

FreeBSD at 30 Years: Its Secrets to Success

Brought to you by

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Background and Introduction

FreeBSD turned 30 in June 2023

Long-term projects usually have company sponsors

No single company has sponsored FreeBSD over its lifetime though several provided substantial support over the years:

- Walnut Creek CD-ROM
- Yahoo
- Network Appliance
- Netflix
- Juniper
- ARM

Origin

Genesis was first decade of AT&T UNIX

Next decade was Berkeley BSD Project

Basis was open-source release of BSD

Inherited from BSD

- The socket networking interface and the original and widely used implementation of TCP/IP
- the set of system calls used to operate on filesystems
- the virtual filesystem (VFS) interface to support multiple filesystem implementations
- the fast filesystem and network filesystem (NFS) implementations
- the mmap memory model
- the interface to manage processes (signals, process groups, job control, etc)

Distribution Model

Followed the Berkeley-BSD model of a complete distribution

- the operating system
- a core set of libraries and utilities
- contributed software (FreeBSD's ports)
- complete manual pages and system documentation

Leadership

Projects typically started by a single person who becomes the czar-for-life leader of the project

Projects usually go dark when the leader loses interest and stops working on it

Contributors often get frustrated if the leader is not good at reviewing and critiquing or accepting input from others

FreeBSD started with seven-member Core team who were “Czars for life.”

To provide full upward mobility Core became elected from committers

Leadership evolves over time and project less susceptible to collapse if its leader departs

Development

Used source-control and bug-reporting tools from the start.

Adopted code and ideas from other projects:

- NetBSD - multiple architecture support
- OpenBSD – Security improvements
- Open Solaris – ZFS and DTrace

Distributions

Complete distributions including sources and binaries

Easy-to-use installation tools

Comprehensive documentation

Curate hardware and provide complete support for it

Communication

Set up mailing lists for discussion

Establish a culture of civil discussion

Evolve rules to adapt to evolving culture and worldwide customs to keep project on an even keel

Documentation

Give equal standing to documentation contributors

Encourage code and documentation writers to work together

Set up a framework to support multiple languages which is a gateway to bring in new folks

The Ports Collection

Create a collection of ports

Maintain to ensure that they compile and run on FreeBSD

Upstream changes needed to work with FreeBSD

Implement the package system to ease use of ports

- saves need to compile ports
- tracks and installs needed support libraries and utilities
- tracks and performed updates

Provide the Poudriere system for building customized distributions

Project Culture

Port, documentation, and development committers given equal say in running the project

Encourage a “plays well with others” culture

Help bring in new participants through being involved in initiatives like Google’s Summer of Code

Be welcoming to new folks and have a well documented process for becoming involved with FreeBSD

Project Support

Need to set up a foundation

- provide project infrastructure
- raise money
- provide a legal entity that can hold copyrights, sign NDA, etc

Licensing

Use of Berkeley license is important

- embedded market with company IP in the kernel
- more comfortable for companies
- less fringe politics

Collecting Statistics

Rodrigo Osorio (rodrigo) has been tracking commits since start of the FreeBSD project.

Available at:

`pkg-provides.osorio.me/freebsd-committer-data`

- `active_committers_src.txt` (1993-06)
- `active_committers_ports.txt` (1994-08)
- `active_committers_doc.txt` (1995-04)

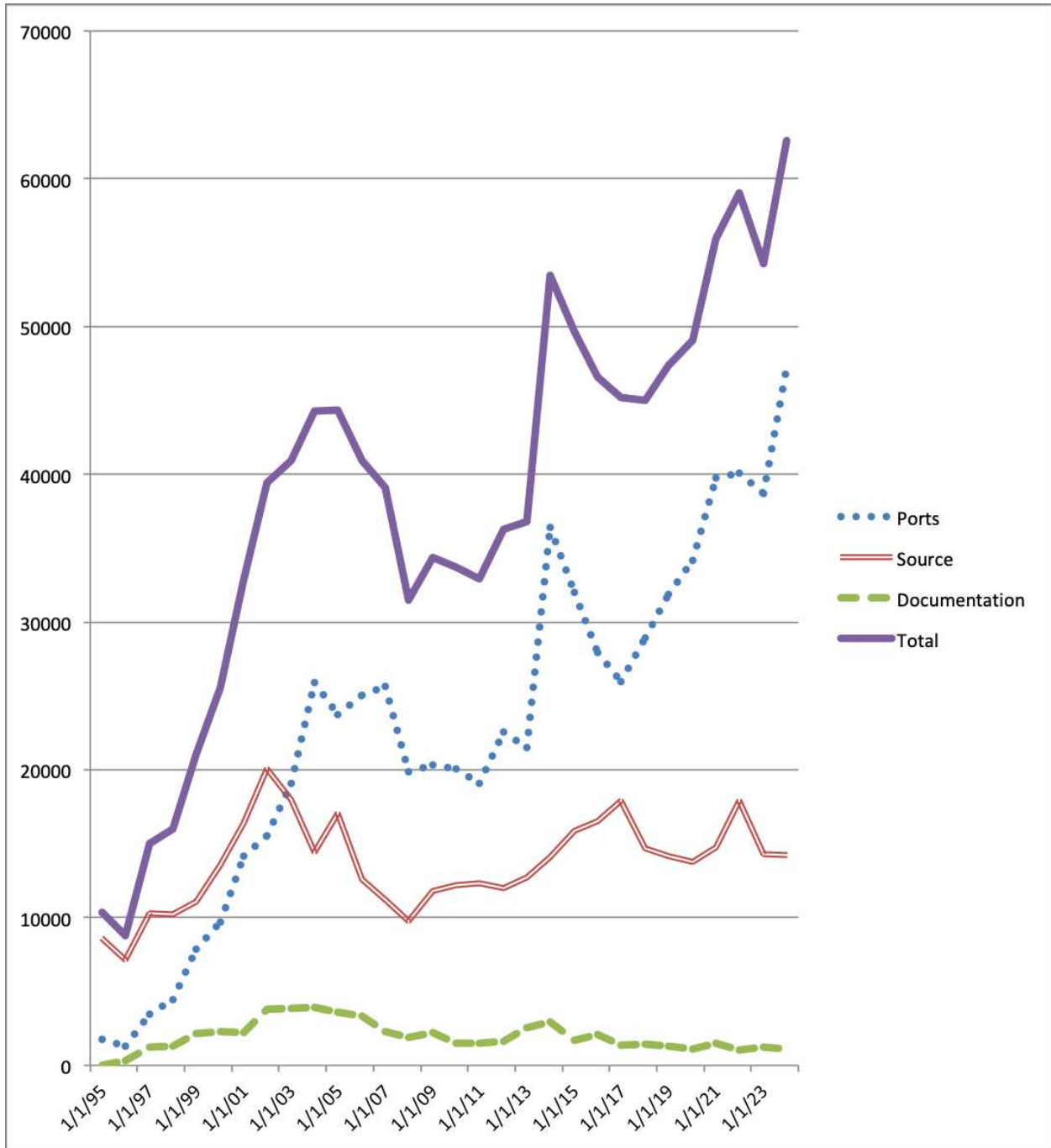
First four lines of `active_committers_doc.txt`

- 1) 1995-04 1 jfieber(3)
- 2) 1995-05 3 ache(1) jfieber(7) roberto(2)
- 3) 1995-06 2 gclarkii(1) jfieber(8)
- 4) 1995-07 5 doceng(2) jfieber(13) jkh(1)
markm(1) roberto(5)

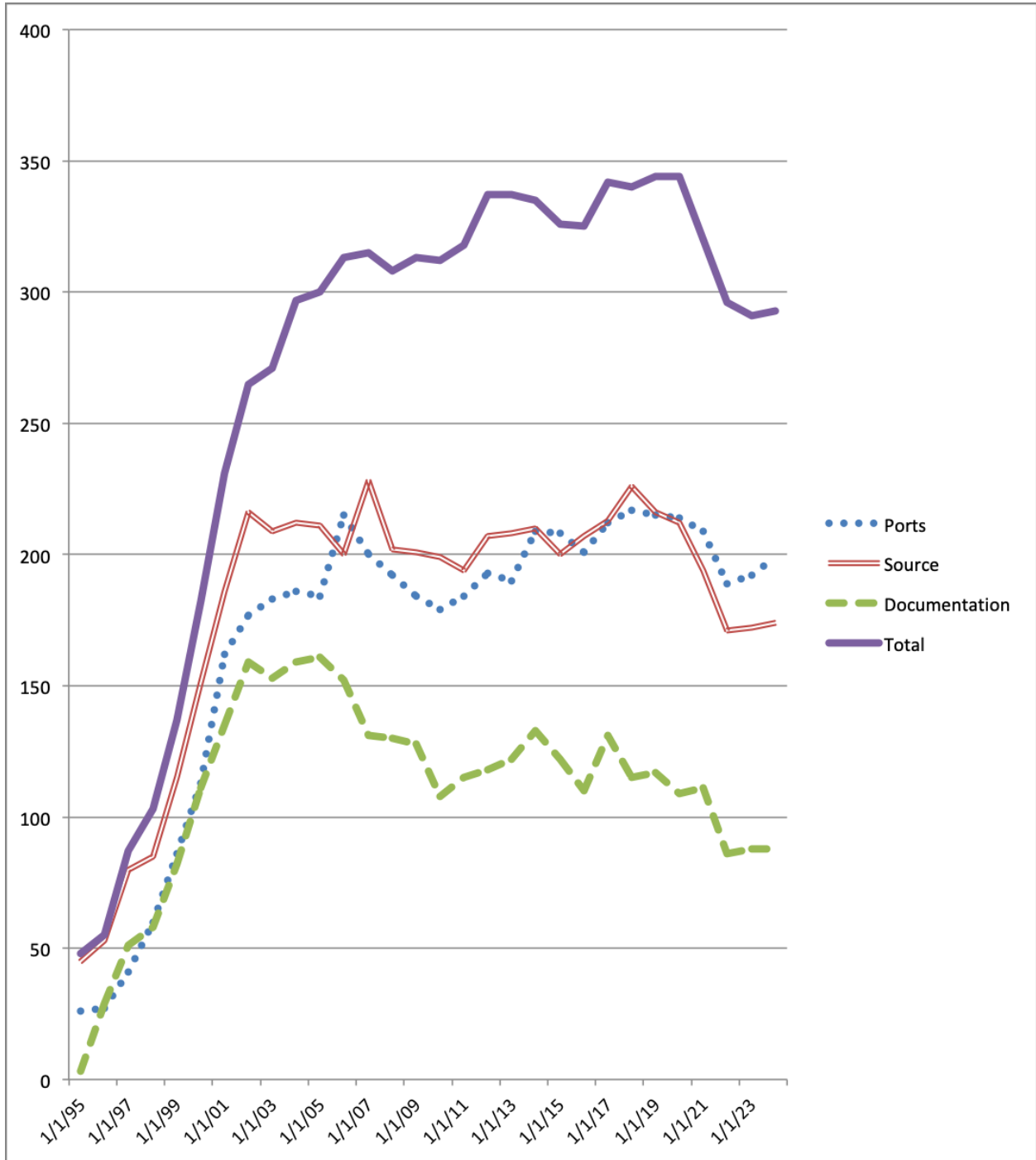
Use to calculate yearly statistics (June through following May)

- Annual commits
- Active committers
- Committer ages (using `/usr/share/calendar/calendar.freebsd`)

Yearly Commits



Active Committers



Top 5 Committers

Documentation

2760	Ryusuke Suzuki (ryusuke)	2009-12	2023-02
2677	Glen Barber (gjb)	2010-09	2023-11
2428	Marc Fonvieille (blackend)	2002-06	2024-05
1962	Wolfram Schneider (wosch)	1996-02	2024-05
1496	Murray Stokely (murray)	2000-04	2013-07

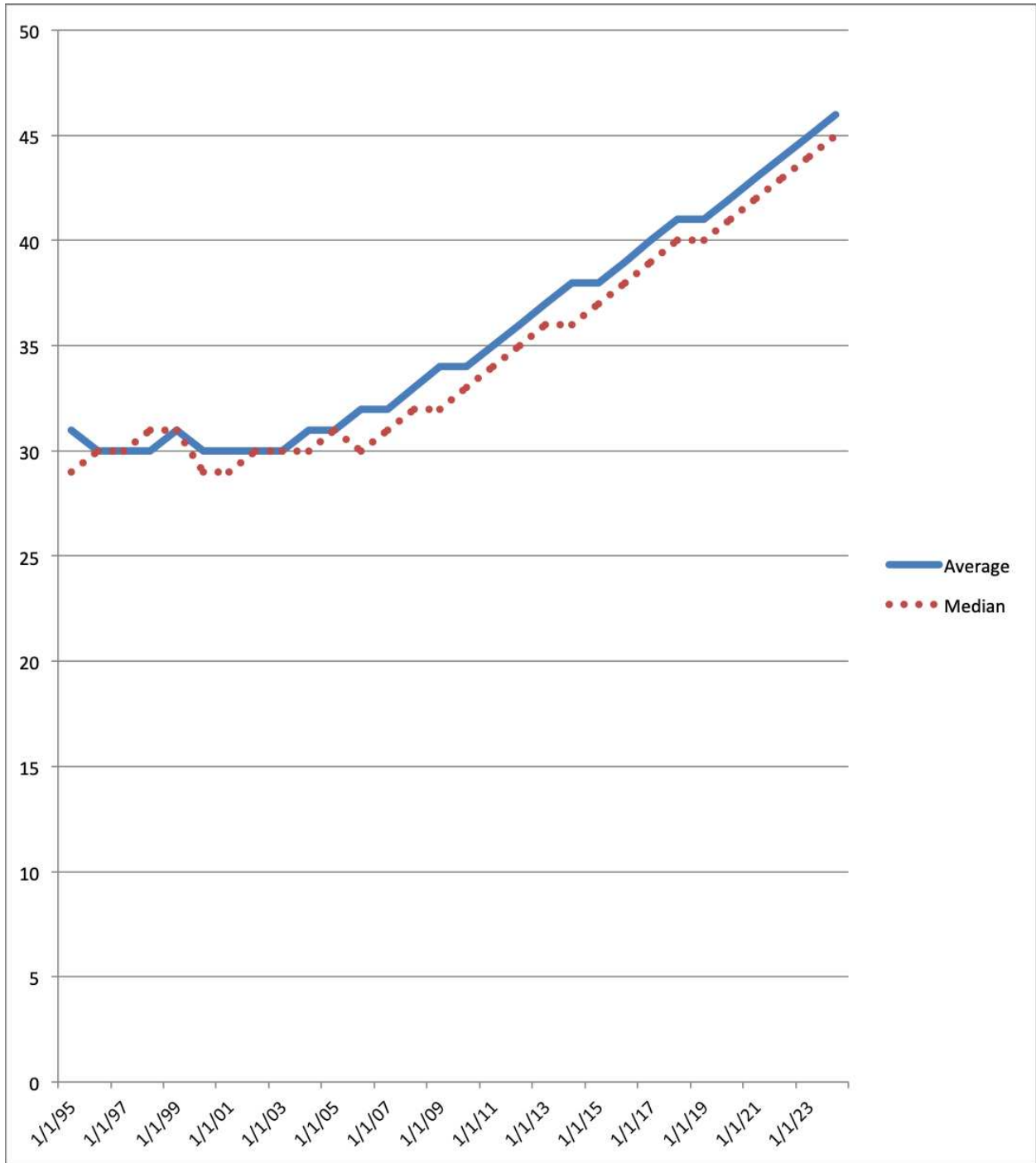
Ports

87166	Po-Chuan Hsieh (sunpoet)	2010-09	2024-05
20256	Martin Wilke (miwi)	2006-06	2020-01
20221	Yuri Pankov (yuri)	2017-11	2024-05
19675	Jan Beich (jbeich)	2015-01	2024-05
17236	Dmitry Marakasov (amdmi3)	2008-06	2024-05

Source

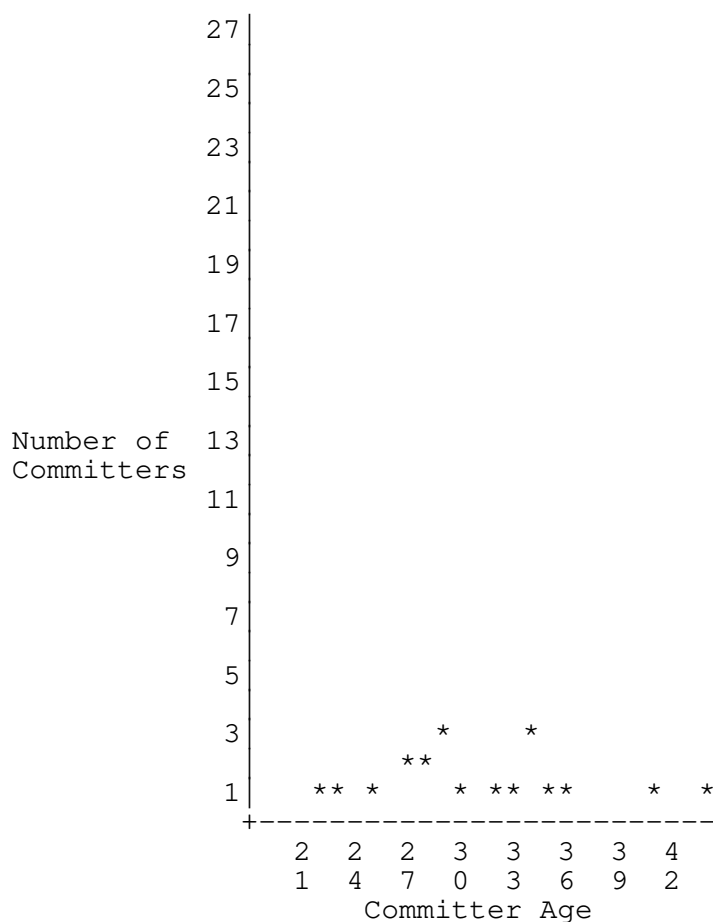
13103	John Baldwin (jhb)	1999-09	2024-05
12456	Warner Losh (imp)	1996-09	2024-05
11420	Konstantin Belousov (kib)	2006-06	2024-05
8117	Alexander Motin (mav)	2007-04	2024-04
7101	Jordan K. Hubbard (jkh)	1993-06	2004-11

Average Ages



Committer Statistics

Run date: May 31, 1995
 Active Source Committers = 45
 Active Ports Committers = 26
 Active Document Committers = 3
 Total Active Committers = 48
 Total Commits = 10379
 Port 1792, Doc 13, Src 8574
 Average age 31
 Median age 29



Committer Statistics

Run date: May 31, 2005

Active Source Committers = 211

Active Ports Committers = 184

Active Document Committers = 161

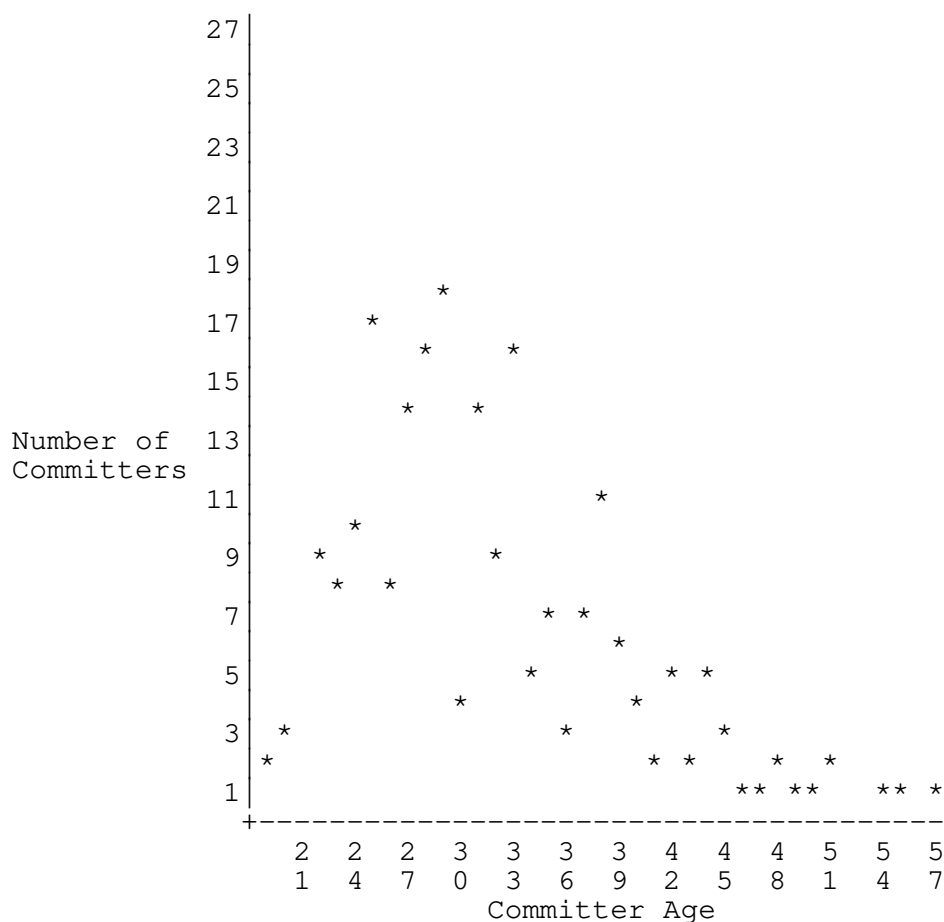
Total Active Committers = 300

Total Commits = 298646

Port 127082, Doc 24771, Src 146793

Average age 31

Median age 31



Committer Statistics

Run date: May 31, 2015

Active Source Committers = 200

Active Ports Committers = 208

Active Document Committers = 122

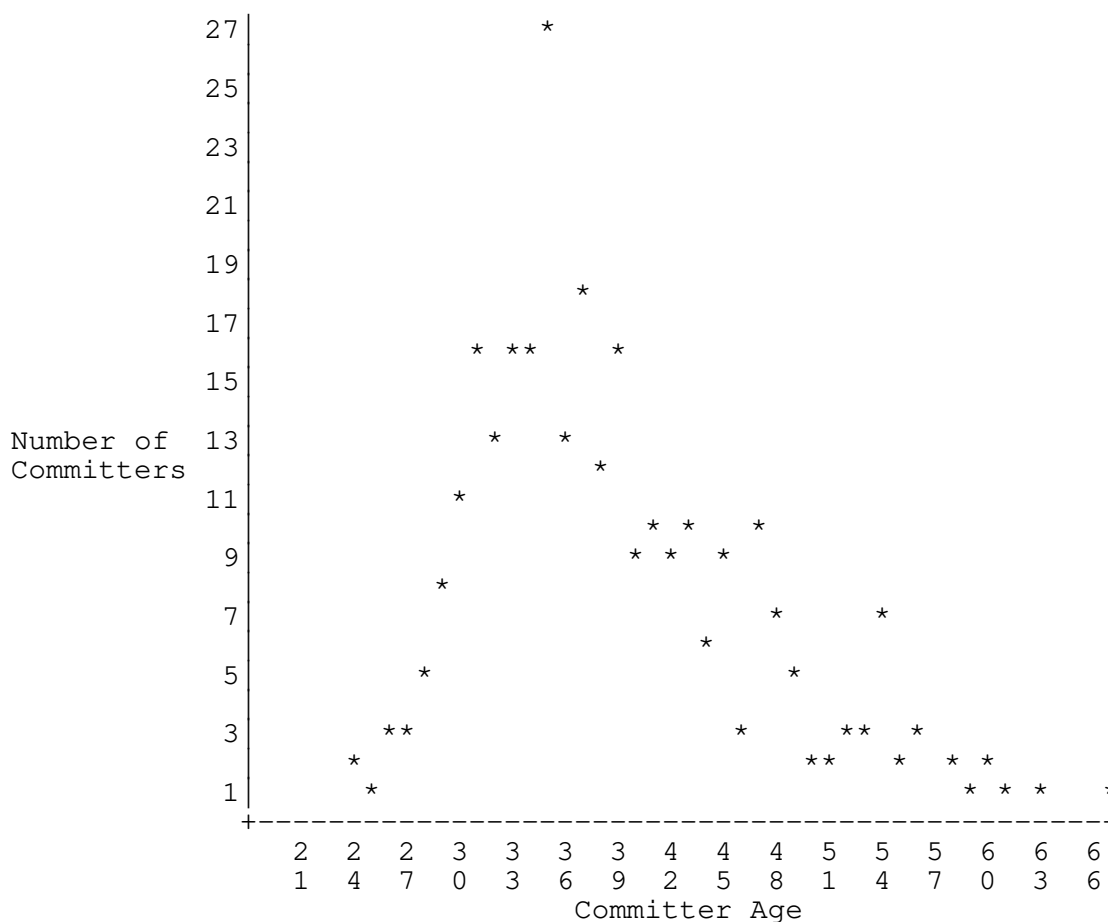
Total Active Committers = 326

Total Commits = 687410

Port 369607, Doc 46375, Src 271428

Average age 38

Median age 37



Committer Statistics

Run date: May 21, 2024

Active Source Committers = 174

Active Ports Committers = 199

Active Document Committers = 88

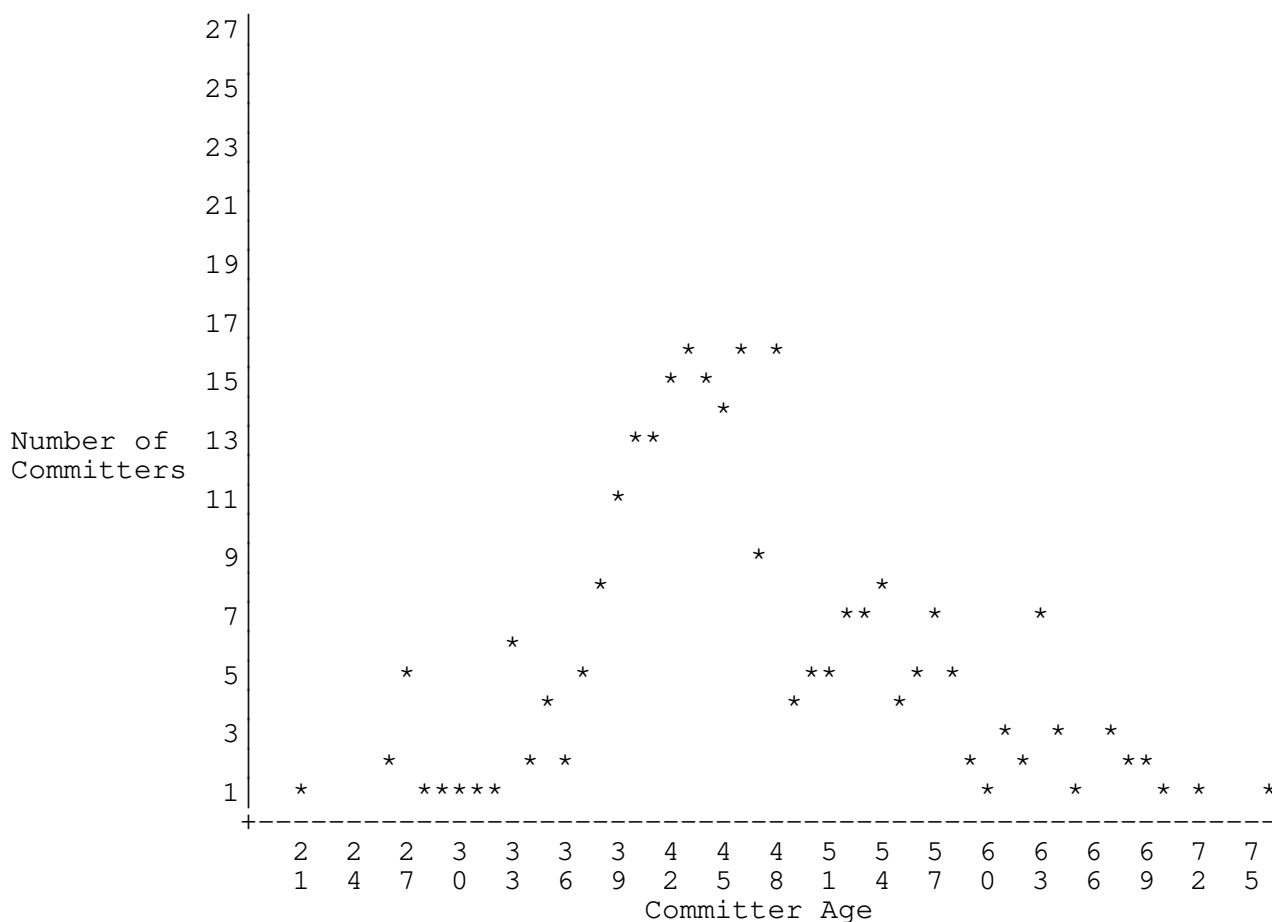
Total Active Committers = 293

Total Commits = 1152193

Port 684182, Doc 58539, Src 409472

Average age 46

Median age 45



Conclusions

FreeBSD still going strong after 30 years

Strength comes from having built a strong base in its code, documentation, and culture

It has managed to evolve with the times, continuing to bring in new committers, and smoothly transition through several leadership groups

It continues to fill an important area of support that is an alternative to Linux

Companies needing redundancy require more than one operating system since any single operating system may fall victim to a failure that could take out the entire company's infrastructure

For all these reasons, FreeBSD has a bright future. In short, FreeBSD is awesome!

Questions

References:

M K McKusick “FreeBSD at 30 Years: Its Secrets to Success”, *The FreeBSD Journal*, 10, 2. pp 22–24, March 2023

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