

**Building and Running  
an Open-Source Community:  
The FreeBSD Project**

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# Introduction to FreeBSD

- Open-source operating system derived from 4.4BSD–Lite released in 1994 by The University of California at Berkeley
- One of very few open-source projects still active after more than 15 years
- Provides core Internet support:
  - Root name servers
  - Major web hosts and search engines
  - Routing infrastructure
  - Foundation for major commercial operating systems

# Users of FreeBSD

- ISP server platform
  - Yahoo
  - Vario
  - Internet Software Consortium
- Appliance/embedded OS
  - Juniper Networks
  - Network Appliance
  - Nokia
  - Panasas
- Operating system core
  - Apple's Darwin, base operating system of Mac OS X
  - WindRiver's VXWorks networking stack

## CSRG at Berkeley

- BSD started at University of California at Berkeley in 1977
- Coordinated by the Computer Systems Research Group (CSRG)
- Core of CSRG was four people
- In 1970's contributions came via tape or email
- In the early 1980's
  - Started using SCCS (source code control system)
  - Came up on the ARPAnet (which later became the Internet)

## **External Contributors to CSRG**

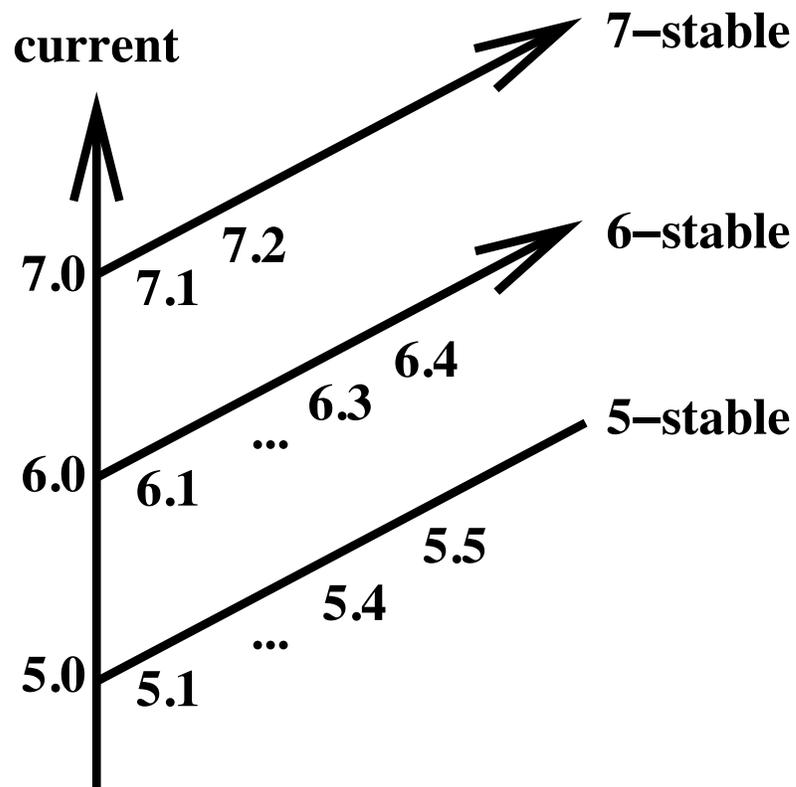
- Give accounts on CSRG machines to 10 other trusted people who could log on and update sources
- CSRG staff used SCCS to track changes and verify them before doing distributions
- This structure formed the basis for the current BSD-based projects.

## FreeBSD Project Structure

- Central source code repository (using Subversion)
- Subversion feeds to CVS which is mirrored on over 40 sites worldwide
- Anyone may anonymously download CVS tree
- Only committers can update Subversion on central site
- Core system is composed of 100 libraries and 775 utilities plus the symmetric-multithreaded kernel that runs on Intel/AMD 32/64-bit, ARM, MIPS, PowerPC, Sparc, and other processors
- All other software is maintained in the ports collection which currently has over 18,000 packages

# Releases

- Development on main trunk (–current)
- Stable releases on branches (–stable), currently 7.2
- Important bug fixes in –current are merged into –stable branches



# Release Engineering

- Major release approximately every two to three years
- Minor release approximately every four to six months
- Anyone can download and update to –stable at any time
- Approximately one month freeze on changes for the major release cutover
- Approximately one week freeze on changes for the minor release cutover

# The FreeBSD Community

## Volunteers

- Only do what they want to do
- Lowest priority (after work, family, recreation)
- No schedule
- Transient

## Goals

- Self-organizing (no paid staff or managers)
- Egalitarian and merit-based advancement
- Anticipate turnover and manage it gracefully

# Organization

## Users (millions)

- Send and receive feedback for bugs and mailing lists

## Developers (6000+)

- Read access to source code and CVS logs
- Submit changes through committers

## Organization (continued)

### Committers (390)

- Most are authorized to commit changes to specific ports for which they agree to assume responsibility
- All changes require review by at least one other committer
- All commit changes are mailed to all committers
- Gateway to feed in developers changes
- Nominate developers to become committers
- Mentor new committers
- Automatic suspension of commit privileges after one year of non-use
- Mean age 32, median age 30, youngest 17, oldest 58, most 25-40

## Organization (continued)

### Core (9)

- Nominated from and elected by committers every two years
- Maintain FreeBSD roadmap
- Resolve differences between committers
- Admit / remove committers

# Types of Contributors

## Coding

- Port maintainers
- Utility maintainers
- Kernel maintainers

## Documentation group

## Quality assurance

## Release engineers

## System administrators

## Advocacy and marketing group

# Funding

- The FreeBSD Foundation
- Created as a charitable organization (allows individuals and companies a tax deduction for cash or hardware contributions)
- Funds used to support infrastructure work that no one is willing to do for free

# Licensing

- Traditional Copyright

Often source is not available, or is only available in very restricted ways.

- GNU “Copyleft”

With GPL 2, must make source available including any of your own work. With GPL 3, source and free use of any patents you own must be provided.

- Berkeley “Copycenter”

Source and patent rights may or may not be provided.

# Questions

FreeBSD home

<http://www.freebsd.org>

FreeBSD Foundation

<http://www.freebsd.foundation.org/>

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**The End**



May the Source Be With You!