The NetBSD Operating System

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What is NetBSD?

- NetBSD is a freely distributable UNIX-like operating system.
- NetBSD is a solid platform suitable for mission-critical applications and use in commercial products.
- NetBSD is portable, and runs on a wide variety of hardware.
- NetBSD is based on a variety of free software, including 4.4BSD-Lite2 from the University of California, Berkeley.
- NetBSD is developed and supported by a large group of volunteers from all over the world.

NetBSD Project Goals

- Provide a complete, secure, UNIX-like operating system suitable for use by educators, researchers, professionals, and hobbyists
- Port to as many hardware platforms as possible
- Focus on good design and clean implementation
- Avoid restrictive licensing
- Conform to open standards
- Provide documentation on kernel internals

NetBSD Project Organization

- The NetBSD Foundation, Inc.
  - Non-profit organization chartered to support the NetBSD Project
- The Core Group
  - The acting body for The NetBSD Foundation, Inc.
  - Manages the Project's people and services
  - Performs the role of system architect
- The Port Masters
  - Responsible for the verious platform-specific portions of the NetBSD operating system
- The Developers
  - Catch-all category for everyone else who has access to the NetBSD CVS repository
  - General or specialized development and bug fixing

NetBSD Features

- Solid and full-featured TCP/IP stack
  - One of the best behaving TCP implementations available, used by TCP researchers
  - Support for fast IP forwarding
  - Many network utilities have been modified to add enhanced features.
- Support for high-performance I/O
  - Built-in support for disk striping
  - Support for FibreChannel-attached disks
  - Support for high-performance networks such as 100 Mbit Ethernet, FDDI, ATM, and HIPPI
- Flexible emulation framework
  - i386 - BSD/OS, FreeBSD, iBCS2, Linux, Solaris/SVR4
  - m68k - HP-UX, SunOS
  - SPARC - SunOS, Solaris
  - MIPS - Ultrix

NetBSD Features (continued)

- Flexible device driver architecture
  - Modular design makes adding support for new devices easier.
  - Bus access abstractions provide support for writing portable device drivers.
- New UVM virtual memory system
  - Better performance under high-load
  - Support for advanced virtual memory features
- Software package framework
  - One-stop shopping for third-party software
  - Pre-built packages are available for several platforms.
- Strong BSD heritage
  - Supported by 20 years of development and experience by recognized UNIX experts

NetBSD and Security

- Dedicated security officer and security team
  - Handles and issues security advisories
  - Periodic code reviews of sensitive programs and libraries
  - Constant exploration of new, innovative ways of solving security problems *before* they happen
- http://www.NetBSD.ORG/Security/
  - Advisories
  - Patches
  - Links to more information
- Active participation in other security groups
  - Many NetBSD developers and users participate in the Internet Engineering Task Force's Security Area working groups.

Supported Platforms

- DEC Alpha (alpha)
- Commodore Amiga (amiga)
- ARM-based platforms (arm32)
- Atari TT, Falcon, Medusa Hades (atari)
- BeBox (bebox)
- HP 9000/300-series (hp300)
- IBM PC and compatibles (i386)
- M680x0-based Macintosh (mac68k)
- Motorola M680x0-based single-board computers (mvme68k)
- MIPS-based Sony News (newsmips)

Supported Platforms (continued)

- PC532 computer (pc532)
- DECstation (pmax)
- Generic OpenFirmware-based PowerPC platforms (powerpc)
- Sun SPARC systems (sparc)
- Sun 3 and Sun 3x (sun3)
- DEC VAX (vax)
- Sharp X680x0 (x68k)
- …and more are on the way!

Current and Future Work

- Multi-threaded NetBSD kernel
  - I/O threads and interrupt scheduling to eliminate livelock and boost I/O performance
  - Kernel scheduling support for user-level threads
- Symmetric multiprocessor support
  - Preliminary implementation expected by December, 1998
- More high-end server support
  - Built-in disk mirroring
  - Support for storage enclosure services
- Common console subsystem
  - Loadable terminal emulations and keyboard maps
  - “Unified” X server
- Eliminate the need for setuid bits

Current and Future Work (continued)

- Support for IPv6
- Name service caching daemon and nsswitch
- Support for more high-performance interconnects
  - Better FibreChannel support
  - Gigabit Ethernet
  - IEEE 1394 (Firewire)
- Support for Universal Serial Bus
- Support for Sun UltraSPARC, PowerPC-based Macintosh, PA-RISC, and embedded MIPS platforms

How to get more information

- WWW - http://www.NetBSD.ORG/
- Mailing lists at NetBSD.ORG
  - Send mail to **majordomo@NetBSD.ORG** for help
  - http://www.NetBSD.ORG/MailingLists/
- USENET News Groups
  - comp.unix.bsd.netbsd.misc - general discussion
  - comp.unix.bsd.netbsd.announce - announcements

How to obtain NetBSD

- ftp://ftp.NetBSD.ORG/pub/NetBSD/
  - Binary and source releases
  - Current development sources
  - Binary snapshots of development sources
- sup.NetBSD.ORG
  - Updates of development sources via the Software Upgrade Protocol
- CD-ROMs - http://www.NetBSD.COM/
  - Proceeds help fund NetBSD development