



# obDilbert

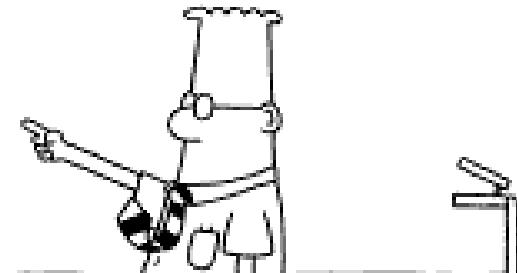
I'D LIKE TO START  
WITH A CARTOON.



IT'S ABOUT A GUY  
WHO SHOWS A  
CARTOON BEFORE  
GIVING A BORING  
PRESENTATION.



BUT IT DOESN'T  
WORK BECAUSE  
THE CARTOON HAS  
NO PUNCHLINE.



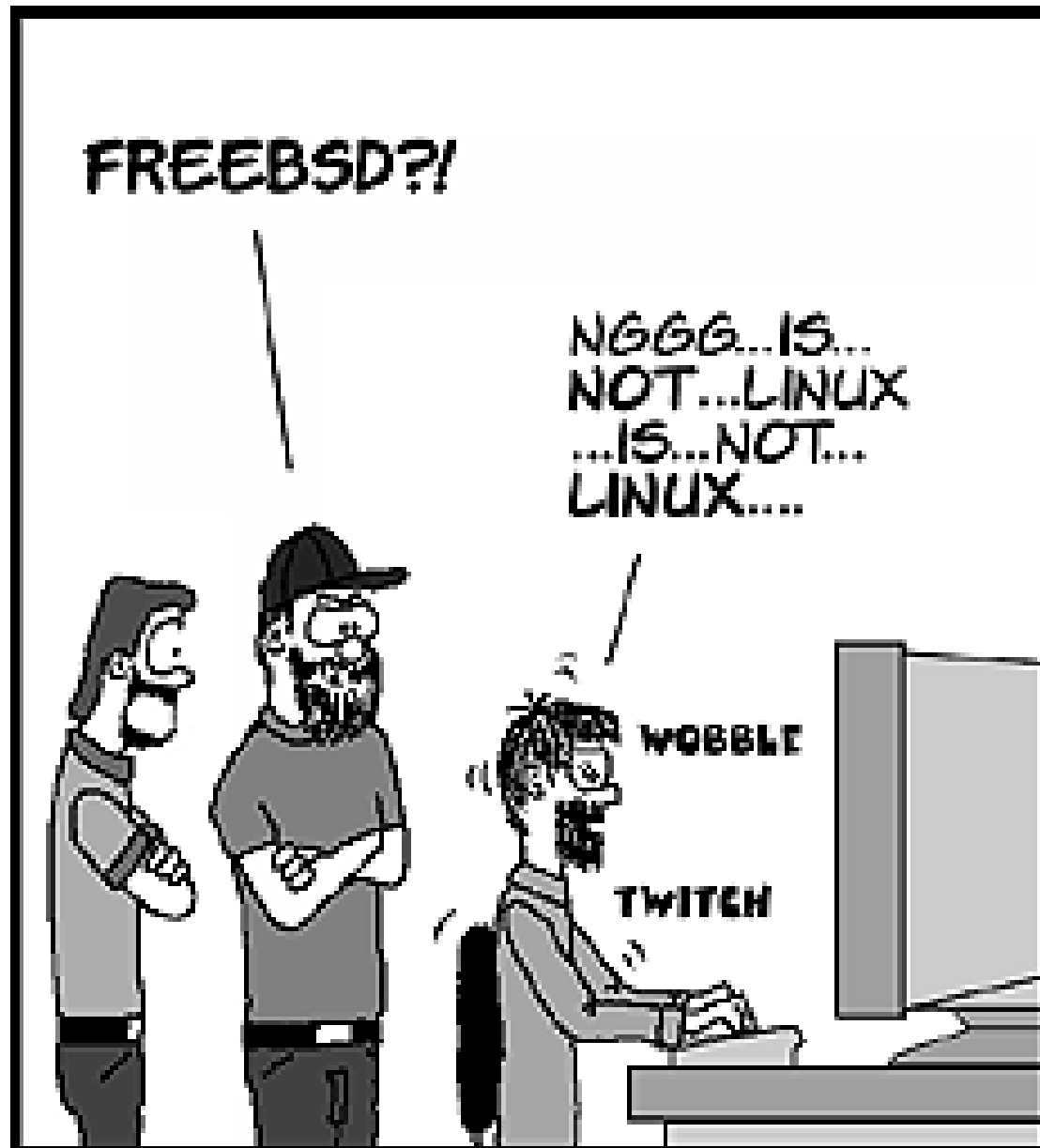


# Bli kjent med FreeBSD!

*Oddbjørn Steffensen*  
*EDB Business Consulting*



# FreeBSD?!





# Hva er FreeBSD?

- Open source UNIX<sup>TM</sup>-lignende operativsystem
- Utviklet av frivillige over hele verden
- Kjører på x86 og Alpha (og litt SPARC)
- Opprinnelig basert på BSD4.4-Lite





# UNIX historikk – Bell Labs



1969		Ken Thompson, Dennis Ritchie og "en lite brukt PDP-7" hos Bell Labs
1971	1 <sup>st</sup> Edition	Skrevet i assembler for PDP-11/20, filsystem, fork, roff og ed
1973	4 <sup>th</sup> Edition	Skrevet i C
1975	6 <sup>th</sup> Edition	~Version 6. Første som får vid distribusjon utenfor Bell Labs.
1979	7 <sup>th</sup> Edition	C, UUCP, Bourne shell. Portet til VAX, kjernen vokste over 40KB
1982	System III	AT&T UNIX System Group (USG) slipper den første offentlige release
1983	System V	Første release som supporteres (av UNIX System Development Lab)
1984	System V R2	~100.000 installasjoner
1987	System V R3	~750.000 installasjoner. STREAMS & TLI introduseres.
1989	System V R4	Fletter sammen egenskaper fra SysV, Xenix og BSD
1991		UNIX System Laboratories (USL) skilles ut som eget selskap
1992	System V R4.2	~"Destiny". 22. nov annonserer Novell at de ønsker å overta USL
1993		16. juni: Novell overtar USL.
1995		SCO kjøper USL & trademarket "UNIX" fra Novell
2001		Versjon 3 av Single UNIX specification (IEEE POSIX, OpenGroup++) Caldera overtar det meste av SCO



# UNIX historikk – CSRG



1977	(1BSD)	Computer Science Department ved UCB begynner å arbeide med Version 6; Bill Joy setter sammen Berkeley Software Distribution (BSD), med en Pascal-kompilator og ex. 30 kopier sendes ut til interesserte.
1978	2BSD	Bill Joy. vi, termcap. 75 kopier sendes ut.
1979	3BSD	Port til Digital VAX 11/780. Virtual Memory. Nesten 100 kopier sendes ut. Computer Systems Research Group (CSRG) etter innspill fra DARPA.
1980	4BSD	Jobbkontroll, auto reboot, nytt filsystem, Franz Lisp. 150 kopier.
1981	4.1BSD	Ytelsesforbedringer
1983	4.2BSD	TCP/IP. Berkeley Fast File System (FFS). 1000 kopier.
1986	4.3BSD	Ytelsesforbedringer
1989	Net1	Kildekode minus AT&T-kode; første fritt redistribuerbare.
1990	4.3BSD	Reno-utgaven. Network File System (NFS).
1991	Net/2	Hele BSD, men minus 6 filer som opprinnelig kom fra AT&T.
1992	386BSD	Utgave med clean room-implementasjon av de 6 filene.
1992	BSDI	Berkeley Software Design, Incorporated; kommersielt støttet BSD.
1992-1994		AT&T mener BSDI benytter AT&T-kode; rettsaken begynner. Tvisten løses ved at tre av de 18.000 filene i BSD fjernes.
1994	4.4BSD	Lite. BSDI, NetBSD og FreeBSD må synce på nytt mot denne.
1995	4.4BSD	Lite2. Siste CSRG-release.



# Andre spinoffs fra 4.4BSD

- 386BSD
  - Basert på 80386-delene av Net/2; utviklet av Bill og Lynn Jolitz; publisert i Dr Dobbs Journal.
- FreeBSD, NetBSD & OpenBSD
- BSDI BSD/OS
- Apple MacOS/X



# FreeBSDs opprinnelse

- Oppsto som en følge av at patchkitet til 386BSD ble for stort og uhåndterlig
- Tre personer laget en uoffisiell snapshot av 386BSD i påvente av offisiell release av Jolitz
- Jordan K. Hubbard
- Walnut Creek CDRom
- [ftp.cdrom.com](http://ftp.cdrom.com)





# Overordnet

---

- Èn distribusjon (både kjerne og userland)
  - Moden, stabil kodebase
  - Enkel installasjon
  - Bruk av CVS/CVSup for sourcehåndtering
  - Ports-samlingen av tredjeparts programvare
- Organisatorisk struktur (core-team)
- BSD-lisensen
- Relativt brukbar dokumentasjon



# Utviklingsform

- Overordnet styring av core-teamet
  - For øyeblikket ni personer
  - Velges blant samtlige committere
- Totalt ~300 committere
  - /usr/src (200, 140 i /usr/src/sys)
  - /usr/doc
  - /usr/ports
- Mailinglister benyttes for koordinering og diskusjon
- De fleste endringer skjer etter input fra brukere



# BSD-lisensen

---

- GPL vs BSD-lisensen
  - GPL: 339 linjer
  - Essensen i BSD-lisensen: 33 linjer
- Det primære målet bak FreeBSD-prosjektet er å tilby kode som kan benyttes for alle formål, ut uten 'strings attached'.
- Mer fri enn GPL, inklusive kommersiell gjenbruk. Ingen krav om å distribuere endringer.
- Eneste krav er copyright-notis; et tidligere punkt angående anerkjennelse ifb. reklame ble droppet sommeren 1999.
- FreeBSD-prosjektet er svært forsiktige med å ta inn GPL-lisensiert kode i /usr/src; koden er skilt ut i /usr/src/gnu.



# Essensen i BSD-lisensen:

- All of the documentation and software included in the 4.4BSD and 4.4BSD-Lite Releases is copyrighted by The Regents of the University of California.
- Copyright 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994 The Regents of the University of California. All rights reserved.
- Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:
  - 1. Redistributions of source code must retain **the above copyright notice, this list of conditions and the following disclaimer.**
  - 2. Redistributions in binary form must reproduce **the above copyright notice, this list of conditions and the following disclaimer in the documentation** and/or other materials provided with the distribution.
  - 3. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

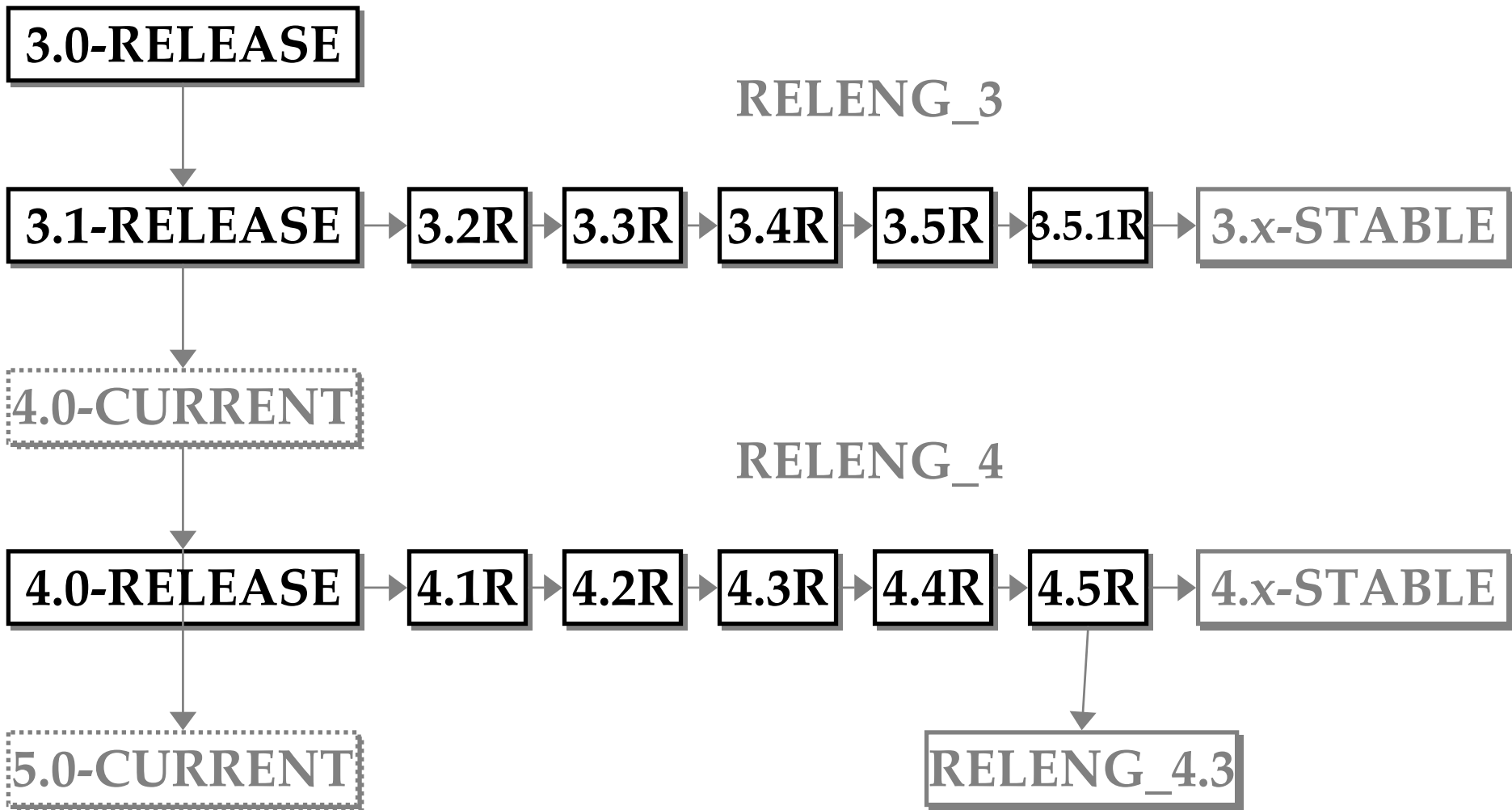


# Releaseprosessen #1

- Ett kildekode tre for hele distribusjonen, men to utviklingsløp:
- **-STABLE**
  - Fryses i en -RELEASE 3 ganger per år
  - Konservativ “produksjons”-kode
  - Code slush / freeze 30 dager før planlagt -RELEASE
  - Releasekandidater siste 15 dager før planlagt -RELEASE
- **-CURRENT**
  - Bleeding edge
  - Daglige snapshots
  - Blir etterhvert den neste X.0-release
- Merge from -CURRENT (**MFC**):
  - Viktige egenskaper backportes fra -CURRENT til -STABLE
- Snapshots



# Releaseprossen #2





# FreeBSD releaser



- 4.8 February, 2003
- 4.7 October, 2002
- 4.6 June, 2002
- 4.5 January, 2002
- 4.4 September, 2001
- 4.3 April, 2001
- 4.2 November, 2000
- 4.1.1 September, 2000
- 4.1 July, 2000
- 4.0 March, 2000
- 3.5 June, 2000
- 3.4 December, 1999
- 3.3 September, 1999
- 3.2 May, 1999
- 3.1 February, 1999
- 3.0 October, 1998
- 2.2.8 December, 1998
- 2.2.7 July, 1998
- 2.2.6 March, 1998
- 2.2.5 October, 1997
- 2.2.2 May, 1997
- 2.2.1 April, 1997
- 2.2 March, 1997
- 2.1.7 February, 1997
- 2.1.6 December, 1996
- 2.1.5 July, 1996
- 2.1 November, 1995
- 2.0.5 June, 1995
- 2.0 November, 1994
- 1.1.5.1 July, 1994
- 1.1 May, 1994
- 1.0 November, 1993



# FreeBSD 5.0 Developer Preview #1

---

- Sluppet 3. april:
  - Forbedret SMP-kode, basert på BSD/OS 5.0
  - Forbedringer i scheduleren for å bedre håndtere multithreadede prosesser
  - Forbedret /dev/random
  - Støtte for 32-bits Cardbus
    - Sikkerhet
    - Reimplementert PAM
    - Access Control Lists
    - Færre SUID/SGID-programmer i basesystemet
  - devfs – device-filsystem for å støtte attachment og detachment av komponenter
  - Støtte for SPARC64-arkitekturen
  - FFS snapshots og bakgrunns-fsck
- Preview #2 planlagt til 25. juni 2002
- 20. november 2002: FreeBSD 5.0!





# FreeBSD 5.0 Release Engineering

Action	Expected	Actual	Description
releng_5_dp1 branch (Perforce)	15 Mar 2002	15 Mar 2002	Branch created, commits require re@ approval. The branch will be used to allow us time to QA the release, synchronize the release notes with the translation teams, synchronize sysinstall and the package set, etc without disrupting the normal flow of development on -CURRENT.
Ports Freeze	2 Apr 2002	2 Apr 2002	The ports tree is frozen and tagged for the developer preview.
Final i386 package build completes	3 Apr 2002	4 Apr 2002	The final package build for the i386 architecture is complete.
Final Alpha package build completes	3 Apr 2002	5 Apr 2002	The final package build for the Alpha architecture is complete.
Final sparc64 package build completes	3 Apr 2002	7 Apr 2002	The final package build for the sparc64 architecture is complete.
Package Split	3 Apr 2002	7 Apr 2002	The packages for the installation CDROM are selected from the results of the final package build.
FreeBSD 5.0 Developer Preview 1	5 Apr 2002	8 Apr 2002	A full release for the i386, Alpha, and sparc64 architectures. The i386 and Alpha releases at least will contain a full package set and a disc1 ISO image will be made available.
RELENG_5_0_DP2 branch	10 Jun 2002	--	Branch created, commits require re@ approval.
5.0 Feature List finalized	16 Jun 2002	--	At the FreeBSD Developer Summit at Usenix, we will need to finalize the list of features that will be included with FreeBSD 5.0. Some features will just have to wait for 5.1 to give us ample time to QA the many features that are ready.
FreeBSD 5.0 Developer Preview 2	25 Jun 2002	--	A full release for the i386, Alpha, and sparc64 architectures. The i386 and Alpha releases at least will contain a full package set and a disc1 ISO image will be made available.
-CURRENT feature freeze	1 Oct 2002	--	After this date, significant new features should be discussed with re@ before consideration for 5.0-RELEASE.
-CURRENT code freeze	20 Oct 2002	--	The code freeze for 5.0. Commits to HEAD require re@ approval.
FreeBSD 5.0 Released	20 Nov 2002	--	FreeBSD 5.0 is announced.



# Installasjon

- FreeBSD kan installeres via:
  - CD-ROM eller DVD-ROM
  - To floppies + FTP, Disk, Tape, PLIP, NFS
- Ulike installasjonsmodi avhengig av erfaring
- Støtter “JumpStart”-lignende bootstrapping
- <ftp://sunsite.uio.no/>
- Fra 100Mb og oppover



# Sysinstall #1

- sysinstall er installasjonsprogrammet (!)
- Konsoll-basert

## /stand/sysinstall Main Menu

Welcome to the FreeBSD installation and configuration tool. Please select one of the options below by using the arrow keys or typing the first character of the option name you're interested in. Invoke an option by pressing [ENTER] or [TAB-ENTER] to exit the installation.

Usage	Quick start - How to use this menu system
Standard	Begin a standard installation (recommended)
Express	Begin a quick installation (for the impatient)
Custom	Begin a custom installation (for experts)
<b>Configure</b>	<b>Do post-install configuration of FreeBSD</b>
Doc	Installation instructions, README, etc.
Keymap	Select keyboard type
Options	View/Set various installation options
Fixit	Enter repair mode with CDROM/floppy or start shell
Upgrade	Upgrade an existing system
Load Config	Load default install configuration
Index	Glossary of functions

**[Select]**

**X** Exit Install

**[ Press F1 for Installation Guide ]**



# Sysinstall #2

## FreeBSD Configuration Menu

If you've already installed FreeBSD, you may use this menu to customize it somewhat to suit your particular configuration. Most importantly, you can use the Packages utility to load extra "3rd party" software not provided in the base distributions.

### X Exit

Distributions

Packages

Root Password

Fdisk

Label

User Management

Console

Time Zone

Media

Mouse

Networking

Security

Startup

Options

XFree86

Desktop

HTML Docs

### Exit this menu (returning to previous)

Install additional distribution sets

Install pre-packaged software for FreeBSD

Set the system manager's password

The disk Slice (PC-style partition) Editor

The disk Label editor

Add user and group information

Customize system console behavior

Set which time zone you're in

Change the installation media type

Configure your mouse

Configure additional network services

Select default system security profile

Configure system startup options

View/Set various installation options

Configure XFree86 Server

Configure XFree86 Desktop

Go to the HTML documentation menu (post-install)

[ OK ]

Cancel

[ Press F1 for more information on these options ]



# Diskpartisjonering #1

- Device
  - da = SCSI direct access disk
  - ad = ATAPI (IDE) disk
  - acd = ATAPI (IDE) CDROM
  - cd = SCSI CDROM
  - fd = Floppy disk
  
- Fysiske slices (1-4)
  - Logiske slices (5-) inne i en extended partisjon
  
- Partisjoner (a-h) – partisjonsid 165
  - Ett filsystem per partisjon
  - Konvensjoner:
    - a Normalt root
    - b Normalt swap
    - c Normalt hele slicen
  
- Filsystem / swap



# Diskpartisjonering #2

- da0s1
  - Første slice på den første SCSI-disk
- /dev/da0s1a (root)
- /dev/da0s1e (/var)
- /dev/da0s1f (/usr)
- /dev/ad1c
  - Hele den første IDE-disk (dangerously dedicated)
- /dev/ad2s3e
  - Femte partisjon på tredje slice på den andre IDE-disk



# Filsystemer

---

- Unix File System (UFS):
  - Berkeley Fast File System (FFS)
  - Memory File System (MFS)
  
- Network File System (NFS)
  
- Støtte for andre filsystem:
  - CD9660
  - FAT/FAT32
  - SMBFS
  - delvis NTFS
  - Linux ext2
  - NetWare



# Softupdates

---

- En måte å gjøre diskoperasjoner på, slik at man får de fleste fordelene med asynkron skriv, men at filsystemene allikevel er konsistente ved driftsavbrudd.
- Problemet er metadataenes konsistens; SU lar on-disk og in-memory avvike ved å endre rekkefølgen på skriveoperasjoner.
- Fordeler:
  - Garanterer konsistens
  - Eliminerer de fleste synkrone skriveoperasjoner
  - Reduserer behovet for fsck ved boot
- Introdusert på OpenBSD 97.11, FreeBSD 98.03 og NetBSD 99.10.
- `tunefs -n enable /filesystem` eller ved opprettelse av filsystemet





# DIRHASH

---

- Standard UFS filsystem håndterer ikke svært store filkataloger (titusen eller hundretusen filer pr. katalog) så bra, fordi tiden for en del operasjoner vokser enten lineært eller kvadratisk med antall filer.
- DIRHASH innfører en hash-struktur for metadata om kataloger som avhjelper en del av disse problemene. Ytelsesforbedring ved gjentatte aksesser mot store kataloger.
- Introdusert i FreeBSD 01.06.



# DIRPREF

---

- Vanligvis blir metadata om kataloger spredd ut over disken
- DIRPREF samler metadata om kataloger på disken, og gir en kraftig ytelsesforbedring ved traversering av et filsystem.
- Introdusert OpenBSD 01.04, FreeBSD 01.04, NetBSD 01.09



# Effekt av Softupdates + DIR\*

- Softupdates:
  - Eksempel ved X410src-1.tgz:
    - untar fra 233s til 70s
    - rm fra 177s til 17s
  - Eksempel 33.000 MH filer:
    - create fra 645s til 70s
    - pack fra 1030s til 240s
    - rm fra 279s til 4.7s
- DIRHASH
  - Eksempel X410src-1.tgz:
    - Ingen endring
  - Eksempel 33.000 filer:
    - create fra 70s til 2.5s
    - MH pack fra 240s til 2.5s
    - rm fra 4.7s til 2s
- DIRPREF
  - Eksempel X410src-1.tgz:
    - untar fra 70s til 49s
    - rm fra 17s til 7.3s
  - Eksempel 33.000 MH-filer
    - Ingen endring



# Concatenated Disk Driver (CCD)

- To bruksmåter:
  - Kombinere flere fysiske diskere til en virtuell disk
    - Eventuelt med interleaving for bedret ytelse (striping)
- Speiling
  - Skriving til begge sider av speilet
  - Les fra den siden av speilet som driveren vurderer å være optimal
  - Ved feil prøves automatisk lesing fra den andre siden av speilet



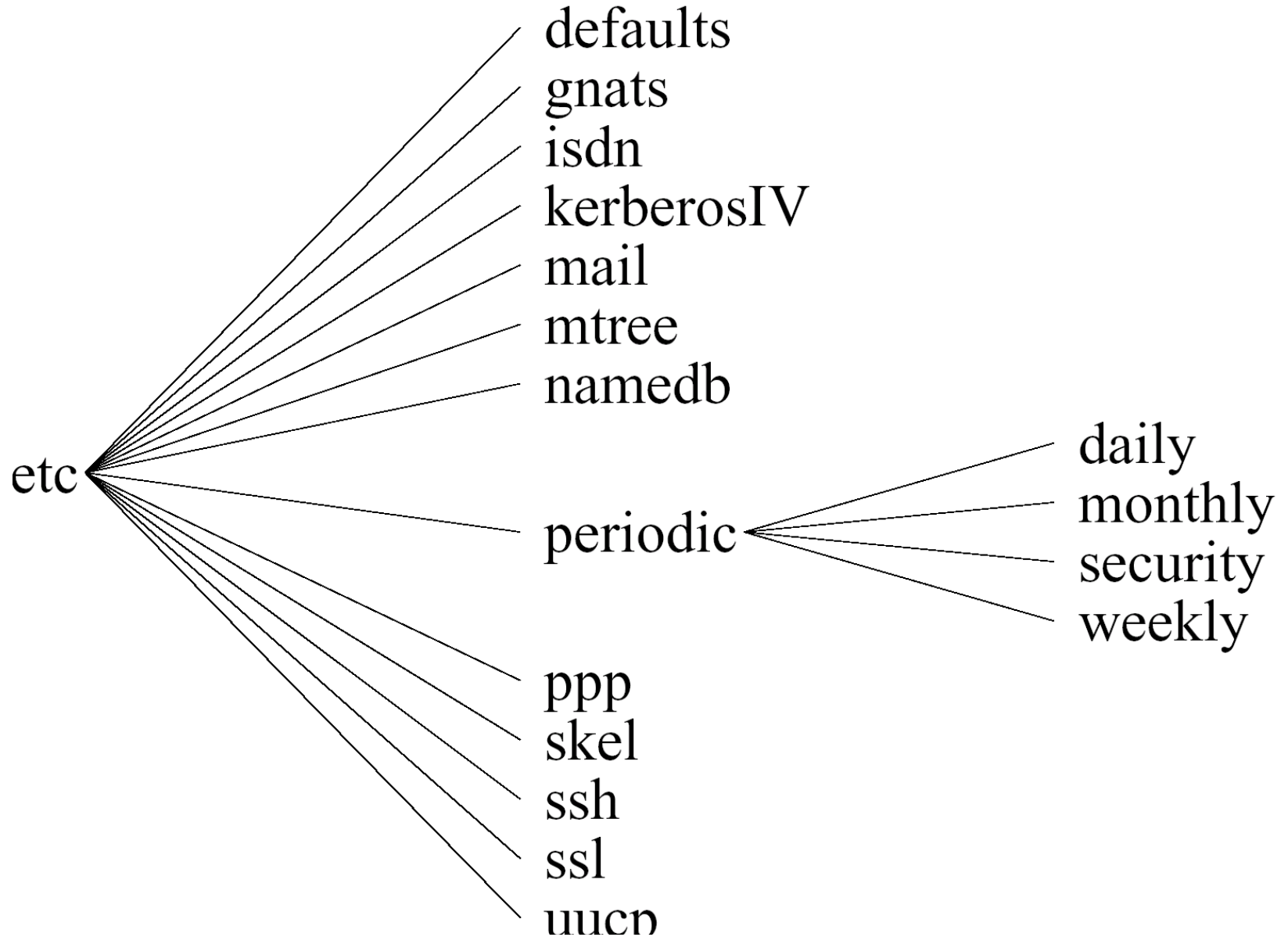
# Vinum

---

- Logical Volume Manager (LVM), a la Veritas Volume Manager (om enn ikke like robust)
- Tilbyr:
  - Device-uavhengige logiske disk (volumer), bygget opp av plexer.
  - RAID-1 (speiling) for bedre redundans og ytelse
  - RAID-5 (to enheter + paritet)
  - Sammenkjeding og striping av plexer
  - Online flytting av data mellom plexer
  - Volumene inneholder selv konfigurasjonen

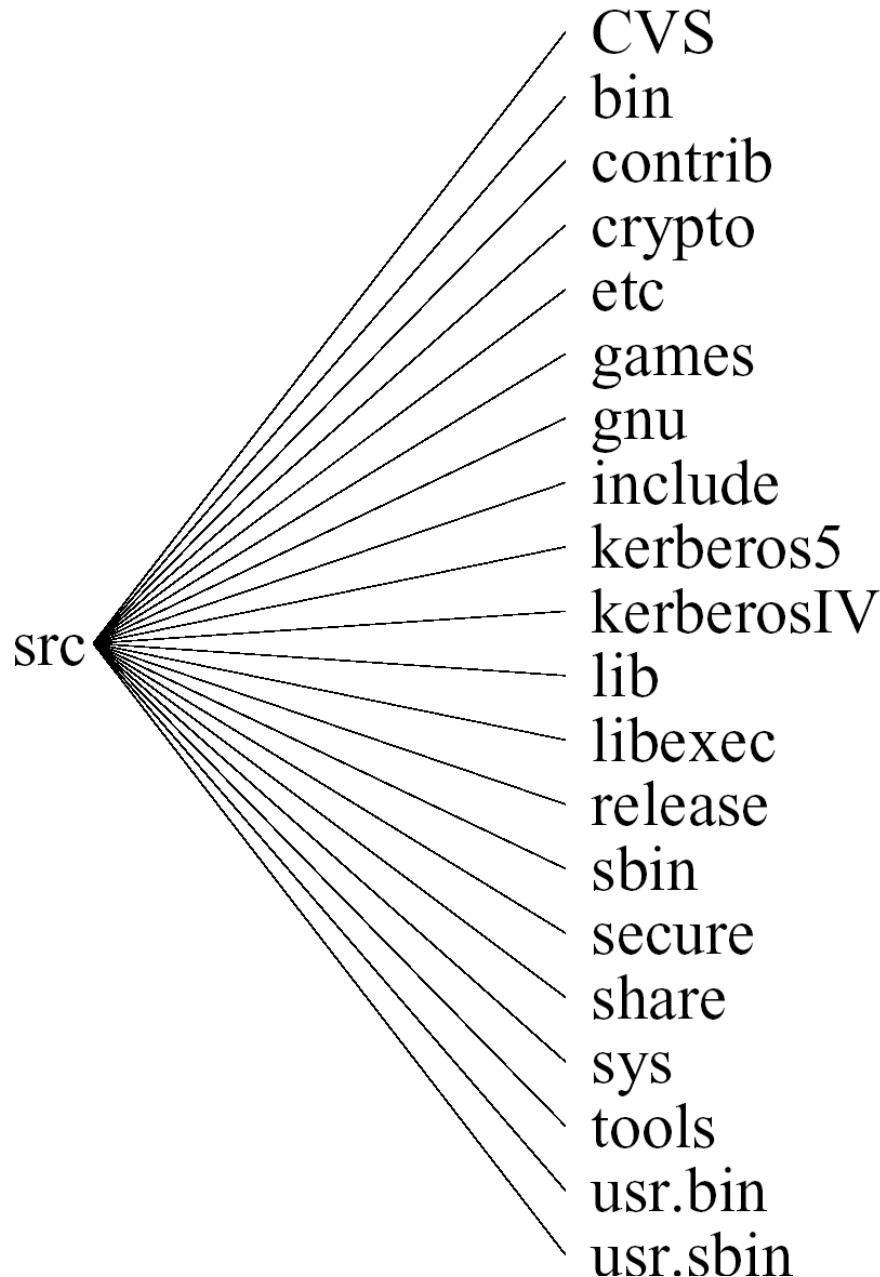


# Filsystemet: /etc



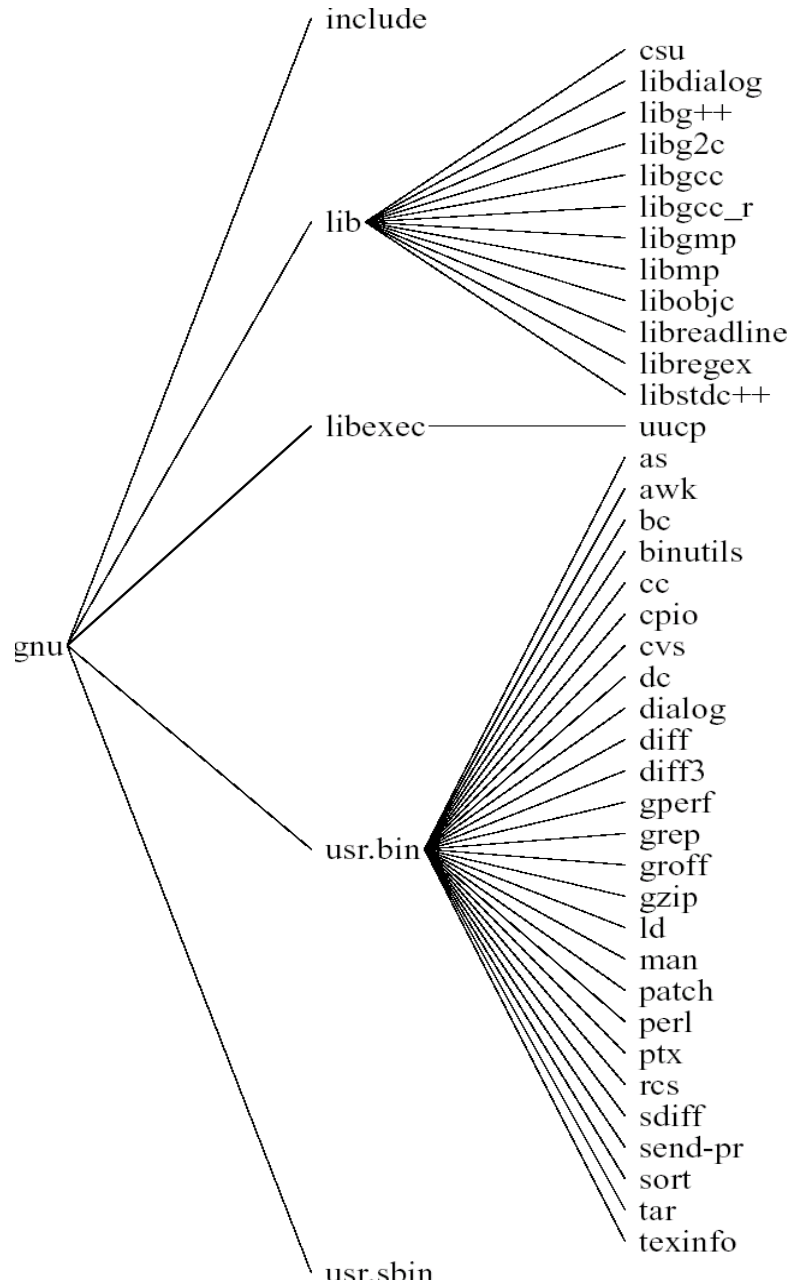


# Filsystemet: /usr/src





# Filsystemet: /usr/src/gnu

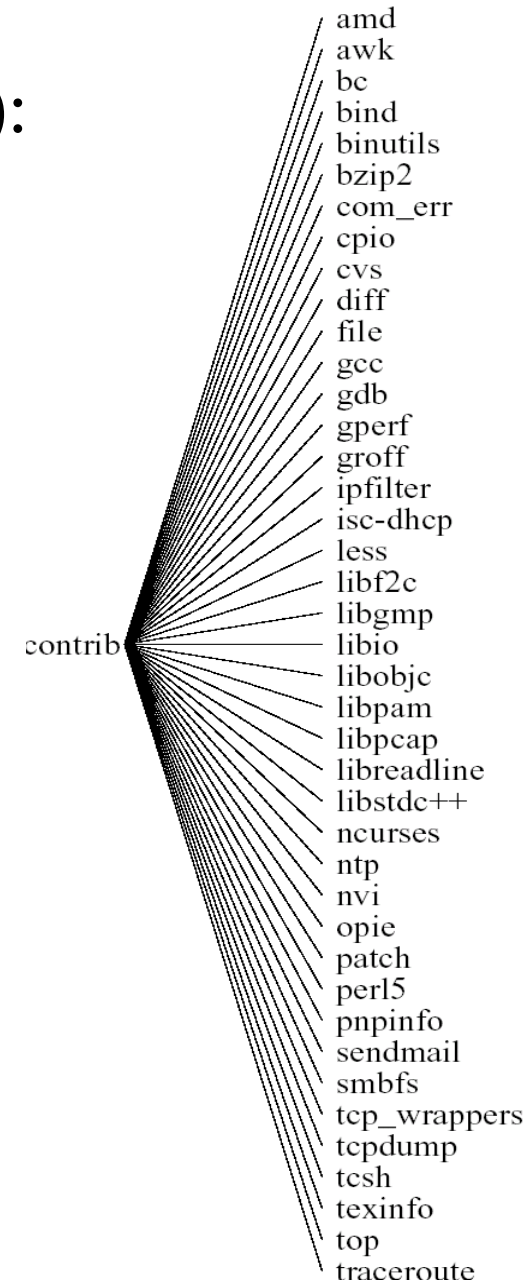






# Filsystemet: /usr/src/contrib

- The usual suspects (-STABLE):
  - BIND 8.3.1
  - Perl 5.005\_03
  - gcc 2.95.3
  - sendmail 8.11.6





# Oppstartsmekanismer

- Det meste av de maskinspesifikke settingene gjøres i `/etc/rc.conf`
  - Hostnavn
  - IP-adresser for nettverksinterface
  - Oppstart og opsjoner til daemons
- `/etc/defaults/` inneholde defaultsettinger; overstyres av `/etc/rc.conf`
- Oppstartsscript ifb. ports legges i:
  - `/usr/local/etc/rc.d/`
- Altså ikke knyttet til runlevels som i System V/Linux



# Eksempel på /etc/rc.conf

```
defaultrouter="10.0.0.1"
firewall_enable="YES"          # Set to YES to enable firewall functionality
firewall_logging="NO"         # Set to YES to enable events logging
firewall_quiet="YES"          # Set to YES to suppress rule display
firewall_script="/etc/rc.firewall" # Which script to run to set up the firewall
firewall_type="/etc/ipfw.conf" # Firewall type (see /etc/rc.firewall)
fsck_y_enable="YES"
gateway_enable="YES"
hostname="fermat.tricknology.org"
network_interfaces="fxp0 xl0"
ifconfig_fxp0="inet 10.0.0.2 netmask 255.255.255.0"
ifconfig_xl0="inet 10.0.0.10 netmask 255.255.255.0"
ifconfig_lo0="inet 127.0.0.1 netmask 255.255.255.0"
inetd_enable="YES"
inetd_flags="-wW"
named_enable="YES"
portmap_enable="NO"
sendmail_enable="YES"
sshd_enable="YES"
syslogd_enable="YES"
syslogd_flags="-ss"
xntpd_enable="YES"
xntpd_flags="-f /var/tmp/ntpd.drift -p /var/run/ntpd.pid"
```



# Kjernekonfigurering #1

- Èn tekstfil i /usr/src/sys/i386/conf
- Endres vha. \$EDITOR
- GENERIC vs LINT
- `cd /usr/src; make kernel KERNCONF=navn`
- Mulighet for dynamisk rekonfigurering ved boot



# Kjernekonfigurering #2

machine	i386	
cpu	I386_CPU	
cpu	I486_CPU	
cpu	I586_CPU	
cpu	I686_CPU	
ident	FERMAT	
maxusers	32	
options	MATH_EMULATE	#Support for x87 emulation
options	INET	#InterNETworking
#options	INET6	#IPv6 communications protocols
options	FFS	#Berkeley Fast Filesystem
options	FFS_ROOT	#FFS usable as root device [keep this!]
options	SOFTUPDATES	#Enable FFS soft updates support
options	MFS	#Memory Filesystem
options	MD_ROOT	#MD is a potential root device
#options	NFS	#Network Filesystem
#options	NFS_ROOT	#NFS usable as root device, NFS required
#options	MSDOSFS	#MSDOS Filesystem
options	CD9660	#ISO 9660 Filesystem
options	CD9660_ROOT	#CD-ROM usable as root, CD9660 required
options	PROCFS	#Process filesystem
options	COMPAT_43	#Compatible with BSD 4.3 [KEEP THIS!]
options	SCSI_DELAY=15000	#Delay (in ms) before probing SCSI
options	UCONSOLE	#Allow users to grab the console
options	USERCONFIG	#boot -c editor
options	VISUAL_USERCONFIG	#visual boot -c editor
options	KTRACE	#ktrace(1) support
options	SYSVSHM	#SYSV-style shared memory
options	SYSVMSG	#SYSV-style message queues
options	SYSVSEM	#SYSV-style semaphores
options	P1003_1B	#Posix P1003_1B real-time extensions
options	_KPOSIX_PRIORITY_SCHEDULING	
options	ICMP_BANDLIM	#Rate limit bad replies
options	KBD_INSTALL_CDEV	# install a CDEV entry in /dev
options	IPFIREWALL	#firewall
options	IPFIREWALL_FORWARD	#enable transparent proxy support
# options	IPFIREWALL_DEFAULT_TO_ACCEPT	#allow everything by default
options	DUMMYNET	
options	BRIDGE	





# CVS

---

- Concurrent Version System, et Software Configuration Management (SCM)-system basert på RCS.
- Tar vare på alle endringer gjort på enkeltfiler, inklusive støtte for endringslogger.
- Resolving av konflikter ved samtidig oppdatering.
- Tags for å merke et gitt sett av filer
- Opprinnelig fra 1989, og er merket av tidens tann, sammenlignet med Perforce, Bitkeeper og andre mer moderne systemer.



# cvsweb #1

## src/bin/ls/

Click on a directory to enter that directory. Click on a file to display its revision history and to get a chance to display diffs between revisions.

Current directory: [\[frebsd\]](#) / [src](#) / [bin](#) / [ls](#)

File	Rev.	Age	Author	Last log entry
<a href="#">Parent Directory</a>				
<a href="#">Attic/</a> <a href="#">[Don't hide]</a>				
<a href="#">Makefile</a>	<a href="#">1.23</a>	2 months	kris	Correct inadvertent style botches in previous commit.
<a href="#">cmp.c</a>	<a href="#">1.11</a>	2 months	markm	Use __FBSID() and clean up the vendor tags.
<a href="#">extern.h</a>	<a href="#">1.18</a>	2 months	markm	WARNS=4 fixes, plus a healthy dose of fixes inspired by lint.
<a href="#">lomac.c</a>	<a href="#">1.7</a>	3 weeks	ru	Install sys/security/lomac/*.h to /usr/include/security/lomac/. Install sys/<ar...
<a href="#">lomac.h</a>	<a href="#">1.2</a>	5 weeks	rwatson	NAI DBA update.
<a href="#">ls.1</a>	<a href="#">1.64</a>	5 days	charnier	ls(1) is utility not function
<a href="#">ls.c</a>	<a href="#">1.56</a>	2 months	imp	Fixed divots that I created when I moved prototypes of group_from_gid and user_f...
<a href="#">ls.h</a>	<a href="#">1.17</a>	2 months	markm	WARNS=4 fixes, plus a healthy dose of fixes inspired by lint.
<a href="#">print.c</a>	<a href="#">1.53</a>	7 weeks	bde	#include <time.h> for the definition of time functions instead of depending on n...
<a href="#">util.c</a>	<a href="#">1.29</a>	7 weeks	ache	Add (unsigned char) cast lost in WARNS=4 fixes which break 8bit locales PR: 35...

Show only files with tag:

Module path or alias:





# cvsweb #2

## CVS log for src/bin/ls/ls.c

⬅ Up to [\[freebsd\]](#) / [src](#) / [bin](#) / [ls](#)

[Request diff between arbitrary revisions](#)

---

Default branch: MAIN

---

Revision [1.32.2.5](#) / ([download](#)) - [annotate](#) - [\[select for diffs\]](#), *Thu Mar 28 01:28:14 2002 UTC* (3 weeks, 3 days ago) by *joe*

Branch: [RELENG\\_4](#)

Changes since [1.32.2.4](#): +121 -94 lines

Diff to previous [1.32.2.4](#) ([colored](#)) to branchpoint [1.32](#) ([colored](#)) next main [1.33](#) ([colored](#))

MFC: Sync with -current, bringing all the differences into line, apart from those that are -current specific.

In particular:

Revamp the colour support to allow for bold characters. Colours are now defined using the characters a-h and A-H for the bold variants. The old way using 0-7 for the colours still works, but prints a message asking the user to switch.

Add a new flag, -h which when combined with the -l option causes file sizes to be displayed with unit suffixes; Byte, Kilobyte, Megabyte, Gigabyte, Terabyte and Petabyte in order to reduce the number of digits to three or less.

K&R->C89 source code changes.

---

Revision [1.56](#) / ([download](#)) - [annotate](#) - [\[select for diffs\]](#), *Tue Feb 19 00:05:50 2002 UTC* (2 months ago) by *imp*

Branch: [MAIN](#)

CVS Tags: [HEAD](#)

Changes since [1.55](#): +2 -0 lines

Diff to previous [1.55](#) ([colored](#))

Fixed divots that I created when I moved prototypes of group\_from\_gid and user\_from\_uid to grp.h and pwd.h. Update the man pages.



# CVSup

---

- Enkel måte å tracke kildekodeetreet på
- Oppgradering:
  - `cvsup supfile`
  - `cd /usr/src`
  - `make world`
  - `make KERNCONF=xyz`
- `/usr/src/UPDATING`



# Eksempel på supfile

\*default host=cvsup.no.FreeBSD.org

\*default base=/usr

\*default prefix=/usr

\*default release=cv tag=RELENG\_4

\*default delete use-rel-suffix

\*default compress

src-all

ports-all tag=.

doc-all tag=.



# Eksempel på cvsup

**# cvsup supfile**

Connected to cvsup.no.FreeBSD.org

Updating collection src-all/cvs

Edit src/UPDATING

Edit src/etc/defaults/make.conf

Edit src/etc/defaults/rc.conf

Edit src/etc/inetd.conf

Edit src/etc/sendmail/Makefile

Checkout ports/biology/avida/pkg-descr

Checkout ports/biology/avida/pkg-plist

Edit ports/biology/chemeq/Makefile

Edit ports/biology/chemeq/distinfo

Delete ports/chinese/chinput2/files/patch-aa

Delete ports/chinese/chinput2/files/patch-ab



# mergemaster

- En liten genistrek av et shellscript som differ /etc mot /usr/src/etc, og
- lar brukeren interaktivt merge endringer

**\*\*\* Displaying differences between ./etc/defaults/make.conf and installed version:**

```
--- /etc/defaults/make.conf  Sat Apr 13 21:28:02 2002
+++ ./etc/defaults/make.conf  Sun Apr 21 22:38:05 2002
@@ -1,4 +1,4 @@
-# $FreeBSD: src/etc/defaults/make.conf,v 1.97.2.63 2002/03/30 18:16:13 ume Exp $
+# $FreeBSD: src/etc/defaults/make.conf,v 1.97.2.64 2002/04/20 18:50:56 gshapiro Exp $
 #SENDMAIL_MC=/etc/mail/myconfig.mc
+#SENDMAIL_SUBMIT_MC=/etc/mail/mysubmit.mc
```

**Use 'd' to delete the temporary ./etc/defaults/make.conf**

**Use 'i' to install the temporary ./etc/defaults/make.conf**

**Use 'm' to merge the temporary and installed versions**

**Use 'v' to view the diff results again**

Default is to leave the temporary file to deal with by hand

**How should I deal with this? [Leave it for later]**



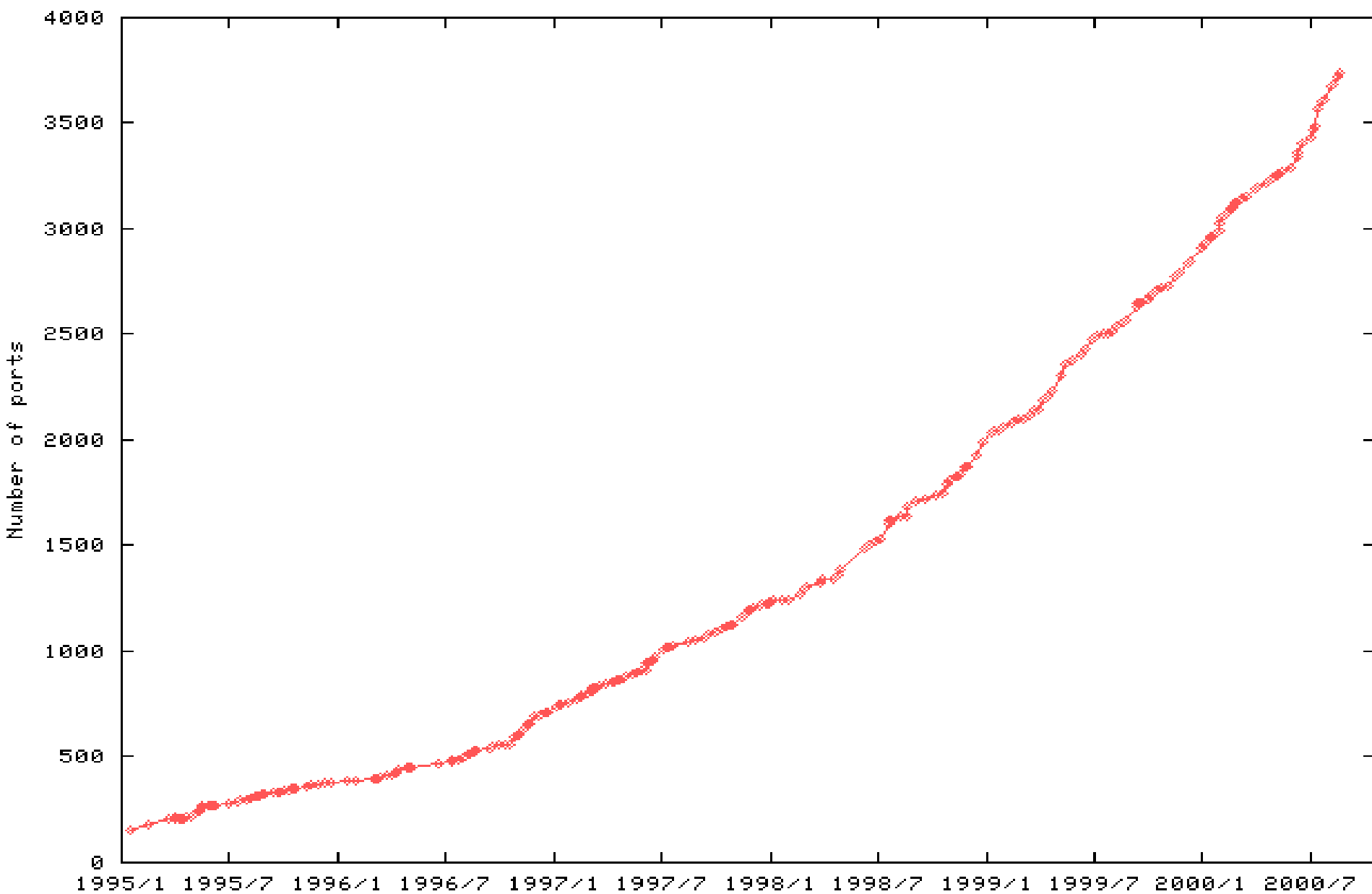
# Ports

---

- Rammeverk for å håndtere tredjeparts programvare
- Lokal bygging av programvaren, kombinert med mekanismer for pakkehåndtering
- Pre-kompilerte utgaver (packages) også tilgjengelig
- 6777 ports per 24. april 2002, gruppert i kategorier



# Ports: Antall (6777 pr 2002.04)





# Ports: Kategorier

---

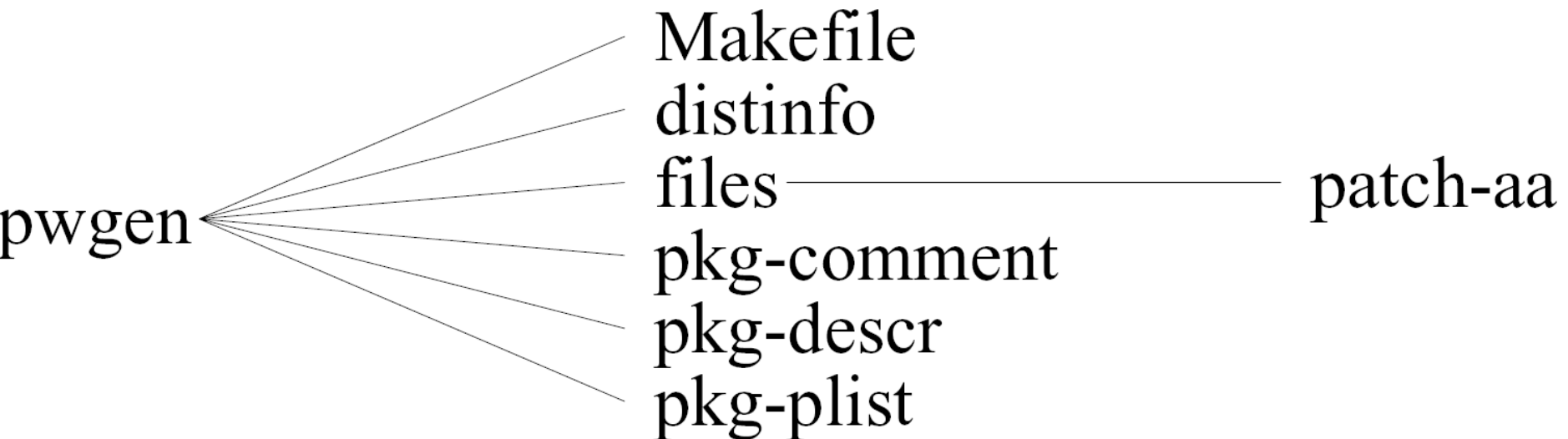
- archivers
- astro
- audio
- benchmarks
- biology
- cad
- chinese
- comms
- converters
- databases
- deskutils
- devel
- distfiles
- editors
- emulators
- french
- ftp
- games
- german
- graphics
- hebrew
- irc
- japanese
- java
- korean
- lang
- mail
- math
- mbone
- misc
- net
- news
- palm
- picobsd
- print
- russian
- science
- security
- shells
- sysutils
- textproc
- ukrainian
- vietnamese
- www
- x11
- x11-clocks
- x11-fm
- x11-fonts
- x11-servers
- x11-toolkits
- x11-wm





# Ports: Eksempel: pwgen

- **Makefile**
- **distinfo** MD5 checksum
- **files/patch-nn** dette
- **pkg-comment** enlinjes beskrivelse
- **pkg-descr** mer utførlig beskrivelse av programmet
- **pkg-message** informasjon ved installasjon
- **pkg-plist** liste over filer som installeres





# Ports: Eksempel: Makefile

```
# New ports collection makefile for:  pwgen
# Date created:      22 July 2000
# Whom:              Oddbjorn Steffensen <oddbjorn@tricknology.org>
#
# $FreeBSD: ports/sysutils/pwgen/Makefile,v 1.4 2000/11/08 22:47:35 steve Exp $
#

PORTNAME=    pwgen
PORTVERSION=  1.15
CATEGORIES=   sysutils
MASTER_SITES= http://www.tricknology.org/ports/

MAINTAINER=   oddbjorn@tricknology.org

LIB_DEPENDS=  gnugetopt.1:${PORTSDIR}/devel/libgnugetopt

WRKSRC=       ${WRKDIR}/${PORTNAME}-1

MAN1 =        pwgen.1

.include <bsd.port.mk>
```



# Ports: Installasjon

```
fermat /usr/ports/sysutils/pwgen> sudo make install
>> pwgen-1.15.tar.gz doesn't seem to exist in /usr/ports/distfiles/.
>> Attempting to fetch from http://www.tricknology.org/ports/.
Receiving pwgen-1.15.tar.gz (14839 bytes): 100%
14839 bytes transferred in 0.3 seconds (56.27 kBps)
==> Extracting for pwgen-1.15
>> Checksum OK for pwgen-1.15.tar.gz.
==> pwgen-1.15 depends on shared library: gnugetopt.1 - found
==> Patching for pwgen-1.15
==> Applying FreeBSD patches for pwgen-1.15
==> Configuring for pwgen-1.15
==> Building for pwgen-1.15
cc -O -pipe -I/usr/local/include -DALLBYOPTS -DRAND48 -DDEBIAN -c -o pwgen.o pwgen.c
cc -L/usr/local/lib -o pwgen pwgen.o -lm -lgnugetopt
==> Installing for pwgen-1.15
==> pwgen-1.15 depends on shared library: gnugetopt.1 - found
install -c -s -o root -g wheel -m 555 pwgen /usr/local/bin
install -c -o root -g wheel -m 444 pwgen.1 /usr/local/man/man1
==> Generating temporary packing list
==> Compressing manual pages for pwgen-1.15
==> Registering installation for pwgen-1.15
```



# Problemhåndtering

- Basert på Cygnus GNATS
- Mailbasert
  - send-pr
  - Komplett arkiv tilgjengelig via CVSup
- Ulike kategorier:
  - alpha
  - docs
  - kern(el)
  - bin
  - gnu
  - misc
  - conf
  - i386
  - ports



# send-pr

---

To: FreeBSD-gnats-submit@freebsd.org  
From: Oddbjorn Steffensen <oddbjorn>  
Reply-To: Oddbjorn Steffensen <oddbjorn>  
Cc:  
X-send-pr-version: 3.113  
X-GNATS-Notify:

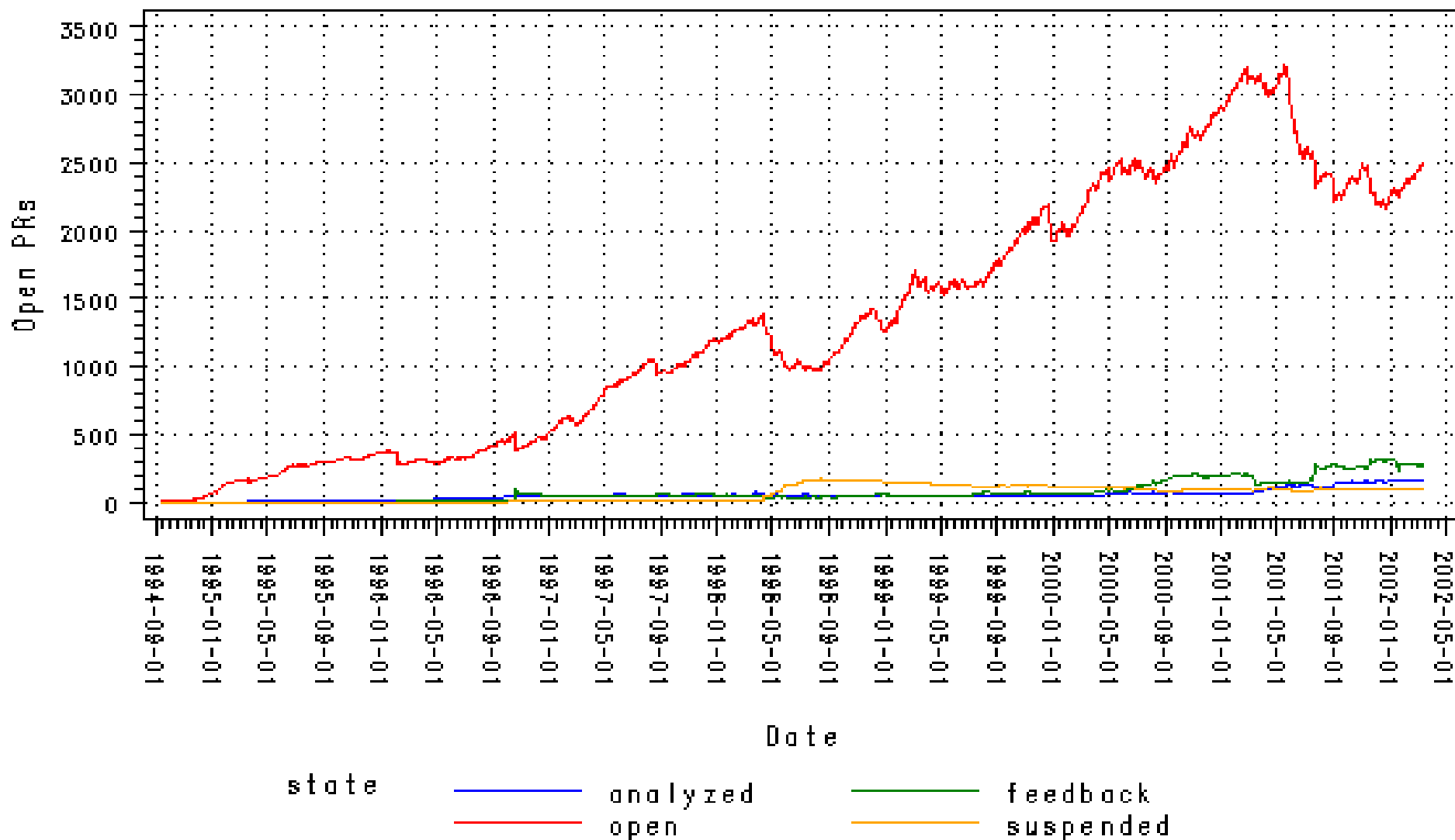
>Submitter-Id: current-users  
>Originator: Oddbjorn Steffensen  
>Organization: <organization of PR author (multiple lines)>  
>Confidential: no <FreeBSD PRs are public data>  
>Synopsis: <synopsis of the problem (one line)>  
>Severity: <[ non-critical | serious | critical ] (one line)>  
>Priority: <[ low | medium | high ] (one line)>  
>Category: <choose from the list of categories above (one line)>  
>Class: <[ sw-bug | doc-bug | change-request | update | maintainer-update ] (one line)>  
>Release: FreeBSD 4.5-STABLE i386  
>Environment:  
System: FreeBSD fermat.tricknology.org 4.5-STABLE FreeBSD 4.5-STABLE #2: Tue Apr 9 22:35:26  
CEST 20

<machine, os, target, libraries (multiple lines)>  
>Description:  
<precise description of the problem (multiple lines)>  
>How-To-Repeat:  
<code/input/activities to reproduce the problem (multiple lines)>  
>Fix:  
<how to correct or work around the problem, if known (multiple lines)>



# Antall åpne problemrapporter

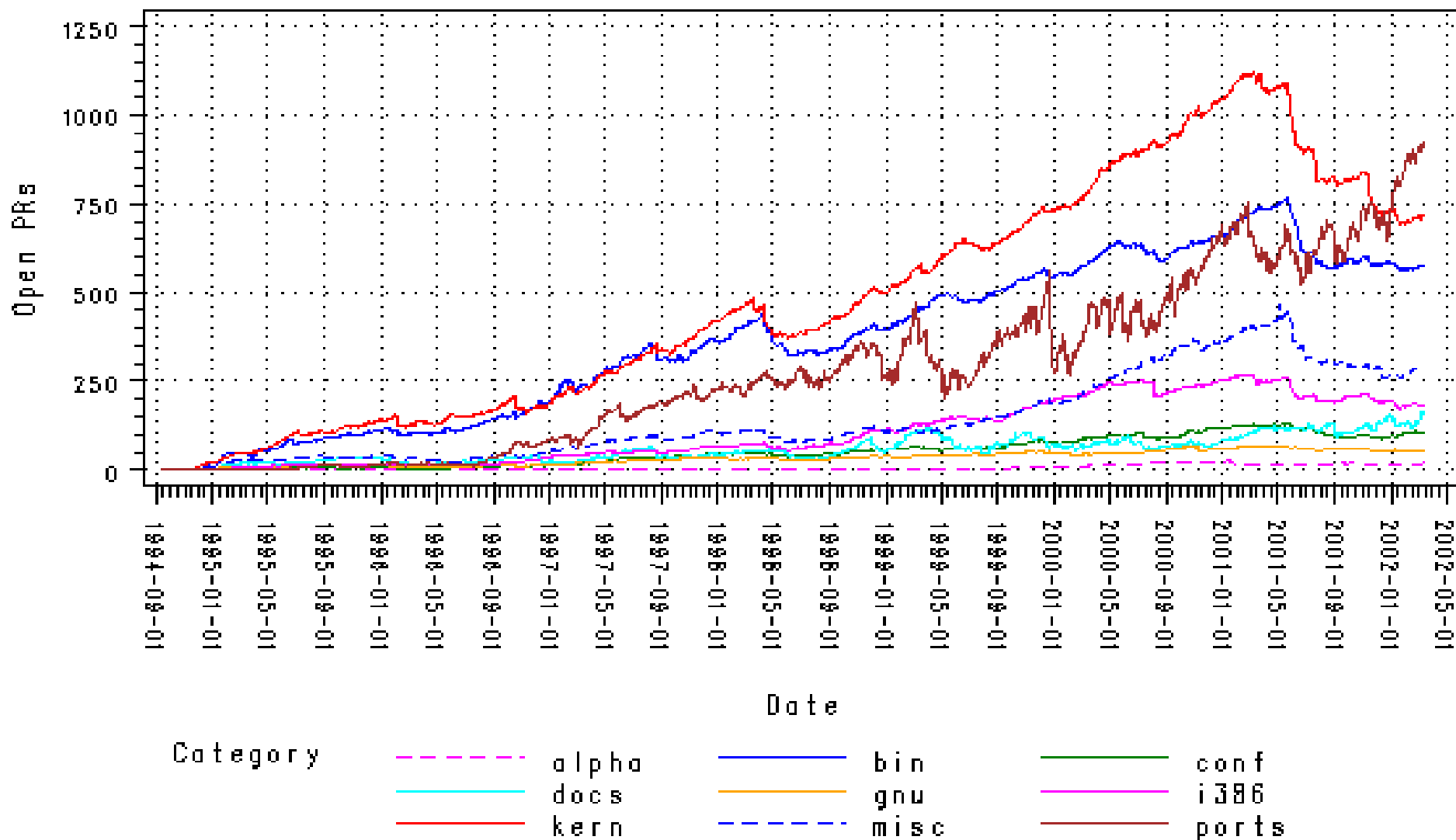
Open PR Count (Project Lifetime)  
Data as of 2002-03-14  
Report Generated 2002-03-14





# Problemrappporter pr kategori

Open PR Count (Project Lifetime)  
Data as of 2002-03-14  
Report Generated 2002-03-14





# Sikkerhet

---

- Relativt god sikkerhet:
  - Få defaulttjenester
  - OpenSSH
  - TCP wrappers
  - jail – forbedret chroot
  
- Betydelige muligheter for å stramme inn:
  - Securelevels
  - Loginklasser
  - ipfw/ipfilter
  - IPsec & IPv6
  - syslogd -ss (ikke lytt på 514/udp)
  
- og etterhvert TrustedBSD





# Securelevels

---

- 4 ulike nivå; root kan øke nivået, men må reboote for å få senket det igjen. Begrensningene gjelder også for root.
  - Insecure mode (0)
    - Immutable og append-only kan slås av
  - Secure mode (1)
    - System immutable og system append-only flaggene kan ikke slås av
    - Disk-devicene for monterte filsystemer, /dev/mem og /dev/kmem kan ikke skrives til
    - Kjernemoduler kan ikke lastes eller tas ut
  - Highly secure mode (2)
    - Som (1), men disker kan ikke skrives til av andre kommandoer enn mount(8).
    - Endring av kjernetid er begrenset til  $\leq 1$  sekund
  - Network secure mode (3)
    - Som (2), samt at ipfw-regler ikke kan endres.
- Nyttig hjelpemiddel, men ikke perfekt.



# Login-klasser

---

- Regler for grupper av brukere
- /etc/login.conf

default:\

```
:passwd_format=md5:\
:copyright=/etc/COPYRIGHT:\
:welcome=/etc/motd:\
:setenv=MAIL=/var/mail/$,BLOCKSIZE=K,FTP_PASSIVE_MODE=YES:\
:path=/sbin /bin /usr/sbin /usr/bin /usr/games /usr/local/sbin /usr/local/bin ~/bin:\
:nologin=/var/run/nologin:\
:cputime=unlimited:\
:datasize=unlimited:\
:stacksize=unlimited:\
:memorylocked=unlimited:\
:memoryuse=unlimited:\
:filesize=unlimited:\
:coredumpsize=unlimited:\
:openfiles=unlimited:\
:maxproc=unlimited:\
:sbsize=unlimited:\
:priority=0:\
:ignoretime@:\
:umask=022:
```



# IPv6/IPSEC

---

- Basert på KAME-prosjektet ([www.kame.net](http://www.kame.net))
- IPv6-implementasjon
- IPSEC for IPv4 og IPv6
  - Transport og tunnel mode



# Brannvegg(er)

- ipfilter
  - Skrevet av Darren Reed
  - Kjører på Solaris, {Net,Free,Open}BSD, BSD/OS, IRIX, HP-UX, QNX.
  
- ipfw
  - FreeBSD native
  - Støtter bridge
  - Dummynet traffic shaping:
    - ipfw add pipe 1 ip from A to B out
    - ipfw add pipe 2 ip from B to A in
    - ipfw pipe 1 config bw 1Mbit/s delay 80ms
    - ipfw pipe 2 config bw 128Kbit/s delay 300ms



# Jail

---

- chroot
  - endrer bare rotkatalogen; ikke \$cwd
  - vanskelig å sikre mot root; fildeskriptorer utenfor chroot
- Jail
  - endrer rotkatalogen og \$cwd
  - Begrenser roots evner innenfor fengselet
  - Definerer en IP-adresse bare til bruk for fengselet
  - Begrenser hva fengslede prosesser kan se utenfor miljøet
  - Prosesser tagges som fengslede
- Selv jail er ikke perfekt:
  - Ikke en komplett virtuell maskin
  - Stor overhead i de chrootede miljøene
  - Liten støtte for drift av jails
  - Kan være kronglete å konfigurere



# TrustedBSD

- Målet er Common Criteria for Information Technology Security Evaluation (CC)
- Egenskaper:
  - Autentiseringsrammeverk
    - Utvidbart, koderevidert
    - Labeling av objekter
    - Sentralisert håndtering av policy
  - Fin granularitet på capabilities for system
  - Mandatory access control (MAC)
  - Access control lists (ACL) for filsystem og kjerneressurser
  - Overvåking av hendelser
- DARPA sponser NAI Labs i utviklingen av enkelte egenskaper





# Ytelse

---

- Virtual Memory
- Accept filters
  - Versions of FreeBSD from August 2000 onwards include a feature called "accept filters" which delay the return from `accept()` until a condition has been met, e.g. an HTTP request has arrived. This postpones the requirement for a child process to handle the new connection which therefore increases the number of connections that a given number of child processes can handle. It also allows a child process to accomplish more immediately after `accept()` returns (because the request is already available to be read) so there is less context switching.
  - <http://httpd.apache.org/docs/misc/perf-bsd44.html>
- Kjernekrøer
  - Versions of FreeBSD from August 2000 onwards include a feature called "accept filters" which delay the return from `accept()` until a condition has been met, e.g. an HTTP request has arrived. This postpones the requirement for a



# Binærkompatibilitet

- Linux, Solaris x86, SCO, BSD/OS, NetBSD
- "90% av Linux-applikasjonene virker", men:
  - /proc er dårlig støttet
  - i386-spesifikke systemkall
- Eksempler:
  - Oracle
  - Sybase
  - Adobe Acrobat
  - VMWare
  - Netscape Communicator





# Java


---

- JDK 1.1.8 default
- Java2-prosjekt i gang (JDK 1.2.2 & 1.3.x)
  - Uoffisielt patchsett
- Antakelig den største kommersielle bremseklossen

Java2



# Kommersielle databaser

- Sybase
  - 11.0.3 + muligens 11.5, 11.9.2, 12.0 og 12.5 (beta)
  - Adaptive Server Enterprise (ASE)
  
- Oracle 
  - Ved hjelp av Linux-emulering
  - Oracle 8.0.5.0.0
  - Oracle 8.0.5.1.0 Enterprise Edition
  - <http://www.scc.nl/~marcel/howto-oracle.html>



# KDE & GNOME

---

- KDE 2.2.2, KDE3 på vei

- GNOME 1.4.1b2

- <http://www.freebsd.org/gnome/>





# Ymse egenskaper

- System V IPC (shm, sem, msg)
- ISDN4BSD (i4b)
- CAM SCSI
- PicoBSD (FreeBSD på èn floppy)
- Network Address Translation (NAT) – natd
- Netgraph
- Bluetooth-stack ([http://www.geocities.com/m\\_evmenkin/](http://www.geocities.com/m_evmenkin/))
- Firewire (<http://people.freebsd.org/~simokawa/>)
- samt mye, mye mer:
  - <http://www.freebsd.org/projects/>



# Ressurser #1

---

- <http://www.freebsd.org/>
  - FreeBSD Documentation Project:
    - FreeBSD Handbook
    - FreeBSD FAQ
  - FreeBSD mailinglister
- FreeBSD Newbies
  - <http://www.freebsd.org/projects/newbies.html>
- <ftp://sunsite.uio.no/pub/FreeBSD/>



# Ressurser #2

-  **dæmon news**  
Bringing you BSD
  - [www.daemonnews.org](http://www.daemonnews.org)



- Big Scary Daemons
  - <http://www.onlamp.com/pub/ct/13>

- FreeBSD  Diary
  - <http://www.freebsdidiary.org/>

-  **FRESH** ports

- <http://www.freshports.org/>



# Ressurser: Mailinglist

- [majordomo@freebsd.org](mailto:majordomo@freebsd.org)
- Noen av listene:

<b>freebsd-advocacy</b>	FreeBSD Evangelism
<b>freebsd-announce</b>	Important events and project milestones
<b>freebsd-chat</b>	Non-technical items related to the FreeBSD community
<b>freebsd-current</b>	Discussion concerning the use of FreeBSD-current
<b>freebsd-newbies</b>	New FreeBSD users activities and discussions
<b>freebsd-questions</b>	User questions and technical support
<b>freebsd-security</b>	Security issues
<b>freebsd-stable</b>	Discussion concerning the use of FreeBSD-stable



# NetBSD



acorn26 acorn32 algor alpha amiga amigappc arc arm32 atari bebox cats  
cesfic cobalt dreamcast evbarm evbmips evbsh3 hp300 hp700 hpcarm  
hpcmips hpcsh i386 luna68k mac68k macppc mipsco mmeye mvme68k  
mvmeppc netwinder news68k newsmips next68k ofppc pc532 playstation2  
pmax prep sandpoint sbmips sgimips shark sparc sparc64 sun2 sun3 vax  
walnut x68k x86\_64





# OpenBSD



- Spinoff fra NetBSD i 1995 etter en spektakulær krangel mellom NetBSD core og Theo de Raadt.
- Fokus på sikkerhet:
  - All kode i basesystemet har gjennomgått audit
  - Jfr. pine-exploiten denne uken – open-semanticen fikset i OpenBSD i 1998.
  - 4 år siden remote exploit (default installasjon)
  - 2-3 år siden lokal exploit (default installasjon)
  - OpenSSH stammer fra samme folkene
- Færre ports enn FreeBSD
- Færre plattformer enn NetBSD





# Hey, Theo!

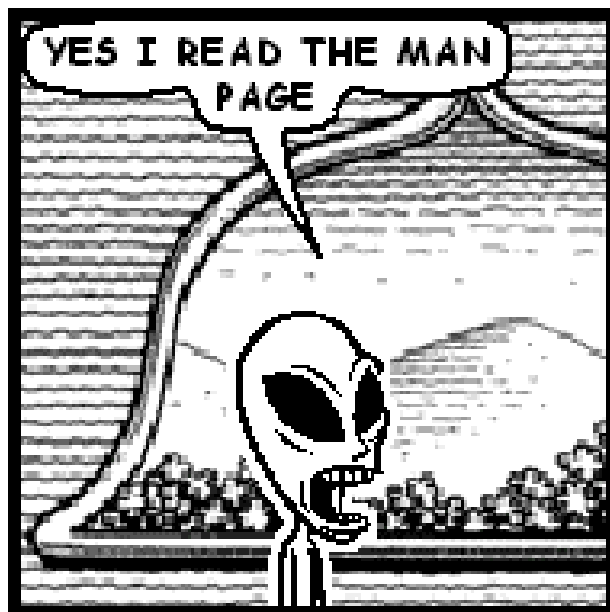
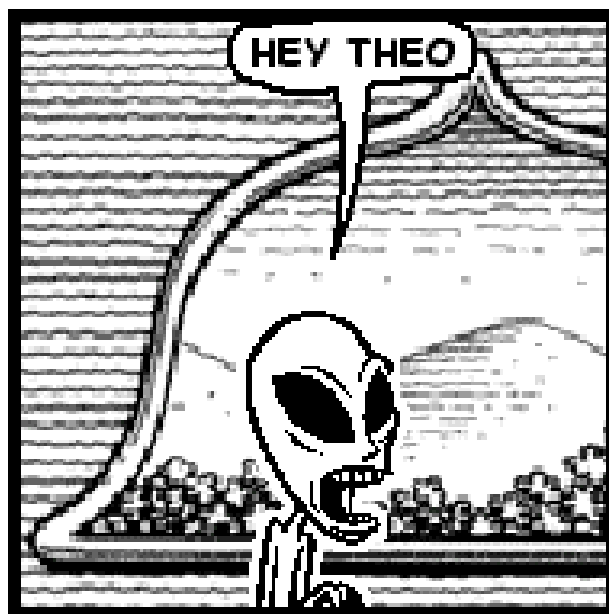
## HEY THEO

STARRING



rande

[www.jerkcity.com](http://www.jerkcity.com)

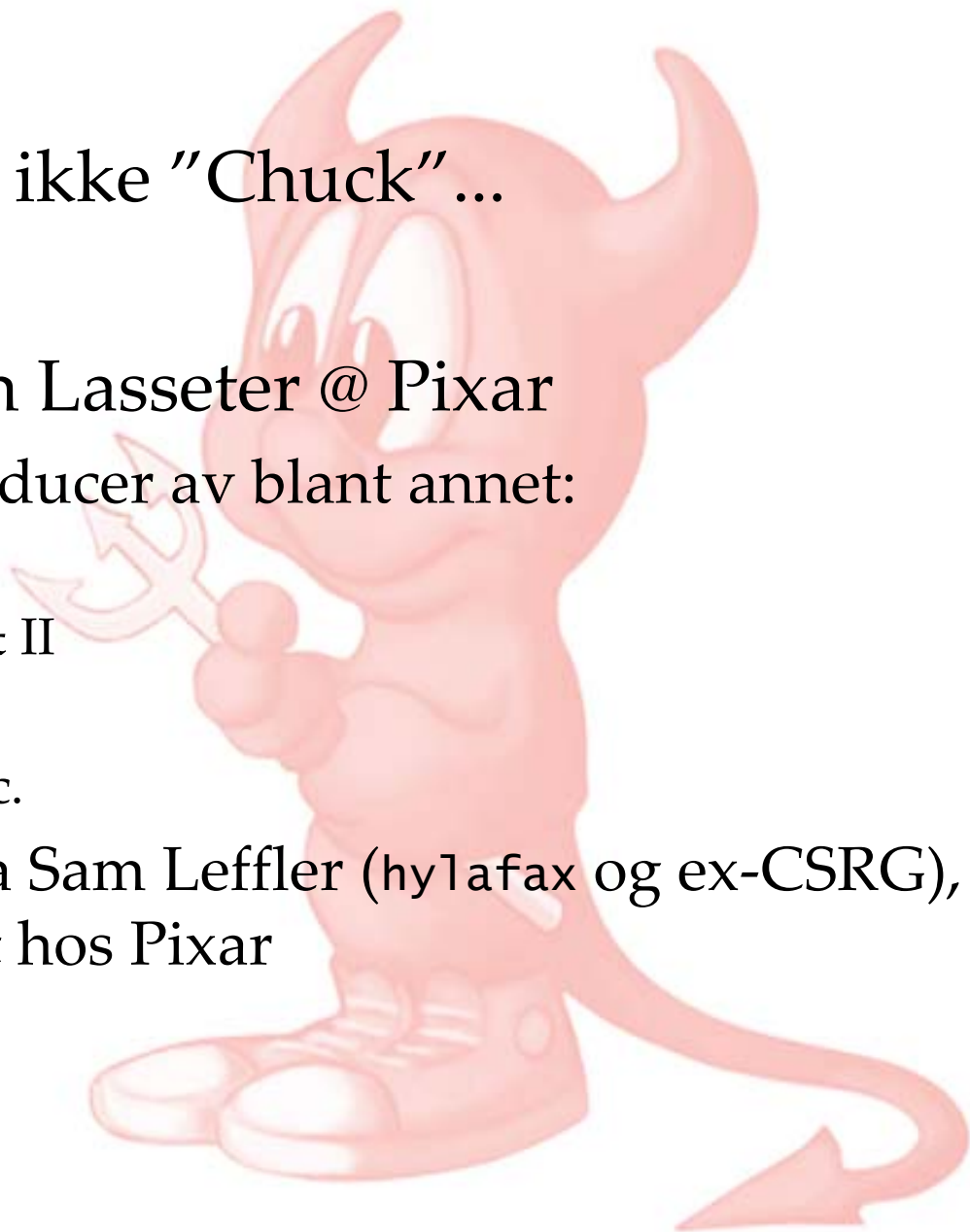




# "Beastie"

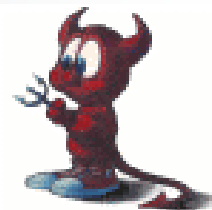


- Heter absolutt ikke "Chuck" ...
- Tegnet av John Lasseter @ Pixar
  - kjent som producer av blant annet:
    - Luxo Jr.
    - Toy Story I & II
    - A Bug's Life
    - Monsters, Inc.
  - etter ønske fra Sam Leffler (hylafax og ex-CSRG), som da jobbet hos Pixar





# Grunn til å ikke bruke FreeBSD?



- <http://members.truepath.com/objective/propaganda.html>:
- "Apparently the Darwin OS is not the original creation of Apple Computers but is instead based off of an older, obsolete OS called "BSD Unix". The child-indoctrinatingly-cute cartoon mascot of this OS is a devil holding a pitchfork (pictured above).
- This OS -- and its Darwin offspring -- extensively use what are called "daemons" (which is how Pagans write "demon" -- they are notoriously poor spellers: magick, vampyre, etc.) which is a program that hides in the background, doing things without the user's notice.
- [...]
- According to one of our readers, the new MacOS X contains another Satanic holdover from the "BSD Unix" OS mentioned above; to open up certain locked files one has to run a program much like the DOS prompt in Microsoft Windows and type in a secret code: "chmod 666". What other horrors lurk in this thing?"
- Sannsynligvis en hoax, jfr.  
<http://www.macobserver.com/article/2002/04/22.4.shtml>



# Go ahead... ..take a Byte



*There's nothing forbidden about it.*



*When Linux can no longer satisfy your needs...*



*Featuring The Ports Collection*

**FreeBSD**

