



From roof to basement

- NetBSD Introduction & Status Report -

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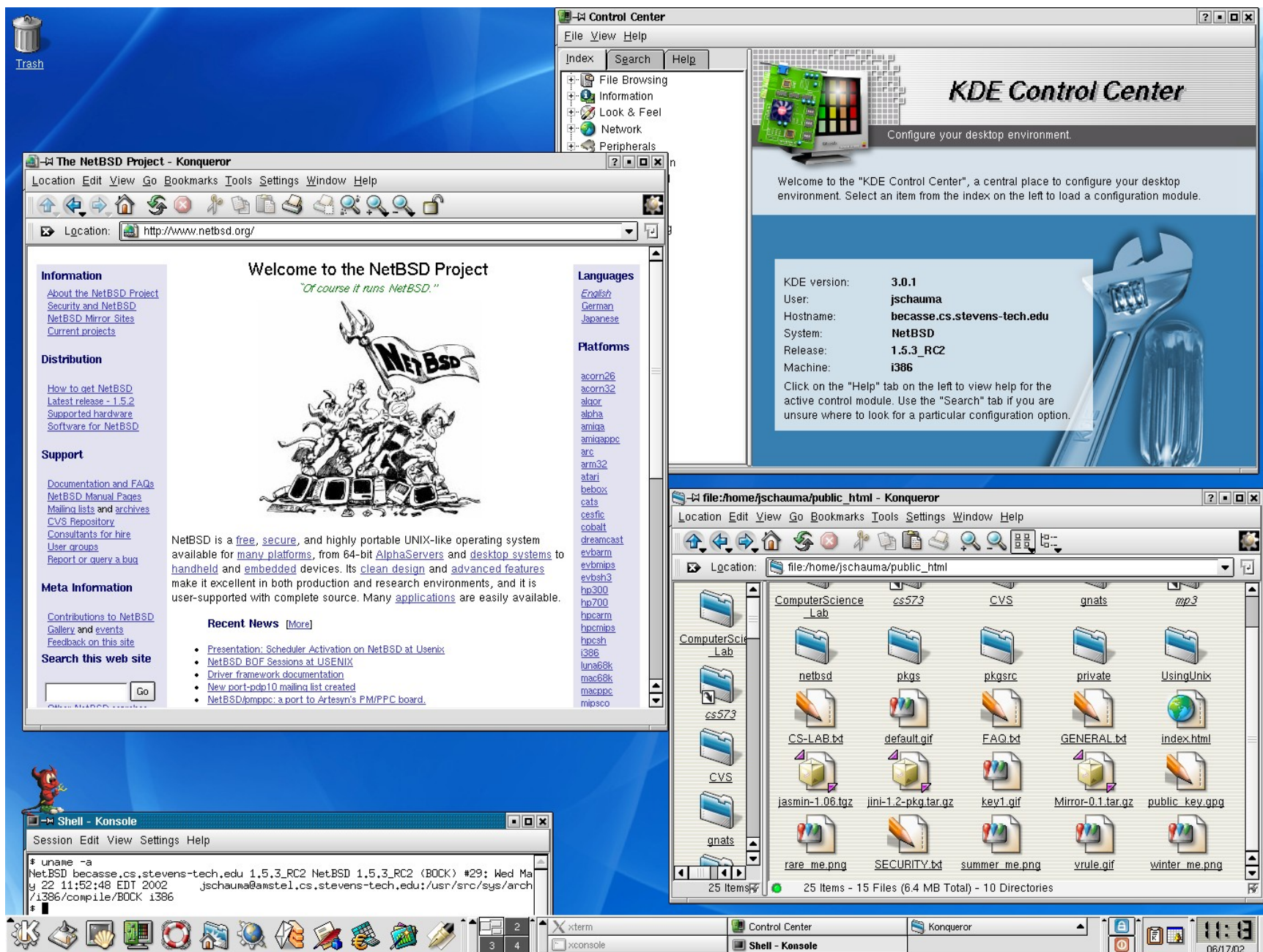


Contents

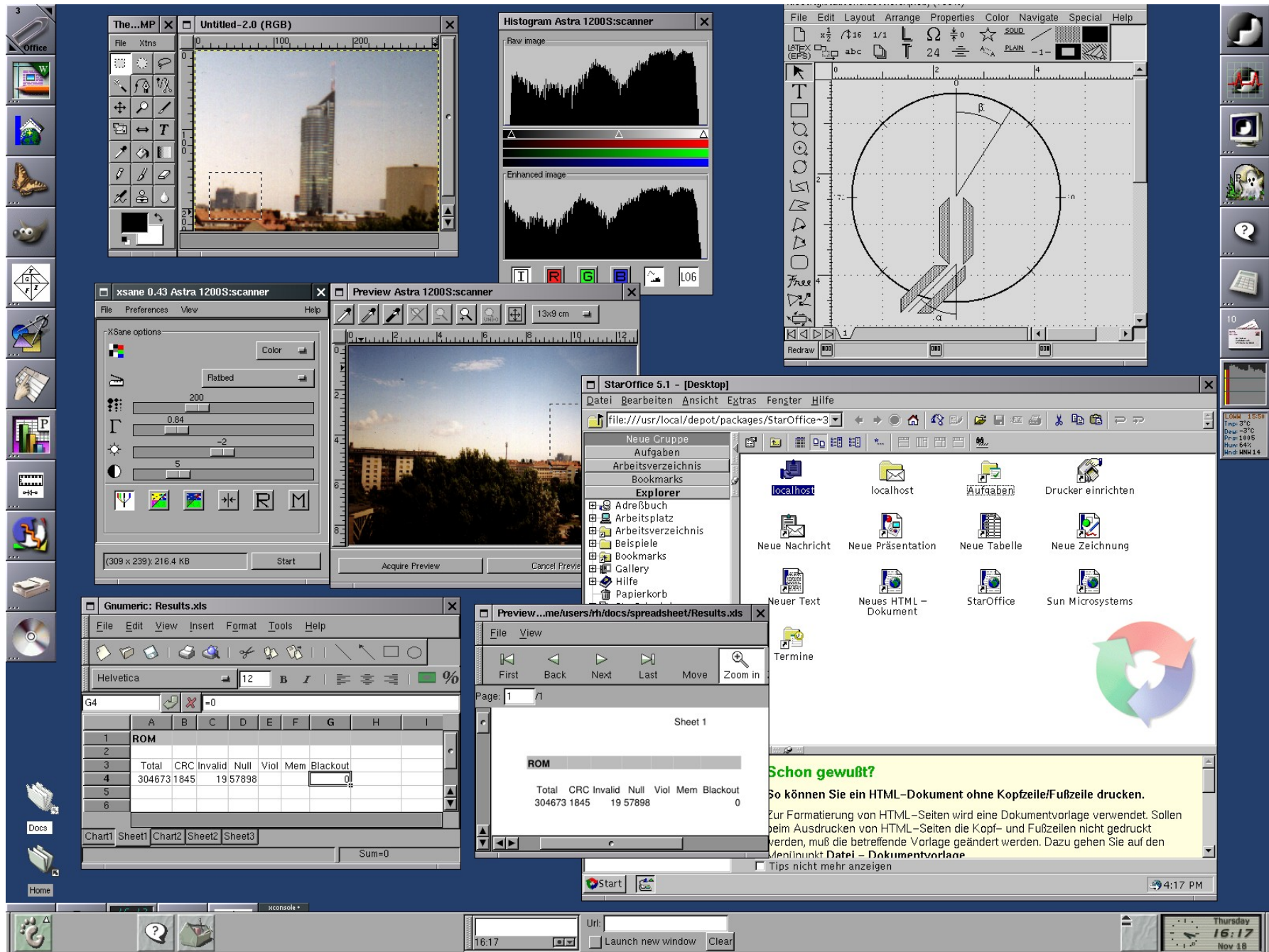
- What does NetBSD look like?
- So what is NetBSD?
- Introducing NetBSD:
Some Applications & Products
- NetBSD 4 and beyond

What does NetBSD look like?

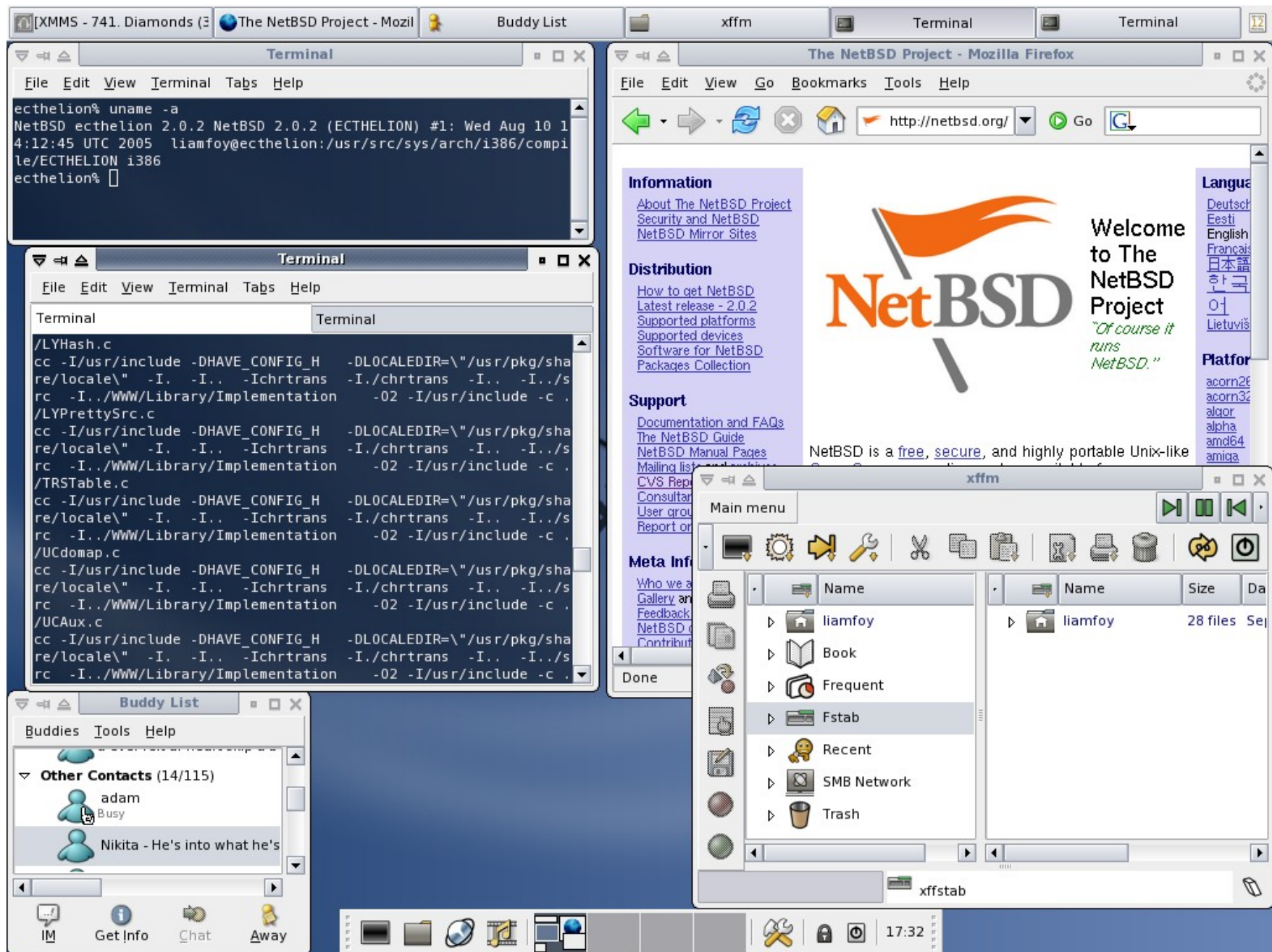
NetBSD looks like ... KDE



NetBSD looks like ... GNOME



NetBSD looks like ... XFCE



NetBSD looks like ... Xen

The screenshot displays a NetBSD desktop environment with four windows open, illustrating its capabilities as a virtualization host.

JPetStore Demo - Konqueror
The browser window shows the JPetStore 4 demo application. The address bar is `http://venus:8080/jpetstore/`. The page includes a search bar, a "Sign-in" link, and logos for iBATIS, PostgreSQL, TOMCAT, NetBSD, and Xen.

/manager - Konqueror
The browser window shows the Tomcat Web Application Manager. The address bar is `http://venus:8080/manager/html`. The page displays a "Message: OK" and a "Manager" section with links for "List Applications", "HTML Manager Help", "Manager Help", and "Server Status".

Befehlsfenster (Systemverwaltungsmodus) - Konsole
The command console window shows the output of the `xenConsole` command. The output includes a table of Xen domains and their resource usage.

Id	Domain	Cpu-%	CpuSecs	MemMB	Mem-%	Cpu#	State	TotalCpu	Host
0	Domain-0	11.4%	0.80	127	8%	0	r----	1m30s	1min 5ml
1	mars	1.4%	0.10	127	8%	0	-b---	18s	
2	merkur	0.0%	0.00	127	8%	0	-b---	1s	
3	saturn	0.0%	0.00	511	34%	0	-b---	1s	
4	venus	0.0%	0.00	511	34%	0	-b---	28s	

Domain memory usage : 1.37 gb of 1.44 gb - 95.4% in use
CPU usage/idle time : 0.90 / 6.13 seconds - 87.2% idle time

Befehlsfenster - Konsole
The command console window shows the output of the `petstore=#` command, displaying a list of relations and their owners.

Schema	Name	Type	Owner
public	account	table	postgres
public	bannerdata	table	postgres
public	category	table	postgres
public	inventory	table	postgres
public	item	table	postgres
public	lineitem	table	postgres
public	orders	table	postgres
public	orderstatus	table	postgres
public	product	table	postgres
public	profile	table	postgres
public	sequence	table	postgres
public	signon	table	postgres
public	supplier	table	postgres

petstore=# select * from signon;

username	password
j2ee	j2ee
ACID	ACID
test	test

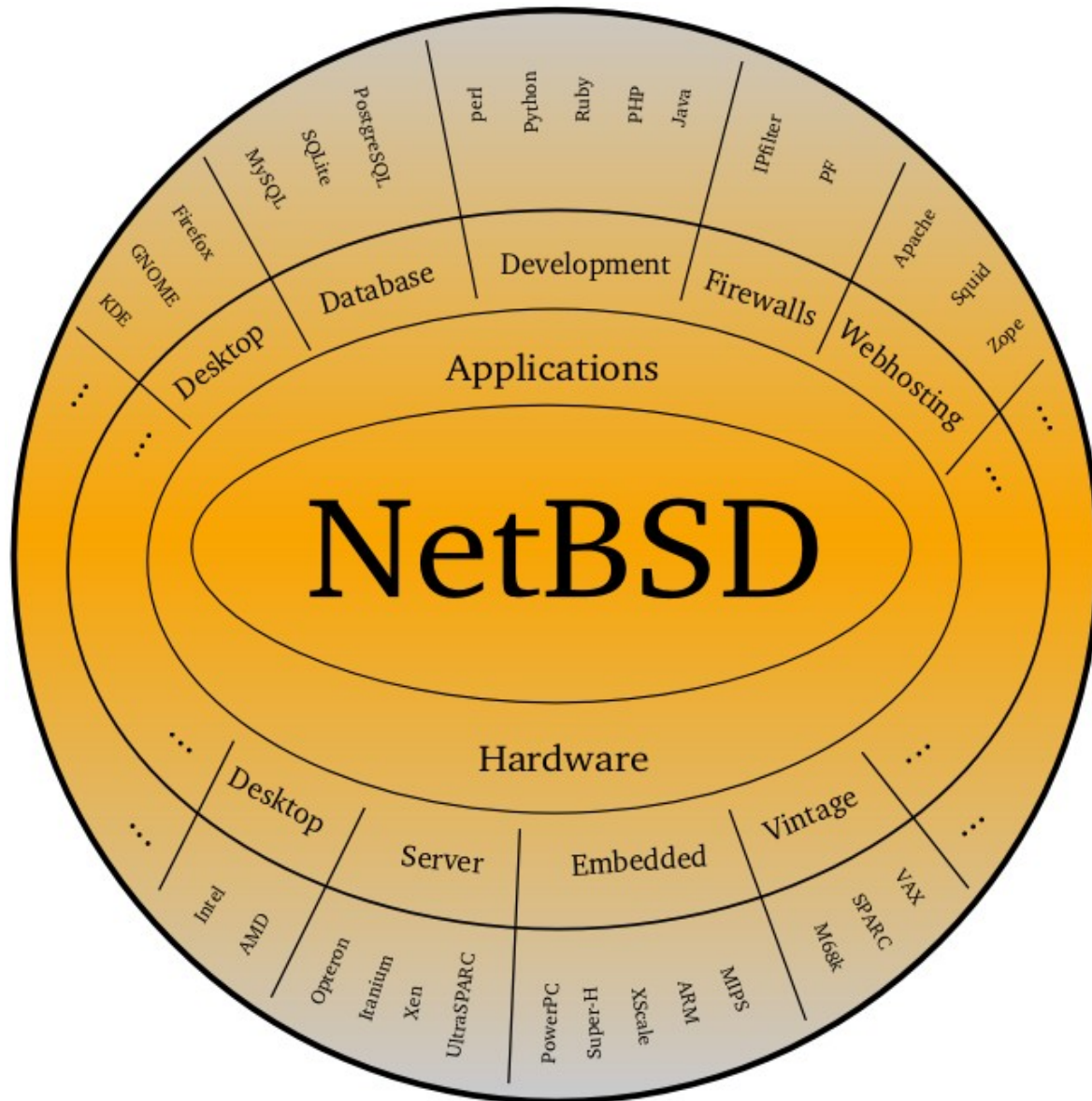
petstore=#

So what is NetBSD?

NetBSD is ...

- A descendant of 4.4BSD Unix
- A “general purpose” Unix/Linux-like Open Source Operating System
- Not Linux – NetBSD has its own kernel and userland
- A small core system that can be adjusted for many purposes via pkgsrc: Desktop, Web and Database servers, Firewalls, ...
- Secure and Performant, of course!
- Focussed on multiplatform portability

Features:



Thousands of
packages via
pkgsrc

Many areas of
application

One Operating
System, 1 Source

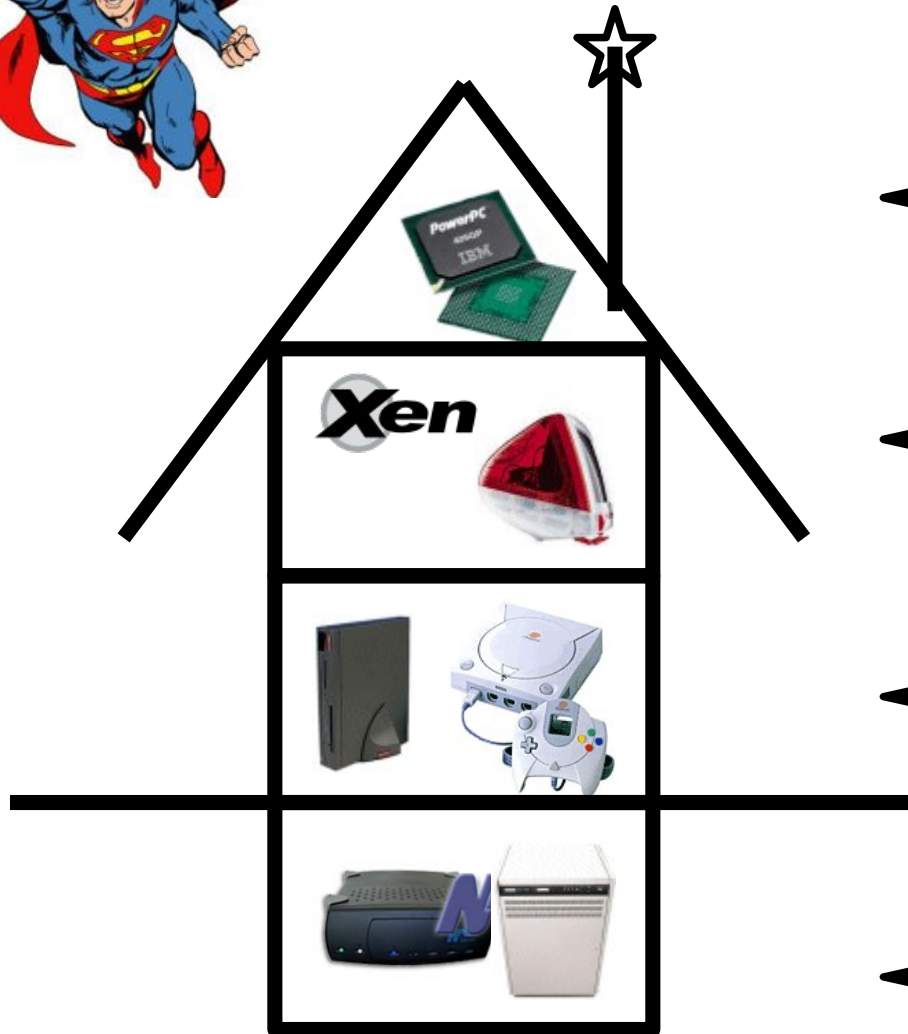
Modern & Vintage
Hardware

More than fifty
Hardware
Platforms



Introducing NetBSD: Some Applications & Products

NetBSD from roof to basement:



- ← **On Air**
International Space Station,
on-plane systems
- ← **Roof**
WaveLAN routers, surveillance
cameras, embedded boards
- ← **Office**
Hightspeed networking, desktop,
Embedded development
- ← **Entertainment**
Various game consoles
and robots
- ← **Basement**
Storage solutions, servers

“Commodity” Networking:

- Various WLAN-Routers and Access-Points by Allied Telesis, Iij/Root and Apple:



- Seclarity's SiNic Router-on-a-card



- Avocent KVM Switches



- Surveillance- and Webcams by SGI, Panasonic and Brains Inc.

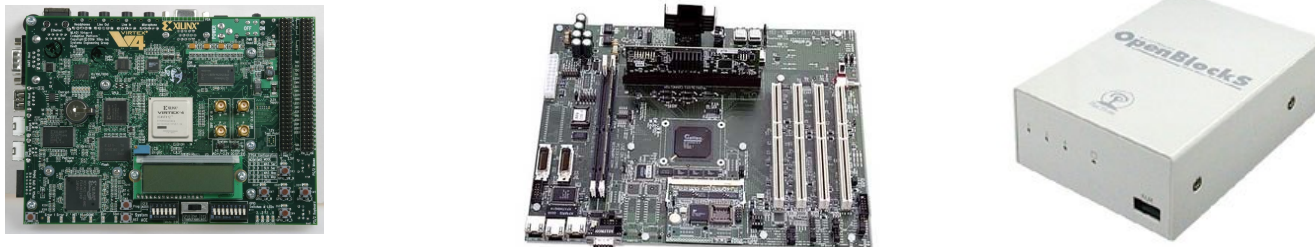


Embedded Boards: PowerPC, MIPS

- MIPS – NetBSD/evbmips
- Malta 4/5kc, Access Cube, AMD Alchemy, Atheros, Meraki Mini

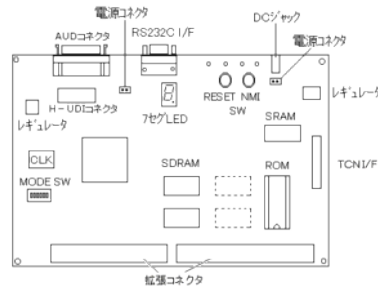
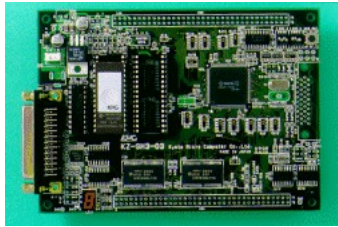


- PowerPC – NetBSD/evbppc
- Virtex-4 ML403 FPGA, Motorola Walnut, Marvell, Plat'Home OpenBlockS



Embedded boards: SH3/4, ARM

- Super-Hitachi - NetBSD/sh3
- CqREEK, Computes 7709, KZ-SH4-01:



- ARM, StrongARM, Xscale – NetBSD/evbarm
- Mesa 4C81, Gumstix + peripherals, Technologic Systems' TS-7200, ...



- Speaking of ARM ...

Of course it runs NetBSD!

```
# dmesg
NetBSD 3.0_BETA (TS7200) #57: Mon Aug 8 00:34:41 MST 2005
joff@sayan.wifi.home:/home/joff/NetBSD-toaster/obj/sys/arch/evbarm/compile/TS7200
total memory = 32768 KB
avail memory = 28196 KB
mainbus0 (root)
cpu0 at mainbus0: ARM920T rev 0 (ARM9TDMI core)
cpu0: DC enabled IC enabled WB enabled EABT
cpu0: 16KB/32B 64-way Instruction cache
cpu0: 16KB/32B 64-way write-back-locking-A Data cache
epsoc0 at mainbus0: Cirrus Logic EP93xx SoC rev E0
epsoc0: fclk 200.03 Mhz hclk 100.01 Mhz pclk 50.01 Mhz
ohci0 at epsoc0 addr 0x80020000-0x80020fff intr 56
epclk0 at epsoc0 addr 0x80810000-0x8081008f intr 35
epe0 at epsoc0 addr 0x80010000-0x8001ffff intr 39
epe0: MAC address 00:d0:69:4f:af:76
ukphy0 at epe0 phy 1: Generic IEEE 802.3u media interface
ukphy0: OUI 0x0010a1, model 0x0021, rev. 9
ukphy0: 10baseT, 10baseT-FDX, 100baseTX, 100baseTX-FDX, auto
epcom0 at epsoc0 addr 0x808c0000-0x808c0fff intr 52
epcom1 at epsoc0 addr 0x808d0000-0x808d0fff intr 54
epcom1: console
ohci0: OHCI version 1.0
usb0 at ohci0: USB revision 1.0
uhub0 at usb0
uhub0: Cirrus Logic OHCI root hub, class 9/0, rev 1.00/1.00, addr 1
uhub0: 3 ports with 3 removable, self powered
tspld0 at mainbus0: Technologic Systems TS-7200 rev C, features 0x1
tspld0: jumpers 0x7
tspld0: board temperature 21.93 degC (71.48 degF)
isa0 at tspld0: PC/104 expansion bus
tsdio0 at isa0 port 0x100-0x107: Technologic Systems TS-DIO24
toasterlcd0 at tsdio0: 4x40 text-mode hd44780 LCD
toasterlcd0: using port C, bits 0-7 as DB0-DB7
toasterlcd0: using port B, bits 0-3 as RS, WR, EN1, EN2
wsdisplay0 at toasterlcd0 kbdmux 1
wsmux1: connecting to wsdisplay0
toaster0 at tsdio0: internal toaster control outputs
toaster0: using port B, bits 4-7 for front panel LEDs
toaster0: using port A, bit 0 for magnetic latch
toaster0: using port A, bit 1 for burner element
wdc0 at tspld0: on-board CompactFlash socket
atabus0 at wdc0 channel 0
toastersensors0 at tspld0: internal toaster sensor inputs
toastersensors0: using signal DIO_0 for toast down sensor
toastersensors0: using signals DIO_1-DIO_5 for panel buttons
toastersensors0: using 12-bit MAX197-ADC channel 0 for burnlevel knob
wskbd0 at toastersensors0 mux 1
wskbd0: connecting to wsdisplay0
uhub1 at uhub0 port 1
uhub1: Chicony Generic USB Hub, class 9/0, rev 1.10/1.00, addr 2
uhub1: 3 ports with 2 removable, bus powered
uhidev0 at uhub1 port 1 configuration 1 interface 0
uhidev0: Chicony PFU-65 USB Keyboard, rev 1.10/1.00, addr 3, iclass 3/1
ukbd0 at uhidev0: 8 modifier keys, 6 key codes
wd0 at atabus0 drive 0:
wd0: drive supports 1-sector PIO transfers, LBA addressing
wd0: 488 MB, 993 cyl, 16 head, 63 sec, 512 bytes/sect x 1000944 sectors
wd0: drive supports PIO mode 4, DMA mode 2
wskbd1 at ukbd0 mux 1
wskbd1: connecting to wsdisplay0
boot device:
root on wd0a dumps on wd0b
```



```
#!/bin/sh
# /usr/local/bin/toast:
sysctl -w hw.toaster0.magnetic_latch=1
# user presses toast lever down now...
sysctl -w hw.toaster0.burner_element = 1
sleep 60
sysctl -w hw.toaster0.burner_element = 0
sysctl -w hw.toaster0.magnetic_latch=0
echo "Toast is done!"
```


You can, too!

Embedded development and
crosscompiling:

- Build a crosscompiler:

```
build.sh -m evbarm tools
```

- Cross-compile the NetBSD system:

```
build.sh -m evbarm distribution
```

- Cross-compile the X Window System:

```
build.sh -m evbarm -x distribution
```

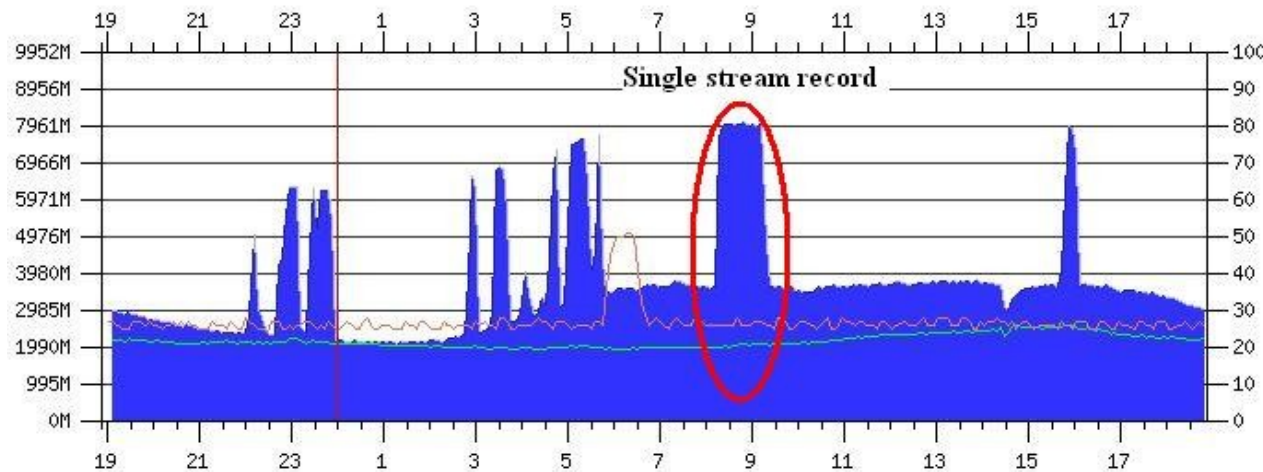
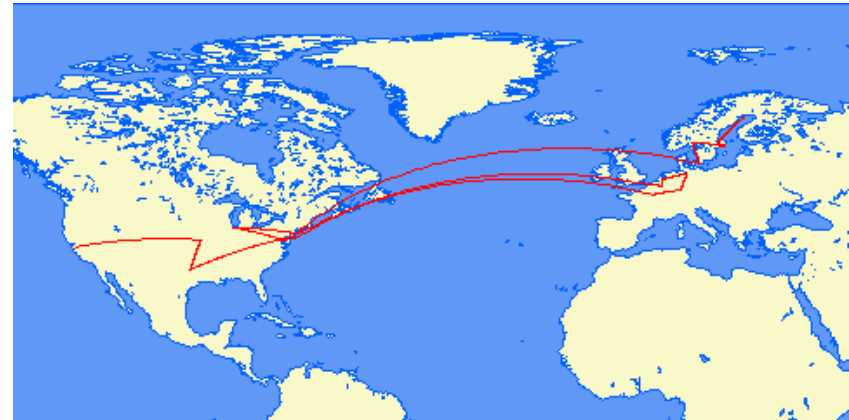
- Cross-compile a NetBSD kernel:

```
build.sh -m evbarm kernel=TOASTER
```

High-Performance Networking:

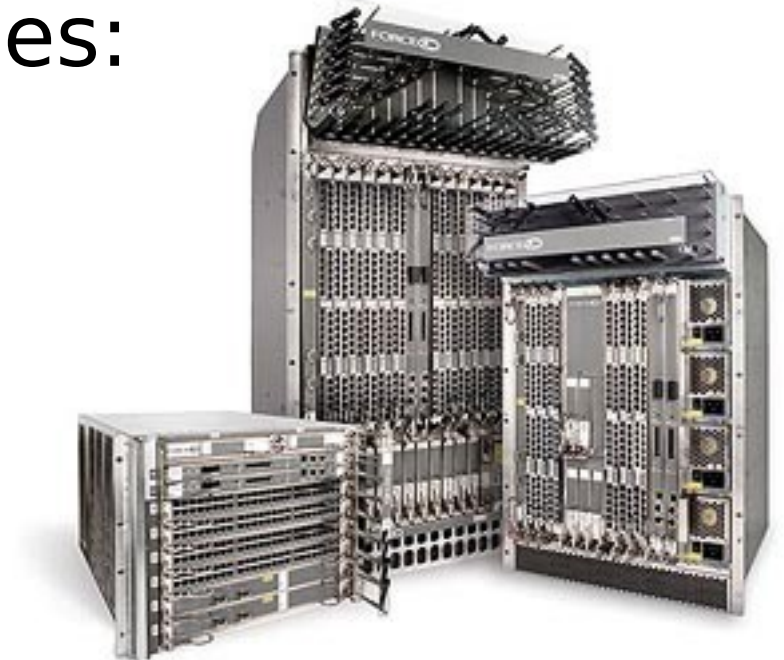
Internet Land Speed Record 2004:

1831GB
in 1 hour
=4.3GBit/s



High-Performance Networking:

- Force10 Ethernet Switches:
Up to 1260 1Gbit or
224 10Gbit Ports



- Brocade Rhapsody SAN Switches:
sold by HP, IBM, Dell, ...



Office Apps

- Firewall solutions by Dubbele and concept04
- Ricoh & Savin fotocopier/printer/fax/scanner
- Thin clients - DEC DNARD “Shark”, IBM NetWork Station, Precedence Netmanager



Desktop use

- KDE, GNOME, you name it
- Flash support via nspluginwrapper, to use Linux-Flash-Plugin with native Firefox
- Native OpenOffice.org
- 3D hardware support starting to evolve, eye candy like Compiz works with ATI cards.

Problem: lack of documentation and support by hardware manufacturers!
(Hi Adobe, nVidia & AMD/ATI!)

In other Operating Systems:

- Apple's Mac OS X – userland tools, ip6config
- Castle's RISC OS uses parts of NetBSD's networking subsystem
- PSO offers a port of NetBSD's TCP/IP stack to VxWorks
- QNX uses the TCP stack and various userland commands (ftp, libsocket, ...)
- Probably many others – **TELL US!**

Entertainment

- Game consoles: Sony PSP and many PS2 games use NetBSD's TCP/IP stack via the EEnet (Emotion Engine) library
- Robots: ITR and MiRai RT with NetBSD-based SpeecysOS



Storage & servers

- TeamASA's NPWRserver
- ... and many others via Wasabi Systems



- Iodata's Landisk (SH4) and compatibles: Plextor PX-EH16L, PX-EH25L and PX-EH40L



- ... plus of course the usual Intel, AMD, Alpha, UltraSPARC, etc. based servers to which NetBSD was ported!

NetBSD 4 and beyond

NetBSD 4

ETA: Early May 2007

Changes:

- Improved platform support
- Kernel changes
- Networking improvements
- Filesystem works

Daily beta builds from [ftp.NetBSD.org](ftp://NetBSD.org)
in `/pub/NetBSD-daily/netbsd-4`

NetBSD 4 – Platform support

- evbmips: Alchemy Au1550 processors and DBAu1550 board, 4G Systems MTX-1 board (MeshCube / AccessCube), Plat'home OpenMicroServer (OMS-AL400/128)
- evbarm: Arcom Viper, Atmark Techno Armadillo, Linksys NSLU2 (a.k.a. "Slug") NAS, Gumstix, I-O DATA HDL-G, Certance CP-3100
- NEC's MIPS based EWS4800 workstations
- Support for Xen3 DomU and Dom0, HVM

NetBSD 4 with Xen 3.0.4 & HVM

VNC: rock:1 (bouyer)

rock:1 (bouyer) Desktop

```
5 partitions:
#      size      offset      fstype [fsize bsize cpq/sgs]
d: 41943040      0      unused      0      0      # (Cyl.  0 - 20479)
e: 41913522      63      NTFS              # (Cyl.  0*- 20465*)
disklabel: boot block size 0
disklabel: super block size 0
rap# dd if=/dev/zero of=/dev/rvmd0d
^C37092+0 records in
37091+0 records out
18990
```

xterm

```
xentop - 20:23:28 Xen 3.0.4-1
2 domains: 2 running, 0 blocked, 0 paused, 0 crashed, 0 dying, 0 shutdown
Mem: 3144684k total, 1099272k used, 2045412k free CPUs: 8 @ 3000MHz
```

NAME	STATE	CPU(sec)	CPU(%)	MEM(k)	MEM(%)	MAXMEM(k)	MAXMEM(%)	VCPUS
Domain-0	-----r	283280	23.1	524288	16.7	no limit	n/a	8
0	0	0	0	0	0	0	0	
test	-----r	470	94.7	532352	16.9	540672	17.2	4
0	0	0	0	0	0	0	0	

HVMXEN-test

Microsoft Windows

Une meilleure disponibilité des applications

Des outils d'administration nouveaux et améliorés facilitent le déploiement des technologies de haute disponibilité apportant une meilleure continuité de service à vos applications sensibles.

Collecte d'informations

Mise à jour dynamique

Préparation de l'installation

Installation de Windows

Fin de l'installation

Fin de l'installation dans environ : 25 minutes

Fin de l'installation...

up 4 days, 2:09 20:23:28

sleeping, 1 on processor

nice, 8.0% system, 0.0% interrupt, 87.1% idle

OM Exec, 360M File, 14M Free

RES	STATE	TIME	WCPU	CPU	COMMAND
542M	RUN	21:51	27.98%	27.98%	qemu-dm
18M	syncer	31:42	1.27%	1.27%	[ioflush]
6316K	select	3:23	0.20%	0.20%	sshd
18M	aiodoned	28:26	0.00%	0.00%	[aiodoned]
6536K	netcon	21:51	0.00%	0.00%	<python2.4>
860K	select	0:37	0.00%	0.00%	xenstored
18M	lfswrite	0:28	0.00%	0.00%	[lfs_writer]
340K	segment	0:24	0.00%	0.00%	[lfs_cleaner]
18M	pgdaemon	0:24	0.00%	0.00%	[pagedaemon]
18M	physiod	0:18	0.00%	0.00%	[physiod]
3656K	pause	0:15	0.00%	0.00%	ntpd
1196K	ttyn	0:12	0.00%	0.00%	xentop
3292K	select	0:10	0.00%	0.00%	xterm
840K	CPU	0:08	0.00%	0.00%	top
1156K	ttyn	0:08	0.00%	0.00%	xentop
9421	bouyer	0:07	0.00%	0.00%	sysstat
24519	root	0:07	0.00%	0.00%	xterm

NetBSD 4 - Kernel

- tmpfs – memory efficient ramdisk
- Added VFS hooks interface and simplified NFS exports list handling
- Stateful read-ahead algorithm
- Switch bufq strategy on the fly
- firmload(9) API for loading firmware
- Multiboot support (GRUB)
- iSCSI target (server) support
- W^X support via paxctl(1)

NetBSD 4 - Networking

- agr(4) for link aggregation
- Common Address Redundancy Protocol (CARP) support added
- Bluetooth support was added
- tftp(1) has multicast support
- Support for Explicit Congestion Notification in the TCP/IP stack
- API for TCP congestion control algorithms, selectable via sysctls

NetBSD 4 – File systems

- UDF file system support for optical media and block devices like harddisc partions and vnd's.
- Support for System V Boot File System
- pam_afslog(8): Obtain AFS tokens from Kerberos5 credentials and create process authentication group
- SPARC can now boot with / on a RAIDframe mirror-set
- puffs - Pass-to-Userspace Framework File System

NetBSD 4 - Misc

- mail(1): Got MIME and multi-character set handling; command line editing, thread support, and completion.
- veriexecgen(8) for easy and fast generation of Veriexec fingerprints
- proplib(3) API for sending property lists to/from the kernel using ioctls
- ... besides many updates of 3rd party software, imports of external projects and drivers, bugfixes, security updates, etc.

NetBSD-current

Will eventually be the base for NetBSD 5

Changes:

- SMP with 1:1 threading (no more Scheduler Activations), fine-grained locking (no more Big Lock)
- POSIX Asynchronous I/O, Direct I/O
- Improved PUFFS & FUSE compatibility
- SSH-FS, Plan9 filesystem (via puffs)
- Apple HFS+ support

Daily builds on [ftp.NetBSD.org](ftp://ftp.NetBSD.org/pub/NetBSD-daily/HEAD) in
/pub/NetBSD-daily/HEAD

Thanks!

Questions?

www.NetBSD.org

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