  - Fix support for multi-section bzip2 files, as created by pbzip2.
  - Add "pack" uncompression support.
  - Avoid an overflow in suffix handling.
- audio{ctl,play,record}: Add extended WAVE header support, attempt to play a bunch more WAV files.
- Update Postfix to 2.6.5.
- df(1): Block numbers are measured in f_frsize units. Make -P option use this instead of f_bsize. Also account for reserved blocks like normal non-P output. PR 41541.
- Update libfetch to 2.30.
- window(1): Fix a SEGV with certain terminal types. PR 41581.
- Update pkg_install to 20100204:
  - audit-packages.conf(5) has been superseded by pkg_install.conf(5). The default configuration is the same.
  - Support for pkg_view(1) has been retired.
  - The functionality of audit-packages(1) and download-vulnerability-list(1) has moved into pkg_admin(1). Wrapper scripts that handle the common use cases are provided.
- racoonctl(8): Adjust ADMINPORTDIR to match that of racoon (/var/run). PR 41376.
- schedctl(8): Skip LSIDL and LSZOMB threads when retrieving info.
- postinstall(8) now knows about /etc/dhcpcd.conf.
- drvctl(8): Allow querying for root devices in the tree by specifying an empty device name. Ensure that l_devname is NUL-terminated and fail otherwise. If drvctl -l is used without argument, print the root device nodes.

- paste(1): Null-terminate the delimiter list string after processing escapes (which can shorten it) because the code that issues delimiters depends on it being null-terminated. This caused e.g. paste -d ' ' a b to print a '0' at the beginning of each line. PR 41159.
- Don't attempt to read or write ~/.lesshst if it's not a regular file or a symlink to a regular file. Previously, symlinking to /dev/null would cause less to trash /dev/null if run with sufficient privileges. PR 42237.
- Make rtsold_flags default to -a. PR 39657.
- libevent: Add -fno-strict-aliasing to work around problems with GCC 4 and strict-aliasing.
- Renamed a number of internal getline() functions to get_line() so as to compile under -current.
- Install the Xvidtune app-defaults file. PR 41577.
- Fixes to Linux compat:
  - In sendmsg(2), copy the msghdr structure before trying to use it.
  - In linux_sys_sched_getaffinity(), do not leak memory on error.
- Various METALOG fixes, including sorting entries. PRs 24457 and 41155.
- Update DRM code.
- cdce(4): Add support for the Openmoko Freerunner. PR 40049.
- pms(4): Add elantech multi-touch support.
- Big X.Org update.
- ugen(4): ugen_get_cdesc() can return NULL. When this happens, return EINVAL error instead of crashing.
- Fix a race between nfsd and local rm. PR 41147.
- puc(4): Add support for Oxford Semiconductor OXmPCI952 2 port UARTs. Add support for the IBM 481033H SCC.
- sysinst(8): Try ATA/SCSI identify commands and when successful, use the model information along with the disk size when creating the 'Available disks' menu. PR 41925.
- Fix PR kern/41659: add missing splx() in FAST_IPSEC code.
- Add hungarian keyboard layout.
- Add Swiss German keyboard layout.
- Introduce MKSUBPIXEL, which allows enabling subpixel rendering code in FreeType.
- Support drives over 1TB in size in sysinst. Error if drive is over 2TB in in size (and thus over the disklabel limit).
- Update and add some TNF ssh keys to /etc/ssh/ssh_known_hosts.
- Prevent makefs(8) from creating invalid ISO format on rockridge support which causes fatal errors in ARC BIOS firmware on MIPS Magnum R4000. PR 42410.
- sysinst(8): When creating /etc/fstab: for the first swap partition use type "sw,dp" instead of "sw", so dump device gets configured correctly if swap is not on the second partition. PR 42148.
- sys/atomic.h: Make atomics usable from C++.

- wc(1): Add support for "-L" option (longest line) as present in the GNU and FreeBSD versions of "wc".
- libm: Add f{min,max,dim}{,l,f}.
- jemalloc: Fix race condition on reallocation of huge category. PR 42876.
- sys/null.h: Enclose (void *)0 in an extra set of parenthese to make the result usable in arbitrary expressions. PR 41890.

Known Problems

Using block device nodes (e.g., wd0a) directly for I/O may cause a kernel crash when the file system containing /dev is FFS and is mounted with -o log. Workaround: use raw disk devices (e.g., rwd0a), or remount the file system without -o log.

Occassionally, gdb may cause a process that is being debugged to hang when "single stepped". Workaround: kill and restart the affected process.

gdb cannot debug running threaded programs correctly. Workaround: generate a core file from the program using gcore(1) and pass the core to gdb, instead of debugging the running program.

The sparc port does not have functional SMP support in this release.

Features to be removed in a later release

The following features are to be removed from NetBSD in the future:

- Support for soft dependencies, also knows as soft updates (see "softdep" in mount(8)) will be removed in the next major release.

  NetBSD 5.1 includes a preview of WAPBL (Write Ahead Physical Block Logging), which will replace soft dependencies in the next major release. See wapbl(4) and
  http://mail-index.netbsd.org/netbsd-announce/2008/12/14/msg000051.html
  for details.

- Support for Xen 2.0.x. The Xen-3 and hypervisor interface is diverging from Xen-2 as development is ongoing, increasing the maintenance cost for NetBSD.

  It should be considered as deprecated. Users are expected to not rely on it any more beyond this major release.

  Further, at least version 3.1 of Xen will be required to run NetBSD as Dom0 or DomU.

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 5.1 Release Contents

The root directory of the NetBSD 5.1 release is organized as follows:

`.../NetBSD-5.1/`

`CHANGES` Changes between the 4.0 and 5.0 releases.

`CHANGES-5.0` Changes between the initial 5.0 branch and final release of 5.0.

`CHANGES-5.1` Changes between the 5.0 and 5.1 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 5.1 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, 450 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.
7 MB gzipped, 32 MB uncompressed

src This set contains all of the base NetBSD 5.1 sources which are not in **gnusrc**, **sharesrc**, or **syssrc**.
59 MB gzipped, 350 MB uncompressed

syssrc This set contains the sources to the NetBSD 5.1 kernel for all architectures as well as the `config`(1) utility.
34 MB gzipped, 197 MB uncompressed

xsrc This set contains the sources to the X Window System.
127 MB gzipped, 694 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:

`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/sparc64 subdirectory structure

The sparc64-specific portion of the NetBSD 5.1 release is found in the `sparc64` subdirectory of the distribution: `.../NetBSD-5.1/sparc64/`. 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.
`netbsd-GENERIC.MP.gz`
A gzipped NetBSD kernel containing code for everything supported in this release. This kernel supports SMP on systems with more than one CPU.
`netbsd-INSTALL.gz`
The install kernel.
`sets/` sparc64 binary distribution sets; see below.
`installation/`
`miniroot/` sparc64 miniroot file system image; see below.
`misc/` Miscellaneous sparc64 installation utilities; see installation section below.
`netboot/` Netboot bootloader; see below.

Binary distribution sets

The NetBSD sparc64 binary distribution sets contain the binaries which comprise the NetBSD 5.1 release for sparc64. The binary distribution sets can be found in the `sparc64/binary/sets` subdirectory of the NetBSD 5.1 distribution tree.

Note: If you want to install 32-bit only binaries, you will still need to boot using the sparc64 installation tools. When sysinst asks you for the distribution set to install, provide the NetBSD/sparc `binary/sets`. Be sure to use the 32 bit sparc `kern-GENERIC_SUN4U.tgz` kernel distribution. Otherwise, continue to follow the sparc64 installation procedure, not the sparc instructions.

Most people will want the 64-bit sparc64 distribution tree:

base The NetBSD 5.1 sparc64 **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.
33 MB gzipped, 104 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.
59 MB gzipped, 226 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.
4 MB gzipped, 9 MB uncompressed

kern-GENERIC
This set contains a NetBSD/sparc64 5.1 `GENERIC` kernel named `/netbsd`. You *must* install this or the kern-GENERIC.MP distribution set.
4 MB gzipped, 10 MB uncompressed

kern-GENERIC.MP
This set contains a NetBSD/sparc64 5.1 `GENERIC.MP` kernel, which will use multiple processors (if present), named `/netbsd`.
4 MB gzipped, 10 MB uncompressed

man This set includes all of the manual pages for the binaries and other software contained in the **base** set. Note that it does not include any of the manual pages that are included in the other sets.
12 MB gzipped, 50 MB uncompressed

misc This set includes the system dictionaries, the typesettable document set, and other files from `/usr/share`.
4 MB gzipped, 13 MB uncompressed

text This set includes NetBSD's text processing tools, including `groff`(1), all related programs, and their manual pages.
3 MB gzipped, 11 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 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.
8 MB gzipped, 25 MB uncompressed

xcomp The extra libraries and include files needed to compile X source code.
17 MB gzipped, 65 MB uncompressed

xfont Fonts needed by the X server and by X clients.
32 MB gzipped, 74 MB uncompressed

xetc Configuration files for X which could be locally modified.
1 MB gzipped, 1 MB uncompressed

xserver The X server. This includes the modular Xorg and Xvfb servers.
7 MB gzipped, 19 MB uncompressed

The sparc64 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.

Note: Each directory in the sparc64 binary distribution also has its own checksum files, just as the source distribution does.

NetBSD/sparc64 System Requirements and Supported Devices

Supported machines

The minimal configuration requires 32 MB of RAM and ~120 MB of disk space. To install the entire system requires much more disk space, and to run X or compile the system, more RAM is recommended, as NetBSD with 32 MB of RAM feels like Solaris with 32 MB of RAM - slow. Note that until you have at least 64 MB of RAM, getting more RAM is more important than getting a faster CPU.

Not all of the machines listed here have been tested. Often Sun will use the same motherboard design in multiple models. For example, they'll release a Blade ("workstation") model, Enterprise or Fire ("server") model, and Netra or ft ("telco") model with essentially the same devices, as far as NetBSD is concerned. If one model in this scheme works, it is highly likely another will work.

Sun has also released a few models with names that might imply the systems are UltraSPARC-based but actually have an i386 class CPU. These systems might be supported by the i386 port of NetBSD. See the following site for more info on what system boards are in which models.

http://sunsolve.sun.com/handbook_pub/Devices/System_Board/SYSBD_TOC.html

(requires a SunSolve login with a valid Sun Service Plan)

- Sbus-based UltraSPARC I or II systems
  - Ultra 1 family (Ultra 1, Ultra 1 Creator, Ultra 1 Creator 3D, Netra i 150, Netra nfs 150, Enterprise 1, Enterprise 150)
  - Ultra 2 family (Ultra 2, Ultra 2 Creator, Ultra 2 Creator 3D, Enterprise 2)
  - Enterprise (3000, 3500, 4000, 4500, 500x, 5500, 600x, 6500, 10000)
- PCI-based UltraSPARC II, IIi, or IIe systems
  - Ultra 5/10 family (Ultra 5, Ultra 10, Enterprise 5, Enterprise 10)
  - Ultra 30 family (Ultra 30, Netra T 1100)
  - Ultra 60 family (Ultra 60, E220R, Netra T 1120 and T 1125)
  - Ultra 80 family (Ultra 80, E420R, Netra T 1400 and T 1405)
  - Ultra 250 family (Enterprise 250 and E250R)
  - Ultra 450 family (Ultra 450, Enterprise 450, Netra ft 1800)
  - Blade 100 and 150
  - SPARCengine CP1400 or SPARCengine CP1500 system boards (Netra T1 (models 100 and 105), CT400, CT800, CT1600)
  - SPARCengine Ultra AXi family (Netra X1, Fire v100, Fire v120, Netra 120, Netra AC 200, Netra DC 200)
  - SPARCengine Ultra AXe system board

Unsupported machines

- Systems with an UltraSPARC III CPU
- Systems with an UltraSPARC IIIi CPU
- Systems with an UltraSPARC IV CPU
- Systems with an UltraSPARC T1 or T2

Supported devices

- Ethernet devices
  - Sbus LANCE ethernet (*le*)
  - Sbus BigMac ethernet (*be*)
  - On-board, PCI, and Sbus HME ethernet (*hme*)

  - PCI ERI (*gem*)
  - Many other PCI and PCMCIA Ethernet interfaces, including:
    - Tulip-compatible (*tlp*)
    - Intel (*fxp*)
    - Intel gigabit (*wm*)
    - NE2000-compatible (*ne*)
    - Realtek (*rtk* or *re*)
    - SysKonnect XMAC II (*sk*)
    - Marvell GMAC (*msk*)
  - Several USB Ethernet interfaces, such as (*aue*, *cue*, and *kue*)

- Wireless network adapters
  - Atheros wireless cards (*ath*)

- Video devices
  - All on-board frame buffers
    Unless otherwise specified, only text console is supported
  - On-board and SBUS card (GX, GX+, TGX, TGX+) (*cgsix*)
    8 bpp accelerated framebuffer. Accelerated X via the integrated Xorg.
  - UPA devices (ffb and afb, also called Creator3D) 24 bpp accelerated framebuffer. Accelerated X via the integrated Xorg.
  - On-board ATI mach64 framebuffers (found in Ultra 5/10).

- SCSI host controllers
  - ncr53c9x based controllers (*esp*)
  - ncr53c8xx based controllers (*siop* or *esiop*)
  - ISP10x0 based controllers (*isp*)
  - 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.

    Note: Some Adaptec cards that support booting on MacOS may be bootable on sparc64 systems.
  - Many other PCI SCSI controllers should work, but no one has tried them
  - Most SCSI disk/tape/CD-ROM devices should work

- PCI IDE host controllers
  - Generic IDE controllers (*pciide*)
  - Acard ATP-850/860 based IDE controllers (*pciide*)
    (including the Acard AEC-6210/6260 and the Sonnet Tempo ATA/66 cards)
  - CMD Tech PCI064[3689] and Silicon Image 0680 IDE Controllers (*cmdide*)
  - Silicon Image 3112, 3114, and 3512 SATA Controller (*satalink*)

    Note: Some IDE cards that support booting on MacOS may be bootable on sparc64 systems.
  - Many other PCI IDE controllers should work, but no one has tried them
  - Most IDE and ATAPI disk/tape/CD-ROM devices should work

- Floppy drives
  - On-board Floppy Disk Controller -- SBus machines only for now (*fdc*)

- Serial devices
  - On-board Sbus z8530 serial (*zs*)
  - On-board PCI 16550-based su and su-pnp serial (*com*)
  - On-board PCI SAB82532 dual UART serial (*sab*)

- Parallel devices
  - On-board and Sbus parallel ports (*bpp*)
  - On-board PCI/Ebus parallel ports (*lpt*)
- Audio devices
  - On-board, PCI, and SBus based CS4231-based 44 KHz, 16 bit, stereo, PCM audio (*audiocs*)
- Other PCI devices
  - PCI "universal" communications cards (*puc*)

There are a large number of untested PCI drivers that have never been tested on UltraSPARC PCI systems that may 'just work'.

Unsupported devices

Smart card readers.

Getting the NetBSD System on to Useful Media

Note that if you are installing or upgrading from writable media, it 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.

Note: If you are installing the 32-bit sparc distribution sets, you will need to rename `sparc/binary/sets/kern-GENERIC_SUN4U.tgz` to `kern-GENERIC.tgz` since the sparc64 installation tools would otherwise attempt to install the kernel for 32-bit sparc computers which does not boot on sparc64 systems.

CD-ROM / DVD Find out where the distribution set files are on the CD-ROM or DVD. Likely locations are `binary/sets` and `sparc64/binary/sets`.

Proceed to the instructions on installation.

MS-DOS floppy NetBSD does not include split distribution sets for installation by floppy. However, they can be created on a separate machine using the `split`(1) command, running e.g. **`split -b 235k base.tgz base.`** to split the `base.tgz` file from `sparc64/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 `204.152.190.15` and the IPv6 address is `2001:4f8:3:7:230:48ff:fec6:9aaa:21` (as of May, 2010).

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-5.1
# cd sparc64/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

Deciding on partition sizes

If you're installing NetBSD/sparc64 for the first time it's a good idea to look at the partition sizes of the disk you plan to install NetBSD on. Will you be installing NetBSD onto the same disk as Solaris, on its own disk, or will you be netbooting? While NetBSD can work just fine on a disk shared with Solaris, the NetBSD installer does not currently support this. The limitation is that the NetBSD `disklabel`(8) writes partition info that Solaris is not familiar with. Therefore, if you are sharing a disk with Solaris, any time you change a partition table, you must do it from Solaris.

Assuming a classic partition scheme with / (root) and `/usr` file systems, a comfortable size for the NetBSD / partition is about 200 MB. A full binary installation including X takes over 600 MB in `/usr`. Since the pkgsrc binaries are typically installed in `/usr/pkg` you may want a significantly larger `/usr` partition. A good initial size for the swap partition is the amount of physical memory in your machine if you've got more than 128 MB RAM. If you've got less RAM, you may want swap to be at least 128 MB.

Note that the OBP on Ultra 1 and Ultra 2 machines can only boot from the first 4Gb of the disk, so this limits the size of the root partition on these models.

Setting up Open Firmware

First, you need to stop your system from automatically booting when powered on. Pressing the `STOP` key (sometimes called the `L1` key, found on the left side of your keyboard) and the `a` key will halt your system and give you the "`ok`" prompt. If you are using a serial console, send a "BREAK" signal from your terminal (the method of sending "BREAK" varies from terminal to terminal).

If the ethernet address of your sparc64 system is `ff:ff:ff:ff:ff:ff` (check with the Open Firmware "banner" command), then your NVRAM battery is dead and you will have trouble using ethernet (among other problems). Read the Sun NVRAM/Hostid FAQ.

http://www.squirrel.com/squirrel/sun-nvram-hostid.faq.html

If you have a valid ethernet address and you plan to netboot, write down your system's ethernet address.

You cannot use the security modes of the SPARC OpenFirmware.

```
ok setenv security-mode none
```

If you are using a serial console, the NetBSD/sparc64 installer defaults to using 9600 bps, 8N1 settings. You may want to configure your system and serial terminal like this prior to booting the installer. A new installation of NetBSD/sparc64 will default to these settings as well.

SCSI devices are specified by an Open Firmware **devalias** which provides simple mnemonics for the full path to the device. Type **devalias** to get a list of all of the available aliases. At a minimum, the alias and partition are necessary when booting.

Therefore, to boot from the swap partition on the internal hard drive one would use:

ok **boot disk:b**

To boot from a CD-ROM (Open Firmware assumes SCSI CD-ROMs are at target 6), one would use:

ok **boot cdrom**

And to boot from a kernel named `netbsd-GENERIC` on the fourth partition ('d', often the `/usr` partition) on an external SCSI hard drive (target 2, partition 3), one would use:

ok **boot disk2:d netbsd-GENERIC**

If you get ".... Fast Data MMU Miss" when booting after the NetBSD installation, your OpenBoot PROM may need updating. It has been reported that version 3.31 lead to a successful boot on an Ultra Enterprise 420R, while version 3.23 did not. Exact values may vary, depending on your hardware, current OpenBoot PROM version and moon phase.

Determining how to boot from an SBUS or PCI card

Some SBUS and PCI cards have firmware that lets you use them as boot devices. These cards do not automatically create **devalias** entries, so you must traverse the device tree to figure out what Open Firmware calls your card. You will be using Open Firmware commands at the 'ok' prompt. First 'cd' to the top of the device tree and list the nodes there. The following is the procedure to boot from an IDE card in an UltraSPARC 30.

```
ok cd /
ok ls
f006cf08 SUNW,ffb@1e,0
f006c32c SUNW,UltraSPARC-II@0,0
f006002c counter-timer@1f,1c00
f005f410 pci@1f,2000
f005eb54 pci@1f,4000
f004cf84 virtual-memory
f004c9a4 memory@0,0
f002ce38 aliases
f002cdc8 options
f002cc90 openprom
f002cc24 chosen
f002cbb4 packages
```

Usually, you can simply type in the name before the at (@) sign and OpenFirmware will fill in the rest.

```
ok cd pci@1f,4000
ok ls
f0081524 ide@2
f007be50 scsi@3
f0074688 network@1,1
f0060324 ebus@1
ok cd ide@2
ok ls
0081fe4 cdrom
f0081938 disk
ok cd disk
ok ls
ok pwd
/pci@1f,4000/ide@2/disk
```

OK, now we know the path to the IDE device in this example. Now, we need to determine if it's capable of booting. If it is, it will have the **word** 'open'.

ok **words**

```
close          load           write          read           seek
open           write-blocks   read-blocks    max-transfer
block-size     dma-free       dma-alloc      spin-down      spin-up
```

Great! Also, in case you're interested in further details about your hardware, you can use the **.properties** command.

So, when it's time to type in a boot command, use the shortened version of the **pwd** command. You need to be more specific if there are two devices with the same name (in this case, two /pci entries). In this example, you'd type:

ok **boot /pci@1f,4000/ide/disk@0,0**

You can also store this device path across reboots using the **nvalias** command.

ok **nvalias wd0 /pci@1f,4000/ide/disk@0,0:a**

And when the kernel is done booting, it may not automatically use your card as the root device -- you may need to type in the NetBSD/sparc64 name for that device:

```
root on sd0a dumps on sd0b
no file system for sd0 (dev 0x700)
cannot mount root, error = 79
root device (default sd0a): ?
use one of: hme0 sd0[a-h] wd0[a-h] halt
root device (default sd0a): wd0a
dump device: wd0a
file system (default generic): ffs
root on wd0a
```

The root device can also be specified in your kernel config file.

Configuration of network interfaces

Some network devices (i.e., certain SBus cards) allow a choice between operating on a UTP or a AUI port. The `le` driver supports automatic detection of the port which is actually connected to the wire. If automatic detection is not available or not working properly in your environment, you may have to specify the type connection using the *media* parameter of `ifconfig`(8). During installation, you'll get the opportunity to specify the appropriate medium. Use `10base5/AUI` to select the AUI connector, or `10baseT/UTP` to select the UTP connector.

Installing the NetBSD System

Installing NetBSD is a relatively complex process, but if you have this document in hand it shouldn't be too much trouble.

There are several ways to install NetBSD onto a disk. The easiest way in terms of preliminary setup is to install from CD-ROM. If you don't have access to a CD-ROM or CD-ROM burner, you can use a miniroot image that can be booted off your local disk's swap partition. Alternatively, if your UltraSPARC is hooked up in a network you can find a server and arrange for a diskless setup which is a convenient way to install on a machine whose disk does not currently hold a usable operating system (see the section **Installing NetBSD by using a diskless setup** below).

If you have problems with these or you are installing NetBSD onto the same disk as Solaris, see the section below on **Manual Installation of NetBSD using Solaris**

Installing NetBSD from CD-ROM

Installing from CD-ROM is the least painful way to install NetBSD. Simply insert the CD-ROM in the drive, power up the computer, and type:

ok **boot cdrom**

This Open Firmware boot command will cause the NetBSD kernel contained in the CD-ROM to be booted. After the initial probe messages you'll be asked to start the install or upgrade procedure. Proceed to the section **Running the sysinst installation program** below.

Installing NetBSD by using the NetBSD miniroot

The miniroot is a self-contained NetBSD file system holding all utilities necessary to install NetBSD on a local disk. It is distributed as a plain file designed to be transferred to a raw disk partition from which it can be booted using the appropriate OpenFirmware command. Usually, the miniroot will be loaded into the swap partition of a disk. If needed, you can use any other unused partition, but remember that the partition will then not available during the installation process.

Loading the miniroot onto your raw partition is simple using the `dd`(1) command. Just remember to first uncompress the miniroot image and boot your OS with the `-s` flag so that it runs "single-user" and does not attempt to start swapping.

ok **boot -s**

On Solaris you use a command like:

gunzip miniroot.fs.gz
dd if=miniroot.fs of=/dev/rdsk/c0t0d0s1 bs=4k

On NetBSD the command is:

gunzip miniroot.fs.gz
dd if=miniroot.fs of=/dev/rsd0b bs=4k

Replace `/dev/rdsk/c0t0d0s1` or `/dev/rsd0b` with your swap partition.

After transferring the miniroot to disk, bring the system down by:

halt

Then boot the miniroot by typing the appropriate command at the OpenFirmware prompt:

ok **boot disk:b netbsd**

If you've loaded the miniroot onto some other disk than `sd0` use the correct `devalias`, such as

ok **boot disk1:b netbsd**

This Open Firmware boot command will cause the NetBSD kernel contained in the miniroot image to be booted. After the initial probe messages you'll be asked to start the install or upgrade procedure. Proceed to the section **Running the sysinst installation program** below.

Installing NetBSD by using a NetBSD kernel on a Solaris partition

This procedure is very straightforward. You will be putting the NetBSD installation kernel (kernel with a RAM disk installer) on your Solaris partition and telling Open Firmware to boot the NetBSD kernel.

CAVEAT: this method is a bit fragile. Depending on physical partition layout, partition size, and parameters used to create the filesystem of your Solaris root partition, bugs in the bootloader might be triggered and cause this method to fail.

First, copy the `netbsd-INSTALL.gz` kernel and bootloader to the root level of your hard drive and halt your system

```
# cp binary/kernel/netbsd-INSTALL.gz /
# cp installation/misc/ofwboot /
# halt
```

At the Open Firmware prompt, boot NetBSD.

```
ok boot disk:a /ofwboot -a
```

The `-a` flag is needed so that the bootloader will ask you to find your installation kernel.

```
Rebooting with command: boot disk:a /ofwboot -a
Boot device: /pci@1f,4000/scsi@3/disk@0,0:a  File and args: /ofwboot -a
Enter filename [/ofwboot]: <return>
>> NetBSD/sparc64 OpenFirmware Boot, Revision 1.7
>> (autobuild@tgm.netbsd.org, Thu May 20 16:29:20 UTC 2004)
Boot: netbsd-INSTALL.gz
```

After the initial probe messages you'll be asked to start the install or upgrade procedure. Proceed to the section **Running the sysinst installation program** below.

Installing NetBSD by using a netboot setup

1. Introduction

   To netboot a sparc64, you must configure one or more servers to provide information and files to your sparc64 (the 'client'). If you are using NetBSD (any architecture) on your netboot server(s), the information provided here should be sufficient to configure everything. Additionally, you may wish to look at the `diskless`(8) manual page and the manual pages for each daemon you'll be configuring. If the server(s) are another operating system, you should consult the NetBSD Diskless HOW-TO, which will walk you through the steps necessary to configure the netboot services on a variety of platforms.

   http://www.NetBSD.org/docs/network/netboot/

   You may either netboot the installer so you can install onto a locally attached disk, or you may run your system entirely over the network.

   Briefly, the netboot process involves discovery, bootstrap, kernel and file system stages. In the first stage, the client discovers information about where to find the bootstrap program. Next, it downloads and executes the bootstrap program. The bootstrap program goes through another discovery phase to determine where the kernel is located. The bootstrap program tries to mount the NFS share containing the kernel. Once the kernel is loaded, it starts executing. For RAM disk kernels, it mounts the RAM disk file system and begins executing the installer from the RAM disk. For normal (non-RAM disk) kernels, the kernel tries to mount the NFS share that had the kernel and starts executing the installation tools or `init`(8). All sparc64 systems use a combination of RARP and DHCP for the discovery stage. TFTP is used in the bootstrap phase to download the bootstrap program, `ofwboot.net`, which has been linked to a file name appropriate to the client's IP address as described in the TFTP section below. NFS is used in both the kernel and file system stages to download the kernel, and to access files on the file server.

   We will use '`CC:CC:CC:CC:CC:CC`' as the MAC address (ethernet hardware address) of your netboot client machine. You should have determined this address in an earlier stage. In this example, we will use '`192.168.1.10`' as the IP address of your client and '`client.test.net`' as its name. We will assume you're providing all of your netboot services on one machine called '`server.test.net`' with the client's files exported from the directory `/export/client/root`. You should, of course, replace all of these with the names, addresses, and paths appropriate to your environment.

   You should set up each netboot stage in order (i.e., discovery, bootstrap, kernel, and then file system) so that you can test them as you proceed.

2. dhcpd(8) in bootpd(8) compatible mode

   Put the following lines in your /etc/dhcpd.conf (see dhcpd.conf(5) and dhcp-options(5) for more information):

```
ddns-update-style none;
                # Do not use any dynamic DNS features
                #
allow bootp;    # Allow bootp requests, thus the dhcp server
                # will act as a bootp server.
                #
authoritative;  # master DHCP server for this subnet
                #
subnet 192.168.1.0 netmask 255.255.255.0 {
                # Which network interface to listen on.
                # The zeros indicate the range of addresses
                # that are allowed to connect.
}
group {
                # Set of parameters common to all clients
                # in this "group".
                #
        option broadcast-address        192.168.1.255;
        option domain-name              "test.net";
        option domain-name-servers      dns.test.net;
        option routers                  router.test.net;
        option subnet-mask              255.255.255.0;
                #
                # An individual client.
                #
        host client.test.net {
                hardware ethernet       CC:CC:CC:CC:CC:CC;
                fixed-address           192.168.1.10;
                #
                # Name of the host (if the fixed address
                # doesn't resolve to a simple name).
                #
                option host-name        "client";
                #
                # Name of the bootloader or kernel
                # to download via tftp.

                #
                # The path on the NFS server.
                #
                option root-path "/export/client/root";

                #
                # If your DHCP server is not your NFS server, supply the
                # address of the NFS server. Since we assume you run everythi
                # on one server, this is not needed.
                #
                # next-server server.test.net;
```

```
        }
 #you may paste another "host" entry here for additional
 #clients on this network
}
```

You will need to make sure that the `dhcpd.leases` file exists.

```
# touch /var/db/dhcpd.leases
```

You will need to start the **dhcpd**. If it's already running, you will need to restart it to force it to re-read its configuration file. If the server is running NetBSD, you can achieve this with:

```
# /etc/rc.d/dhcpd restart
```

3. `rarpd`(8)

   Create an `/etc/ethers` file with the following line:

   ```
   CC:CC:CC:CC:CC:CC     client
   ```

   Add your client to the server's `/etc/hosts` file:

   ```
   192.168.1.10 client
   ```

   You will need to start the **rarpd**. If it's already running, you will need to restart it to force it to re-read its configuration file. If the server is running NetBSD, you can achieve this with:

   ```
   # /etc/rc.d/rarpd restart
   ```

4. `tftpd`(8)

   The default configuration of the TFTP server is to run in a `chroot`(8) environment in the `/tftpboot` directory. Thus, the first order of business is to create this directory:

   ```
   # mkdir -p /tftpboot
   ```

   Next, edit `/etc/inetd.conf` and uncomment the line with the TFTP daemon:

   ```
   tftp  dgram  udp  wait  root  /usr/libexec/tftpd tftpd -l -s /tftpboot
   ```

   Now, restart `inetd`(8). If the server is running NetBSD, you can achieve this with:

   ```
   # /etc/rc.d/inetd restart
   ```

   Now, you need to copy the bootloader for your sparc64 machine to `/tftpboot`. Get `ofwboot.net` from the `installation/netboot` directory of the distribution.

   ```
   # cp ofwboot.net /tftpboot
   ```

   Now, you need to link `ofwboot.net` to the filename that your sparc64 will look for. It will look for a filename composed of the machine's IP address (in hexadecimal). For example, a machine which has been assigned IP address 192.168.1.10, will make a TFTP request for `C0A8010A`.

   You can use `bc`(1) to help calculate the filename:

   ```
   # bc
   obase=16
   192
   C0
   168
   A8
   1
   1
   ```

```
10
A
quit
# cd /tftpboot
# ln -s ofwboot.net C0A8010A
```

Just to be sure, let's make everything readable.

```
# chmod -R a+rX /tftpboot
```

Sometimes, the arp(8) table gets messed up, and the TFTP server can't communicate with the client. In this case, it will write a log message (via syslogd(8)) to /var/log/messages saying: 'tftpd: write: Host is down'. If this is the case, you may need to force the server to map your client's ethernet address to its IP address:

```
# arp -s client CC:CC:CC:CC:CC:CC
```

5. nfsd(8), mountd(8), and rpcbind(8)

   Now your system should be able to load the bootstrap program and start looking for the kernel. Let's set up the NFS server. Create the directory you are exporting for the netboot client:

   ```
   # mkdir -p /export/client/root
   ```

   Put the following line in /etc/exports to enable NFS sharing:

   /export/client/root -maproot=root client.test.net

   If your server is currently running an NFS server, you only need to restart mountd(8). Otherwise, you need to start rpcbind(8) and nfsd(8). If the server is running NetBSD, you can achieve this with:

   ```
   # /etc/rc.d/rpcbind start
   # /etc/rc.d/nfsd start
   # /etc/rc.d/mountd restart
   ```

6. NetBSD kernel and installation tools

   Now, if you place a kernel named netbsd in /export/client/root your client should boot the kernel. Use binary/kernel/netbsd-GENERIC.gz.

   ```
   # gunzip netbsd-GENERIC.gz
   # mv netbsd-GENERIC /export/client/root/netbsd
   ```

   If you are netbooting the installer, copy the distribution files to the client's root directory and extract the tools from installation/misc/instfs.tgz.

   ```
   # cp *tgz /export/client/root
   # cd /export/client/root
   # tar -xpzf instfs.tgz
   ```

7. Client file system

   You can skip this step if you do not plan to run your client diskless after installation. Otherwise, you need to extract and set up the client's installation of NetBSD. The Diskless HOW-TO describes how to provide better security and save space on the NFS server over the procedure listed here. See

   http://www.NetBSD.org/docs/network/netboot/nfs.html

   for details.

   - Extracting distribution sets

     ```
     # cd /export/client/root
     # tar -xpzf /path/to/files/base.tgz
     ```

```
# tar -xpzf /path/to/files/etc.tgz
```

Continue with the other non-essential distribution sets if desired.

- Set up swap

```
# mkdir /export/client/root/swap
# dd if=/dev/zero of=/export/client/swap bs=4k count=4k
# echo '/export/client/swap -maproot=root:wheel client.test.net' | cat >> /
# /etc/rc.d/mountd restart
```

This creates a 16 MB swap file and exports it to the client.

- Create device nodes

```
# cd /export/client/root/dev
# ./MAKEDEV all
```

This procedure only works on NetBSD hosts.

- Set up the client's `fstab`(5)

Create a file in `/export/client/root/etc/fstab` with the following lines:

```
server:/export/client/swap   none  swap  sw,nfsmntpt=/swap
server:/export/client/root   /     nfs   rw 0 0
```

- Set up the client's `rc.conf`(5)

Edit `/export/client/root/etc/rc.conf`

```
rc_configured=YES
hostname="client"
defaultroute="192.168.1.1"
nfs_client=YES
auto_ifconfig=NO
net_interfaces=""
```

Make sure rc does not reconfigure the network device since it will lose its connection to the NFS server with your root file system.

- Set up the client's `hosts`(5) file.

Edit `/export/client/root/etc/hosts`

```
::1                     localhost
127.0.0.1               localhost
192.168.1.10 client.test.net client
192.168.1.5  server.test.net server
```

8. Setting up the server daemons

If you want these services to start up every time you boot your server, make sure the following lines are present in your `/etc/rc.conf`:

```
dhcpd=YES        dhcpd_flags="-q"
rarpd=YES        rarpd_flags="-a"
nfs_server=YES         # enable server daemons
mountd=YES
rpcbind=YES      rpcbind_flags="-l"   # -l logs libwrap
```

Also, you'll need to make sure the `tftpd` line in `/etc/inetd.conf` remains uncommented.

Now, netboot your system from the server by entering the appropriate **boot** command at the Open Firmware prompt.

ok **boot net netbsd**

After the initial probe messages you'll be asked to start the install or upgrade procedure. Proceed to the section **Running the sysinst installation program** below.

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. *General*

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

3. *Quick install*

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

   - What you need.
     - The distribution sets (in this example, they are on CD).
     - A CD-ROM drive (SCSI or ATAPI), a hard disk and a minimum of 32 MB of memory installed.
     - The hard disk should have at least 200 + *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
     - Boot the system as described above. You should be at the **sysinst** main menu.

```
.*******************************************.
* NetBSD-5.1 Install System                  *
*                                            *
*>a: Install NetBSD to hard disk             *
* b: Upgrade NetBSD on a hard disk           *
* c: Re-install sets or install additional sets *
* d: Reboot the computer                     *
* e: Utility menu                            *
* x: Exit Install System                     *
.*******************************************.
```

- If you wish, you can configure some network settings immediately by choosing the **Utility menu** and then **Configure network**. It isn't actually required at this point, but it may be more convenient. Go back to the main menu.
- Choose **install**.
- You will be guided through some steps regarding the setup of your disk, and the selection of distributed components to install. When in doubt, refer to the rest of this document for details.

  WARNING: If you are installing onto a disk which you want to use with Solaris, stop here. You will need to perform a manual installation as **sysinst** overwrites the Solaris partition table. See the section on **Manual Installation of NetBSD using Solaris**
- 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.**
- Once the system reaches the Open Firmware prompt, you will need to type the correct command to boot from your hard 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.

4. *Booting NetBSD*

   You may want to read the boot messages, to notice your disk's name and capacity. Its name will be something like `sd0` or `wd0` and the geometry will be printed on a line that begins with its name. As mentioned above, you may need your disk's geometry when creating NetBSD's partitions. You will also need to know the name, to tell **sysinst** which disk to use. The most important thing to know is that `wd0` is NetBSD's name for your first IDE disk, `wd1` the second, etc. `sd0` is your first SCSI disk, `sd1` the second, etc.

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

5. *Network configuration*

   If you 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.

6. *Installation drive selection and parameters*

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

   The first thing is to identify the disk on which you want to install NetBSD. **sysinst** will report a list of disks it finds and ask you for your selection. You should see disk names like `wd0`, `wd1`, `sd0` or `sd1`.

7. *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.

8. *Partitioning the disk*

- Which portion of the disk to use.

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

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

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

10. *Preparing your hard disk*

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

11. *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'.

12. *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.

13. *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.

14. *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.

15. *Installation from an unmounted file system*

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

16. *Installation from a local directory*

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

17. *Extracting the distribution sets*

    Before extraction begins, you can elect to watch the files being extracted; the name of each file that is extracted will be shown. This can slow down the installation process considerably on machines with slow graphics consoles or serial consoles. Alternatively, you can choose to see a progress bar. This is the preferred option as it shows progress without significantly slowing down the installation process.

    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. The next menu will allow you to select the time zone that you're in, to make sure your clock has the right offset from UTC. Finally you will be asked to select a password encryption algorithm and can then set a password for the "root" account, to prevent the machine from coming up without access restrictions.

18. *Ensure you have the correct kernel installed*

    If you are installing from the 32-bit sparc distribution set, make sure that you installed the correct kernel. The sparc64 installation tools do not by default copy the correct 32-bit kernel. Unless you prepared ahead of time by renaming the `kern-GENERIC_SUN4U.tgz` to `kern-GENERIC.tgz` then you will need to follow the next few instructions.

    Go to the main installation menu, and select **Utility menu** and then select the **Run /bin/sh** option, which will give you a shell prompt. 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 '^?'
    ```

    Type the following command (replacing `wd0a` with the partition name of your destination root partition):

    ```
    # mount /dev/wd0a /mnt
    # cd /mnt
    ```

    Now you ned to mount the location of your distribution sets:

    ```
    # mount /dev/cd0a /mnt2
    # tar xpzvf /mnt2/sparc/binary/kernel/kern-GENERIC_SUN4U.tgz
    # umount /mnt
    # umount /mnt2
    # exit
    ```

19. *Finalizing your installation*

    Congratulations, you have successfully installed NetBSD 5.1. You can now reboot the machine and boot NetBSD from hard disk.

Skip down to the section on **Booting NetBSD for the first time**

Manual Installation of NetBSD using Solaris

(Adapted from Murray Stokely's <murray@osd.bsdi.com> instructions)

You can use Solaris to prepare the NetBSD user-friendly installer or to perform a full manual installation of NetBSD. If you want to use the user-friendly miniroot installer or RAM disk installation kernel, follow the sections **Installing NetBSD by using the NetBSD miniroot** or **Installing NetBSD by using a NetBSD kernel on a Solaris partition**.

Manual installation from Solaris 10 is not possible because NetBSD cannot use the resulting UFS file system. It is possible to install Solaris 10 and NetBSD on the same disk. To do so, partition the disk with the Solaris format command, then boot NetBSD and perform a manual installation. Be careful not to write a NetBSD disklabel. Use the disklabel command to read the partition size, as constructed from the Solaris disklabel. By default the NetBSD newfs command writes a NetBSD disklabel. Avoid this by using the -F and -s arguments to newfs.

- *Preparing the disk in Solaris*

  The first step is to format and label the disk that you would like to use with NetBSD. This can be accomplished with the `format`(1M) command in Solaris, which allows you to partition a disk and write a disklabel. It also is used to perform a low-level format on SCSI drives. You will want to create a root partition and a swap partition. Depending on your preferences, you may also wish to create separate `/usr` or `/var` partitions.

  ```
  # /usr/sbin/format
  Searching for disks...
  Mode sense page(3) reports nsect value as 280, adjusting it to 218
  ```

```
done

c0t1d0: configured with capacity of 16.95GB

AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135>
          /pci@1f,4000/scsi@3/sd@0,0
       1. c0t1d0 <IBM-DXHS18Y-0430 cyl 8152 alt 2 hd 20 sec 218>
          /pci@1f,4000/scsi@3/sd@1,0
Specify disk (enter its number): 1
selecting c0t1d0
[disk formatted]
Disk not labeled.  Label it now? y

format> format
Ready to format.  Formatting cannot be interrupted
and takes 114 minutes (estimated). Continue? y
Beginning format. The current time is Sat May 29 22:15:13 2004

Formatting...
done
Verifying media...
        pass 0 - pattern = 0xc6dec6de
   8151/19/208
        pass 1 - pattern = 0x6db6db6d
   8151/19/208

Total of 0 defective blocks repaired.
format> partition
partition> print
Current partition table (original):
Total disk cylinders available: 8152 + 2 (reserved cylinders)

Part      Tag    Flag     Cylinders        Size            Blocks
  0       root    wm       0 -   60      129.86MB    (61/0/0)     265960
  1       swap    wu      61 -  121      129.86MB    (61/0/0)     265960
  2     backup    wu       0 - 8151       16.95GB    (8152/0/0) 35542720
  3 unassigned    wm       0               0         (0/0/0)           0
  4 unassigned    wm       0               0         (0/0/0)           0
  5 unassigned    wm       0               0         (0/0/0)           0
  6        usr    wm     122 - 8151       16.69GB    (8030/0/0) 35010800
  7 unassigned    wm       0               0         (0/0/0)           0

partition> label
Ready to label disk, continue? y
partition> quit
format> quit
```

After your disk has been labeled you need to create file systems on your slices. The Solaris `newfs`(1M) command will create ffs file systems that can be used by NetBSD.

```
# /usr/sbin/newfs /dev/dsk/c0t1d0s0
# /usr/sbin/newfs /dev/dsk/c0t1d0s6
```

- *Installing NetBSD Software from Solaris*

  You should now mount your NetBSD root and `/usr` partitions under Solaris so that you can populate the file systems with NetBSD binaries.

```
# /usr/sbin/mount /dev/dsk/c0t1d0s0 /mnt
# mkdir /mnt/usr
# /usr/sbin/mount /dev/dsk/c0t1d0s6 /mnt/usr
```

  Now extract the distribution file sets

```
# cd ~/netbsd/binary/sets
# gunzip *.tar.gz
# echo ~/netbsd/binary/sets/*.tar | (cd /mnt; xargs -n1 pax -rpe -f )
```

  Now you should copy the NetBSD second stage bootloader into your new root partition and install the bootblocks using Solaris's `installboot`(1M) command.

```
# cp ~/netbsd/installation/misc/ofwboot /mnt
# /usr/sbin/installboot ~/netbsd/installation/misc/bootblk /dev/rdsk/c0t1d0s0
```

- *Creating NetBSD Device Nodes under Solaris*

  This is not a necessary step. If your `/dev` directory is empty, `init`(8) will create a RAM disk with all of the essential device nodes each time the system boots. If you want to create the device nodes on disk, you will need to use the Solaris `mknod`(1M) command. Look in `/dev/MAKEDEV` for the correct names, major and minor numbers, ownership, and permissions.

- *Configuring the NetBSD system from Solaris*

  To save effort, you may want to use your favorite Solaris editor to configure some of the files in `/etc` before booting into NetBSD the first time. In particular, you should look at `/etc/fstab`, `/etc/rc.conf`, `/etc/resolv.conf`, and `/etc/hosts`. See the section below on **Post installation steps** before **Booting NetBSD for the first time**.

Booting NetBSD for the first time

Now it is time to boot NetBSD for the first time. You will boot from your disk using similar syntax as described above in **Setting up Open Firmware** and **Determining how to boot from an SBUS or PCI card**. To boot from your first disk, type:

```
ok boot 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 **sun** for a local console, or whatever is appropriate for your serial console (some systems display garbage with a **sun** terminal type, you may need to use **sun-ss5**) 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_hme0="inet 192.0.2.123 netmask 255.255.255.0"
```

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

```
ifconfig_hme0="inet myname.my.dom netmask 255.255.255.0"
```

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

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

2. Select the proper terminal devices

   If you are using a serial console, you will have to edit the `/etc/ttys` file and change sun-ss5 to the appropriate terminal type, such as vt220.

3. Logging in

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

4. Adding accounts

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

5. The X Window System

   If you 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

6. Installing third party packages

If you wish to install any of the software freely available for UNIX-like systems you are strongly advised to first check the NetBSD package system, 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/NetBSD/packages/pkgsrc/README.html
- Precompiled binaries can be found at
  ftp://ftp.NetBSD.org/pub/pkgsrc/packages/NetBSD/
  usually in the `sparc64/5.1/All` subdir. You can install them with the following commands under `sh`(1):

```
# PKG_PATH=ftp://ftp.NetBSD.org/pub/pkgsrc/packages/NetBSD/sparc64/5.1/All
# export PKG_PATH
# pkg_add -v tcsh
# pkg_add -v bash
# pkg_add -v perl
# pkg_add -v apache
# pkg_add -v kde
# pkg_add -v firefox
...
```

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

```
# setenv PKG_PATH ftp://ftp.NetBSD.org/pub/pkgsrc/packages/NetBSD/sparc64/5.1/A
```

  Note: Some mirror sites don't mirror the `/pub/pkgsrc` directory. If you would like to use such mirrors, you could also try the `/pub/NetBSD/packages/current-packages/NetBSD/sparc64/5.1/All` directory, which may have the same contents.

  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.

  Note: In some cases the `pkg_add`(1) command will complain about a version mismatch of packages with a message like the following:

```
Warning: package 'foo' was built for a different version
of the OS:
NetBSD/i386 M.N (pkg) vs. NetBSD/i386 5.1 (this host),
```

  This warning is harmless if the formal major release numbers are the same between the pkg and your host. Please refer to the NetBSD release glossary and graphs at
  http://www.NetBSD.org/releases/release-map.html
  for more information about NetBSD's release numbering scheme.
- The framework for compiling packages can be obtained by retrieving the file
  ftp://ftp.NetBSD.org/pub/NetBSD/packages/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.

7. 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 5.1 is with binaries, and that is the method documented here.

To do the upgrade, you must boot the install kernel using one of the methods described above. 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 5.1 system. However, that doesn't mean that you're finished with the upgrade process. You will probably want to update the set of device nodes you have in `/dev`. If you've changed the contents of `/dev` by hand, you will need to be careful about this, but if not, you can just cd into `/dev`, and run the command:

```
# sh MAKEDEV all
```

Finally, you will want to delete old binaries that were part of the version of NetBSD that you upgraded from and have since been removed from the NetBSD distribution.

Compatibility Issues With Previous NetBSD Releases

Users upgrading from previous versions of NetBSD may wish to bear the following problems and compatibility issues in mind when upgrading to NetBSD 5.1.

If your port uses X.Org and you see messages from the X server indicating that no devices were found, you may need to run **X -configure** and update your existing xorg.conf to use the BusID line from the newly-generated config file.

Dual-head support for PC systems has become broken for many configurations with the update to xorg-server 1.6.x, which has removed the userland PCI configuration mechanism, and needs to rely upon the OS. We

hope to correct this for future releases. Workaround: The only workaround is non-trivial and requires programming several PCI BAR registers as they previously were in NetBSD 5.0.

If you are updating to NetBSD 5.1 without the aid of sysinst or postinstall and your port uses X.Org, be sure to remove `/usr/X11R7/lib/X11/xkb/symbols/pc` before extracting the xbase set. In the version of X.Org shipped with 5.0, this was a directory, but in more recent X.Org versions it is a file.

On ports using X.Org, libpixman and libXfont had their major versions bumped. This can be a source of trouble if using binary packages built on 5.0.x with a clean install of 5.1 (upgrades from 5.0.x will include both old and new versions of libpixman and libXfont). Compatibility packages have been prepared and are available from:

ftp://ftp.NetBSD.org/pub/pkgsrc/packages/NetBSD/sparc64/5.0/emulators/compat50-5.1.tgz

(or a convenient mirror). This URL can be passed directly to the `pkg_add`(1) command.

pkg_install now depends on the pkgdb cache for automatic conflict detection. It is recommended to rebuild the cache with

```
# pkg_admin rebuild
```

`audit-packages.conf`(5) has been superseded by `pkg_install.conf`(5). The default configuration is the same.

Support for `pkg_view`(1) has been retired.

The functionality of `audit-packages`(1) and `download-vulnerability-list`(1) has moved into `pkg_admin`(1). However, wrapper scripts that handle the common use cases are provided.

Issues when running older binaries on NetBSD 5.1

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.x kernel with an older userland.
- Running an older userland inside a chroot'ed environment on a 5.x system.
- Running older statically linked pthread applications.

The 5.x kernel defaults to `0` for `kern.no_sa_support`, which covers the first case. However, please note that a full installation of 5.x (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).

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 3.x releases

See the section below on upgrading from NetBSD 4.x as well.

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 '_proxy', '_rwhod', and '_sdpd' and the groups '_proxy', '_rwhod' and '_sdpd' need to be created and the user 'uucp' needs to be updated.
- A number of things were removed in the NetBSD 4.0 release, including: the evbsh5 port, the Fortran 77 compiler (g77), NETCCITT, NETNS, Sendmail, Sushi, UUCP, and Vinum. If you were using any of these, please see the "Components removed from NetBSD" at
  http://www.NetBSD.org/releases/formal-4/NetBSD-4.0.html#removals
- The replacement of Sendmail by Postfix can be handled automatically by *postinstall* but it is not done by default. If you want to transition to Postfix, the command

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

  will update your `/etc/mailer.conf` file to use Postfix as the MTA. When using **`sysinst`** to upgrade the system, it will ask if you want this to be done.

  Note that if you have a customized Sendmail setup, you need to set up Postfix in an equivalent way; there is no tool for automatic conversion of Sendmail configuration to a Postfix one.

  Postfix will be started automatically when the system boots. You may see messages like "$sendmail is not set properly" at boot. You can suppress them by removing `/etc/rc.d/sendmail` and `/etc/rc.d/smmsp`. Those files and other parts of sendmail configuration like files under `/usr/share/sendmail` are not removed by default while upgrading for those who want to continue using sendmail from outside the base system. If you want to delete them, *postinstall* can be used:

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

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 5.1 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.

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 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 Luleå Academic Computer Society for providing the backup services server.
- The Columbia University Computer Science Department for hosting the NYC build cluster.
- The Western Washington University Computer Science Department for running the WWU build cluster.
- The many organizations that provide NetBSD mirror sites.
- Without CVS, this project would be impossible to manage, so our hats go off to Brian Berliner, Jeff Polk, and the various other people who've had a hand in making CVS a useful tool.
- We list the individuals and organizations that have made donations or loans of hardware and/or money, to support NetBSD development, and deserve credit for it at **http://www.NetBSD.org/donations/** (If you're not on that list and should be, tell us! We probably were not able to get in touch with you, to verify that you wanted to be listed.)
- Finally, we thank all of the people who've put sweat and tears into developing NetBSD since its inception in January, 1993. (Obviously, there are a lot more people who deserve thanks here. If you're one of them, and would like to be mentioned, tell us!)

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