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 10 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 (350)

• 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 committer

• 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
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The End

May the Source Be With You!