

How the FreeBSD Project Works



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Introduction

- What is FreeBSD?
- What is the FreeBSD Project?
- How does the FreeBSD Project work?
- And does it all depend on who you ask?
 - Caveat: kernel developer!



FreeBSD

- Open source BSD UNIX OS (1978, 1992)
- ISP server network server platform
 - Yahoo!, Verio, NY Internet, ISC, Demon, ...
- Appliance/product/embedded OS foundation
 - Mac OS X, VXWorks, NetApp, Secure Computing, Nokia, nCircle, Isilon, Symmetricon, NetScaler, Juniper, Thomson, Panasas, IronPort, Palisade, Avid, The Weather Channel, Sandvine, Blue Coat, ...
- Can't use the Internet without using FreeBSD



What do you get with FreeBSD?

- Complete, integrated UNIX system
 - Multi-processing, multi-threaded kernel
 - Intel/AMD 32/64-bit, ia64, sparc64, ARM, PPC, (MIPS)
 - UNIX, POSIX, BSD programming interfaces
 - Multi-protocol network stack
 - IPv4, IPv6, IPX/SPX, AppleTalk, IPSEC, ATM, Bluetooth, 802.11, SCTP, ...
 - Standard and embedded build/integration targets
 - Extensive documentation
- 17,300 third party software ports



The FreeBSD Project

- Online development community
 - Central source repository and revision control
 - Extensive online community
 - 340 CVS committers, thousands of contributors
 - Extensive user community
- Liberal Berkeley open source license
 - Designed to maximize commercial reuse
 - No requirement that derived works be open source
 - Extensive use in commercial, research systems



FreeBSD Foundation

- Non-profit organization based in Boulder, CO
 - Intentionally independent from FreeBSD Project
 - Sponsored development
 - Intellectual property, contracts, licensing, legal
 - Developer travel grants, vent sponsorship
 - Hardware purchase
 - Collaborative R&D agreements
- Support the FreeBSD Project – consider a donation today!



What the Project Produces

- FreeBSD kernel, user space
- Security officer, release engineering
- Ports collection, binary packages
- FreeBSD releases
- Manuals, handbook, web pages, marketing
- Technical support, debugging, etc.
- A variety of user/community events



Things We Consume

- Beer, soda, chocolate, and other vices
- Donated and sponsored hardware
 - Especially in racks, with hands
- Bandwidth in vast and untold quantities
- Travel grants, salaries, contracts, grants
- Thanks, user testimonials, good press
- Yet more bandwidth



FreeBSD People and Processes

- FreeBSD committers
- Core Team
- Ports committers and maintainers
- Groups/projects
- Derived projects
- Mailing lists
- Web sites
- Events
- Development cycle and branches
- Release Cycle
- CVS and Perforce
- Clusters
- Conflict resolution



FreeBSD Committers

- Committer is someone with CVS commit rights
- Selected based on key characteristics
 - Technical expertise
 - History of contribution to the FreeBSD Project
 - Ability to work well in the community
 - Having made these properties obvious!
- Key concept: mentor
 - Mentor proposes to core@ (portmgr@, doceng@)
 - Guide through first few months of committing



Who are the Committers? (2006-2007)

- Locations
 - 34 countries
 - 6 continents
- Ages
 - Oldest (documented) committer born 1948
 - Youngest (documented) committer born 1989
 - Mean age 32.5, median age 31, stddev 7.3
- Professional programmers, hobbyists, consultants, university professors, students ...



Locations of FreeBSD Committers (March 2007)

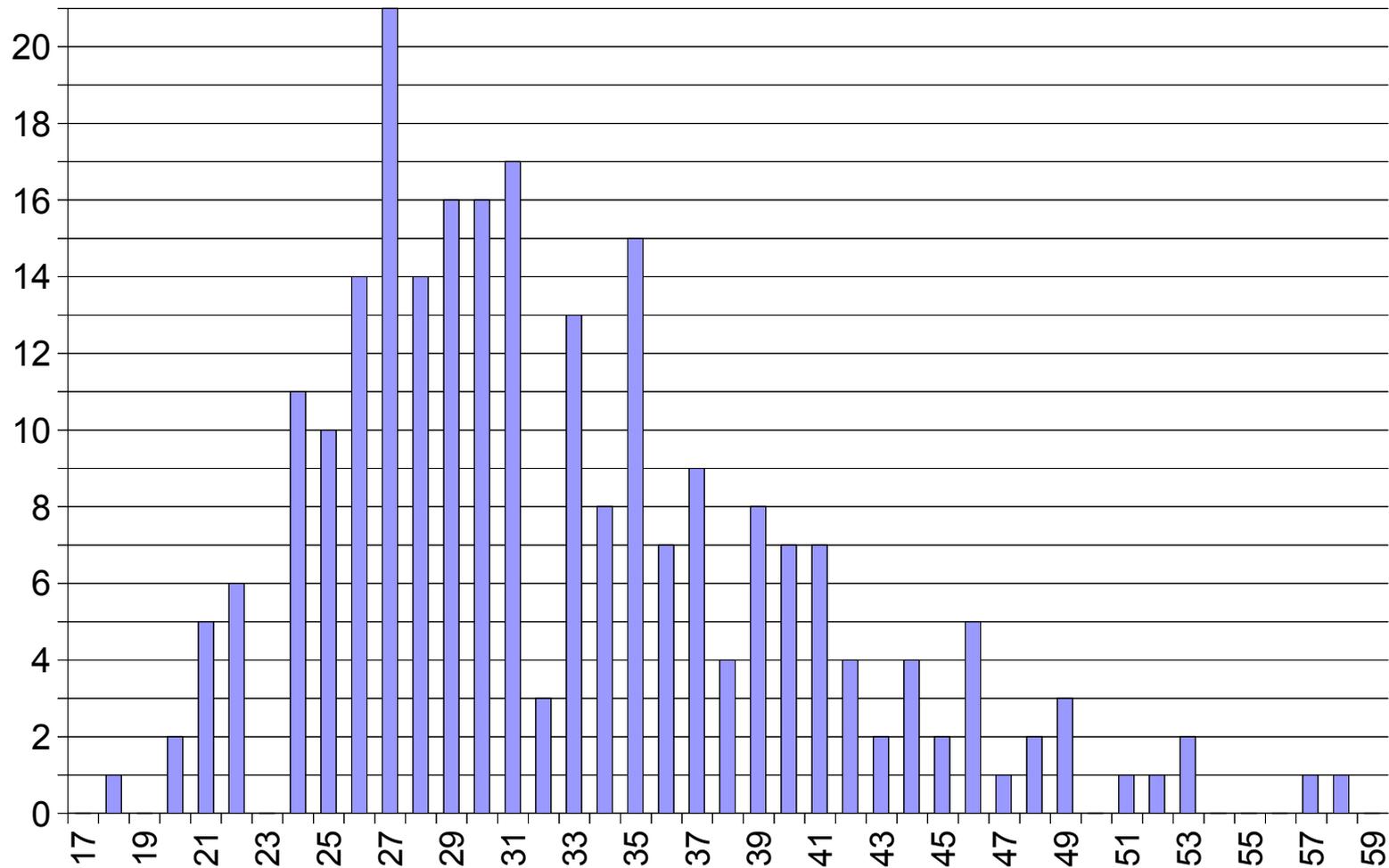
FreeBSD locations



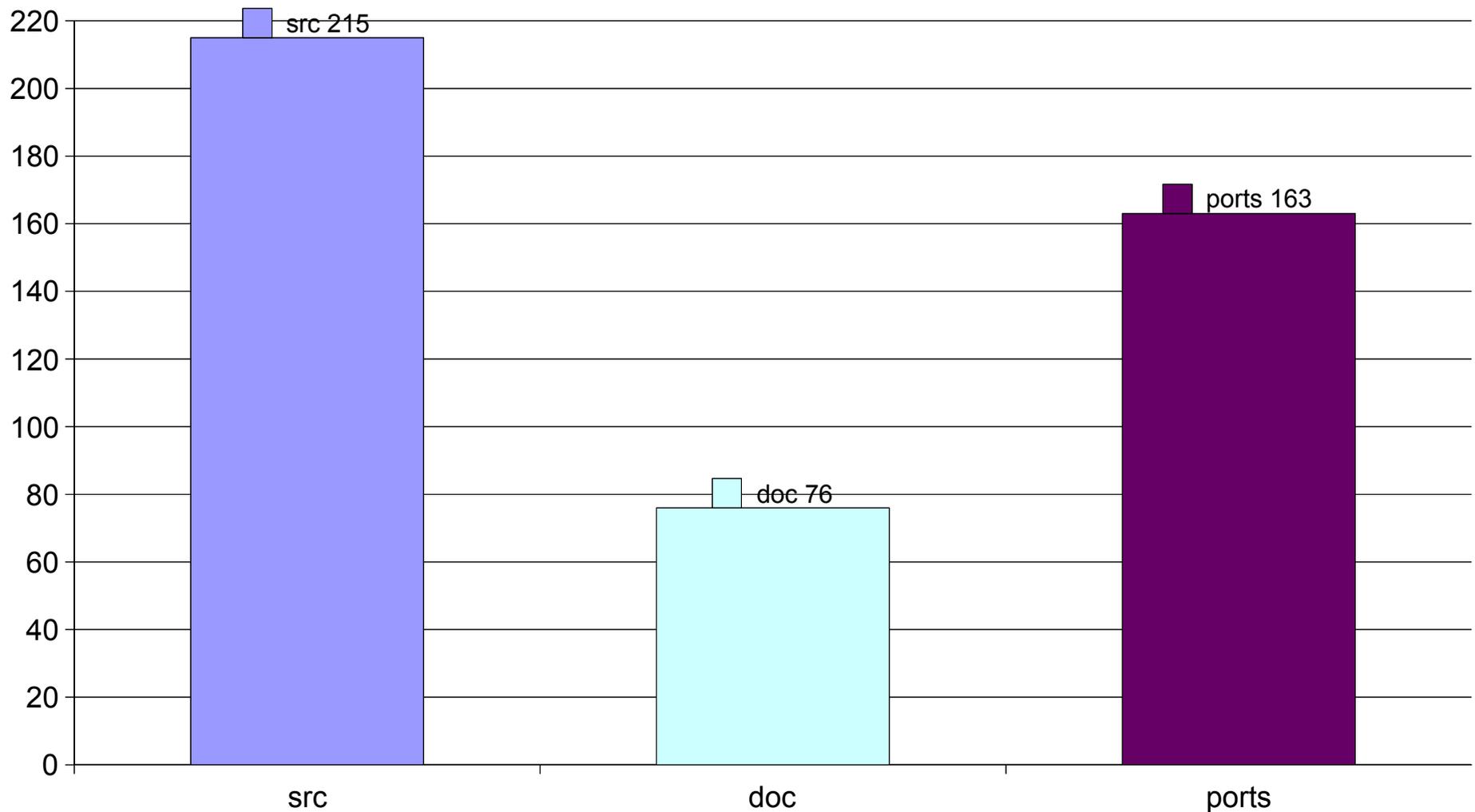
📍 committers 🟢 ftp submitters
Data from `astro/xeearth/files/freebsd.*.markers`,
updated 2007/03/09 22:25:16.



FreeBSD Developer Age Distribution (March 2007)



Number of Commit Bits by Type (March 2007)



FreeBSD Core Team

- Historically “key” developers but now ...
- ... 9-member elected management body
 - Votes and candidates from the full set of active FreeBSD committers
 - Core secretary
- Responsibilities
 - Administrative (commit bits, hats, team charters)
 - Strategic (project direction, coordination, cajoling)
 - Rules, conflict resolution, enforcement

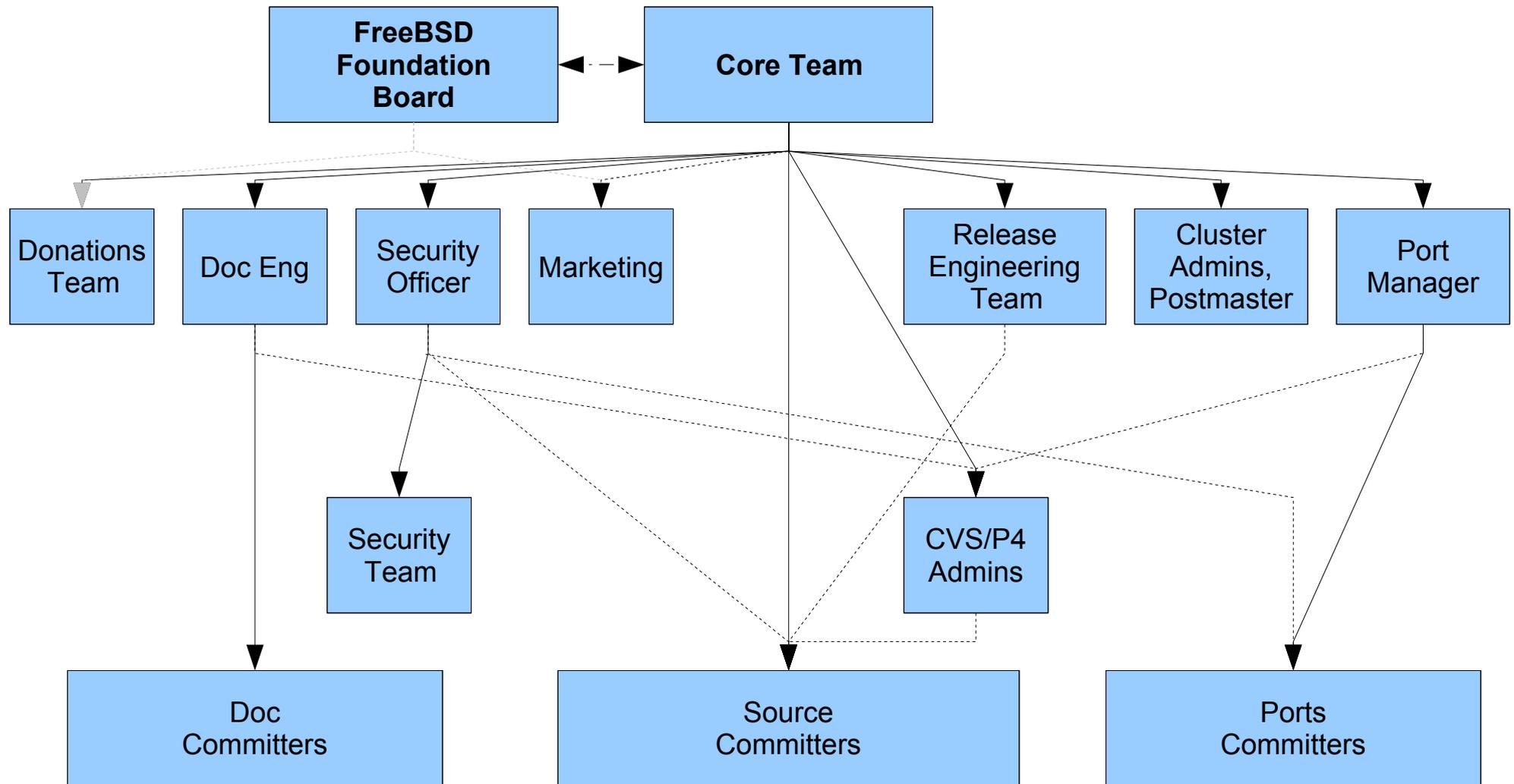


Ports Committers, Maintainers

- Slightly stale data, of course (~2006)
 - 158 ports committers
 - Over 1,400 ports maintainers
 - Over 16,600 ports
- Averages
 - 85 ports/commmitter
 - 9 ports/maintainer
 - 8 maintainers/commmitter



FreeBSD Project Org Chart (Sort of)



Groups and Projects

- Developers
 - Source Developers
 - Core Team
 - Core Team Secretary
 - Release Engineering Team
 - Release Engineering Build Teams
 - Security Officer
 - Security Team
 - Ports Team
 - Port Managers
 - Doceng Team
 - Documentation Team
 - Vendor Relations Team
- Administrative
 - Foundation Board of Directors
 - Foundation Operations Manager
 - FreeBSD.org admins@
 - FreeBSD.org webmaster
 - Sentex cluster admins
 - ISC cluster admins
 - Mirrors Team
 - Donations Team
 - Marketing Team
 - Perforce Admins
 - CVS Admins
 - Postmaster



Wait, I'm Not Done Yet!

- Administrative (cont)
 - CVSUP Mirrors Team
- Other Contributors
 - Perforce Contributors
 - Questions Subscribers
- Software Adaptation Projects
 - FreeBSD GNOME Project
 - FreeBSD KDE Project
 - Mono on FreeBSD
 - OpenOffice.org on FreeBSD
 - Java on FreeBSD
- Special Projects
 - Stress Testing
 - FreeBSD Tinderbox
 - FreeBSD Standards
 - SoC Mentors
 - Monthly Status Reports
 - Coverity Team
- External Projects
 - KAME Project
 - TrustedBSD Project
 - PC-BSD
 - DesktopBSD



Derived Projects and Organizations

- Interesting and important growth in ecosystem
- Projects that consume FreeBSD but produce something new and different
 - FreeSBIE, pfSense, PC-BSD, Darwin, DesktopBSD, DragonflyBSD, FreeNAS, ...
 - Features to flow up- and down-stream
 - Avoid stepping on toes of derived projects, while fostering their growth
- Importance of a scalable community model



Mailing Lists

- Over 100 active central mailing lists
- Mostly public
 - Some exceptions (core, re, so, portmgr, ...)
- Organized loosely by topic
 - -announce, -current, -arch, cvs-all, -security, ...
 - -chat, -hackers, -questions...
- Place where vast majority of FreeBSD discussion and planning takes place
 - Both developer and user



FreeBSD Project Web Pages (Just a few)

The FreeBSD Project - Mozilla Firefox

FreeBSD® The Power To Serve

Home About Get FreeBSD Documentation Community Developers Support

Based on BSD UNIX®

FreeBSD is an advanced operating system for x86 compatible (including Pentium® and Athlon™), amd64 compatible (including Opteron™, Athlon 64, and EM64T), Alpha AXP, IA-64, PC-98 and UltraSPARC architectures. It is derived from BSD, the version of UNIX® developed at the University of California, Berkeley. It is developed and maintained by a large team of individuals. Additional platforms are in various stages of development.

Get FreeBSD Now

SHORTCUTS

- » Mailings Lists
- » FreeBSD 6.0
- » FAQ
- » Handbook
- » Foundation
- » Ports

LATEST RELEASES

- » Production Release 6.1
- » Production Release 6.0
- » FreeBSD 5.4
- » FreeBSD 5.3
- » FreeBSD 5.2
- » FreeBSD 5.1
- » FreeBSD 5.0
- » FreeBSD 4.11
- » FreeBSD 4.10
- » FreeBSD 4.9
- » FreeBSD 4.8
- » FreeBSD 4.7
- » FreeBSD 4.6
- » FreeBSD 4.5
- » FreeBSD 4.4
- » FreeBSD 4.3
- » FreeBSD 4.2
- » FreeBSD 4.1
- » FreeBSD 4.0
- » FreeBSD 3.9
- » FreeBSD 3.8
- » FreeBSD 3.7
- » FreeBSD 3.6
- » FreeBSD 3.5
- » FreeBSD 3.4
- » FreeBSD 3.3
- » FreeBSD 3.2
- » FreeBSD 3.1
- » FreeBSD 3.0
- » FreeBSD 2.9
- » FreeBSD 2.8
- » FreeBSD 2.7
- » FreeBSD 2.6
- » FreeBSD 2.5
- » FreeBSD 2.4
- » FreeBSD 2.3
- » FreeBSD 2.2
- » FreeBSD 2.1
- » FreeBSD 2.0
- » FreeBSD 1.9
- » FreeBSD 1.8
- » FreeBSD 1.7
- » FreeBSD 1.6
- » FreeBSD 1.5
- » FreeBSD 1.4
- » FreeBSD 1.3
- » FreeBSD 1.2
- » FreeBSD 1.1
- » FreeBSD 1.0
- » FreeBSD 0.9
- » FreeBSD 0.8
- » FreeBSD 0.7
- » FreeBSD 0.6
- » FreeBSD 0.5
- » FreeBSD 0.4
- » FreeBSD 0.3
- » FreeBSD 0.2
- » FreeBSD 0.1

UPCOMING EVENTS

IN THE MEDIA

SECURITY ADVISORIES

LATEST NEWS

2006-05-08
FreeBSD 6.1 RELEASE is
Now Available

2006-05-08
Summer of Code Deadline
Extended to June 1st

2006-05-07
New committer - Ion Mihai
Tincu (Linux)

2006-05-06
New committer - Stefan
Vilheimsdottir

2006-05-02 - 2006-05-13
FreeBSD Kernel Code
Reading Evening Course
(Berkeley, U.S.A.)

2006-05-12 - 2006-05-13
BSDCan 2006
(Ozarks, Canada)

2006-05-12 - 2006-05-19
SAFE 2006
(Death, The Netherlands)

2006-05-09 - 2006-05-03
2006 USENIX Annual

FreeSBIE - Free System Burned In Economy - Mozilla Firefox

FreeSBIE Live CD

DOCUMENTATION SET FREEBIE DEVELOPERS CONTACT

wiki mirrors blog contacts
faq downloads cvs mailing list
screenshots store bug tracker donations

Welcome!

FreeSBIE is a LiveCD based on the FreeBSD Operating system, or even easier, a FreeBSD-based operating system that works directly from a CD, without touching your hard drive. We also develop a simple to use and easily extendible toolkit used for the creation of the CD. This toolkit can also be used to make embedded images a-la miniBSD or nanoBSD.

You can find the latest news on the [blog](#) and the documentation on the [wiki](#).

FreeBSD Package building logs and errors - Mozilla Firefox

FreeBSD Package building logs and errors

FreeBSD maintains a build farm (the "pointyhat cluster") that is used to build all packages across all architectures and all major releases. This page contains the build logs and errors for all the ports built by the pointyhat cluster. (Note: all of the "Current run" links are possibly in progress and may be partial, so keep that in mind if there appear to be some missing.)

Port cross-reference summaries on [portsman.FreeBSD.org](#)

- Build errors by [portname](#); by [portname](#) vs. [build environment](#); by [error type](#) vs. [build environment](#)
- Problem Reports for [existing ports](#); for [new ports](#); for the [ports framework](#); for [responses requested](#); for [unknown](#)
- Build Errors and Problem Reports by [portname](#); for [one maintainer](#); for [broken ports](#); for [deprecated ports](#); for [forbidden ports](#)
- Everything about [one port](#)
- The [complete list of all reports](#)

New build failures (check here to find the most recent error log from your port)

- New build failures on 4.x-stable [[3386](#) (2006-05-12 04:05)] [[3486](#) (2005-09-20 19:13)]
- New build failures on 5.x-stable [[3386](#) (2006-05-12 04:05)] [[3486](#) (2006-05-12 04:15)] [[3487](#) (2005-09-09 00:07)] [[3488](#) (2006-05-12 04:18)]

The FreeBSD Foundation - Mozilla Firefox

FreeBSD Foundation

Foundation News and Press Releases

Board of Directors

News Flash! - May 2006

The Foundation is at BSDCan this week. Stop by our table on Friday or Saturday while we are there. We will be giving away t-shirts and other items. We will also be giving away a copy of the FreeBSD Handbook. We will also be giving away a copy of the FreeBSD Handbook. We will also be giving away a copy of the FreeBSD Handbook.

FreeBSD Security Information - Mozilla Firefox

FreeBSD Security Information

Introduction

This web page is designed to assist both new and experienced users in the area of FreeBSD security. FreeBSD takes security very seriously and is constantly working on making the OS as secure as possible.

Here you will find additional information, or links to information, on how to protect your system against various types of attack, on whom to contact if you find a security-related bug, and so on. There is also a section on the various ways that the systems programmer can become more security conscious so that he is less likely to introduce vulnerabilities.

Table of Contents

- How and where to report a FreeBSD security issue
- Information about the FreeBSD Security Officer
- Charter for the Security Officer and Team
- Information handling policies
- FreeBSD Security Advisories
- Reading FreeBSD Security Advisories

All FreeBSD Security issues should be reported to the [FreeBSD Security Team](#), or, if a higher level of confidentiality is required, to the [Security Officer Team](#). All reports should at least contain:

- A description of the vulnerability.
- What versions of FreeBSD seem to be affected if possible.
- Any plausible work-around.
- Example code if possible.

lists.freebsd.org Mailing Lists - Mozilla Firefox

lists.freebsd.org Mailing Lists

Welcome!

Below is a listing of all the public mailing lists on lists.freebsd.org. Click on a list name to get more information about the list, or to subscribe, unsubscribe, and change the preferences on your subscription. To visit the general information page for an unadvertised list, open a URL similar to this one, but with a '/' and the list name appended.

List administrators, you can visit the [list admin overview page](#) to find the management interface for your list.

If you are having trouble using the lists, please contact [mailman@freebsd.org](#).

4-05-12 04:15] [[3487](#) (2006-05-12 04:16)]
4-05-12 04:15] [[3486](#) (2006-05-12 04:16)]
4-05-12 04:05]
4-05-12 04:05]
red while processing this directive]]
\$06:43] [[3484](#) (an error occurred while processing

FreeBSD Security Information - Mozilla Firefox

Description

Adapted Device Drivers in FreeBSD and Linux

CTM Announcements [moderated]

CTM distribution of CVS files

CTM distribution of CVS files

CTM posts

CTM 3-sta

CTM 3-sta

CTM 4-sta

CTM 4-sta

CTM 5-sta

CTM 5-sta

TrustedBSD.org - Home - Mozilla Firefox

www.TrustedBSD.org

Home Developers Components Docs Lists

TrustedBSD Project

The TrustedBSD project provides a set of trusted operating system extensions to the FreeBSD operating system, targeting the Common Criteria for Information Technology Security Evaluation (CC). This project is still under development, and much of the code is destined to make its way back into the base FreeBSD operating system. This Website will provide access to documentation, code relating to features that are still under development, and code that has its fingers in too many places to justify integrating into the base operating system. Targeted features include:

- Extensible and audited authorization framework to support access control modules. This framework provides general-purpose labeling of kernel subjects/objects, centralized policy management, and access to a variety of run-time security events. This will allow the compile-time, boot-time, and run-time extension of the operating system security model based in both TrustedBSD access control modules, and third-party modules that employ the extension framework.
- Mandatory access control modules based on the framework, supporting a variety of access control models, including [flexible and floating label EBIT integrity policies](#), the [MLS confidentiality policy](#), [Type Enforcement](#), and other customized policies designed for common FreeBSD deployment scenarios. In addition, the SELinux FLASK and Type Enforcement implementations will be provided via an SEBSD module, providing access to the higher level FLASK service

TrustedBSD News

- [ACLs](#)
- [Audit](#)
- [Extended Attributes](#)
- [Capabilities](#)
- [GEM](#)
- [IAC](#)
- [OpenBSM](#)
- [OpenPAM](#)
- [SEBSD](#)
- [SEDarwin](#)

FrontPage - FreeBSD-Wiki - Mozilla Firefox

FrontPage

RecentChanges FindPage HelpContents

FreeBSD Wiki

Welcome to the FreeBSD Wiki

This is a wiki mainly for FreeBSD developers - more general information (including information about the ACL's) can be at the [AboutWiki](#) page.

Platforms

- [i386](#)
- [powerpc](#)

Projects

Describe your work-in-progress and/or blue-sky ideas here. You might find out that your blue-sky idea is someone's WIP, or vice versa. Perhaps this can lead to less of the 'if you check that in, it will mess up my local changes' problem.

- [netperf](#) / [Netperf Project](#)
- [Netperf Test Cluster](#)
- [PvsTools](#)



20 June 2007

How the FreeBSD Project Works

Events

- Conferences
 - USENIX ATC
 - BSDCan
 - BSDCon
 - EuroBSDCon
 - AsiaBSDCon
 - NYCBSDCon
 - MeetBSD
 - BSDConTR
- Developer Summits
 - Two day events
 - March 2007:
AsiaBSDCon, Tokyo
 - May: BSDCan 2007,
Ottawa
 - September 2007,
EuroBSDCon,
Copenhagen



FreeBSD Developer Summits

BSDCan 2006-2007



Recent Development Projects

- DTrace
- Network virtualization
- Xen
- Sun4v
- SCTP
- 32-core scalability
- Multi-threaded, multi-processor network stack
- 802.11n + Virtual AP
- ARM, MIPS, PPC
- Security auditing
- MAC Framework
- ZFS, GJournal
- gcc 4.2
- Coverity
- 10gbps optimization

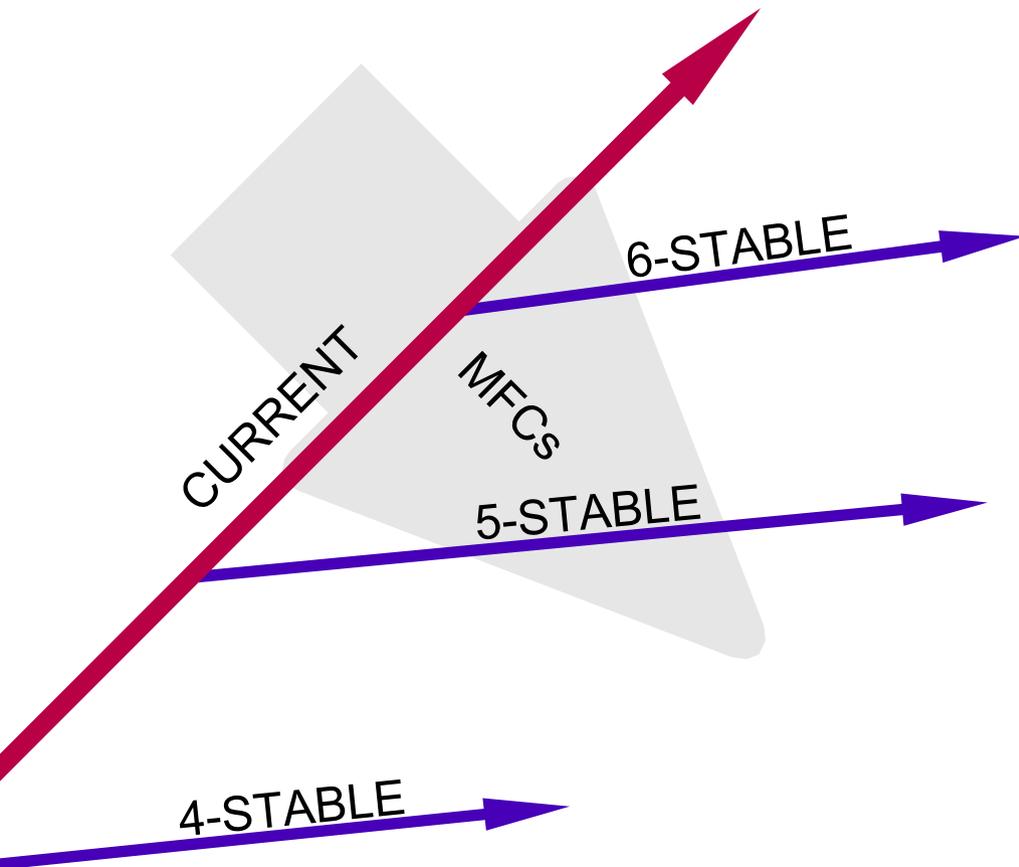


FreeBSD Development Cycle

- Branched development model
 - 7-CURRENT – Cutting edge development
 - 6-STABLE – Active development with releases
 - 5-STABLE – Legacy branch with releases
 - 4-STABLE – Legacy branch
- Goal
 - 18-24 month major “dot zero” releases (6.0, 7.0, ...)
 - 4-6 month minor “dot” releases (5.5, 6.1, 6.2, ...)
- Balance is tricky but important



Development Branches



- Simultaneous parallel development
- Divergence based on feature maturity
- “MFC” merges changes from CURRENT to STABLE branches



FreeBSD Releases

- Three active development branches in CVS
 - 5.x – Major development branch, in maintenance
 - 6.x – Refinement and optimization of 5.x branch
 - 7.x – Active feature development
- Most recent releases FreeBSD 5.5, 6.2
 - Project releases at <http://www.FreeBSD.org/>
 - CDs/DVDs from several vendors
 - Derived systems (PC-BSD, DesktopBSD, et al).



FreeBSD Release Cycle

- Most of the time open development
- Release cycle on STABLE branches
 - Code slush
 - Code freeze
 - Beta series, branching
 - Release candidate series
 - Release
 - Errata/Security advisories
- Big “dot zero” releases less frequently



FreeBSD 7-CURRENT 7.0 due 2007Q3/Q4

- MP Scalability
 - 16+ core scalability
 - ULE2 scheduler
 - New threading library
 - Scalable jemalloc
- File systems
 - Sun's ZFS file system
 - GJournal for UFS
- Sun4v
- Networking
 - Direct dispatch
 - Zero-copy BPF
 - 10gbps optimizations
 - SCTP
- Superpages
- And much more ...



CVS

- Primary revision control system
 - Most project activity is in CVS
 - 10+ year revision history
 - One commit every 11.8 minutes for last three years
 - Technical limitations becoming more apparent
 - Actually four repositories
 - /home/ncvs – FreeBSD src cvs
 - /home/pcvs – FreeBSD ports cvs
 - /home/projcv – FreeBSD project cvs
 - /home/dcv – FreeBSD documentation cvs

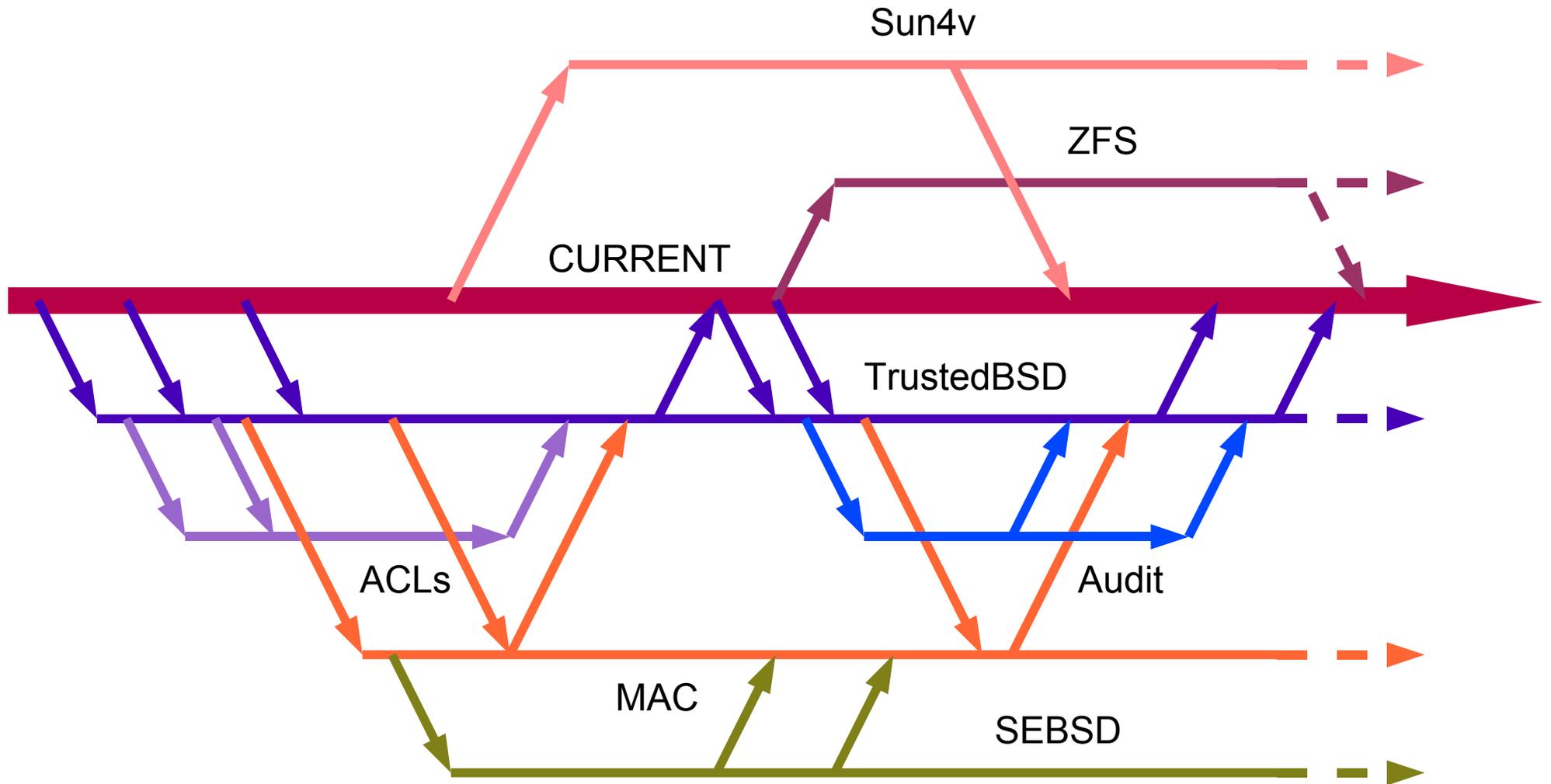


Perforce

- Secondary revision control system
 - Supports heavily branched development
 - FreeBSD developers
 - Guest accounts and project accounts
- Active project include
 - SMPng, TrustedBSD Audit, TrustedBSD MAC
 - TrustedBSD SEBSD, Alan Cox Superpages, uart
 - ARM, Summer of Code, dtrace, Xen, Sun4v
 - GEOM, GJournal, ZFS, CAM locking, netperf, ...



Perforce Development Branches



Revision Control: the Future

- Heavy use of Perforce a symptom of CVS weaknesses
 - Need lightweight branching, history-aware merging
 - Need access control
- Every few years, consider options
 - Cost of migration very high – interrupt development, retrain developers, high risk
- Currently evaluating several of revision control systems to see if any meet requirements



FreeBSD.org Cluster

- Hosted at Yahoo!
 - Mail servers (hub, mx1, mx2)
 - Distribution (ftp-master, www)
 - Shell access (freefall, builder)
 - Revision control (repoman, spit, ncvsup)
 - Ports cluster (pointyhat, gohans, blades)
 - Test systems (sledge, pluto, panther, beast)
 - Name server (ns0)
 - NetApp filer (dumpster)



Other Clusters

- Korean Ports Cluster
- allbsd.org
 - Multiprocessor Sun hardware for testing
- Sentex Cluster
 - Security officer
 - Network, SMP performance, storage work
- ISC Cluster
 - ftp.freebsd.org, Coverity, test systems, ports



Conflict Resolution

- Developers generally characterized by:
 - Independence
 - Cooperation
 - Common sense
- Facilitated by intentional avoidance of overlap
- Strong technical disagreements, personality conflicts, etc, do occur
- When they get out of hand, generally mediated by a member of core



What Is a Bikeshed, Anyway?

- A very special kind of conflict
- Not specific to FreeBSD, but one of our favorites
- Strong opinions easier to have on unimportant details



Conclusion

- FreeBSD Project one of the largest, oldest, and most successful open source projects
 - Hundreds of committers, thousands of contributors
 - Millions of lines of code
 - Tens of millions of deployed systems
- Highly successful community model makes this happen
 - Join this community!
- <http://www.FreeBSD.org/>

