FreeBSD at 30 Years: Its Secrets to Success

Brought to you by

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University of Ottawa
Ottawa, Canada

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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

![Yearly Commits Graph](Image)
Active Committers
## Top 5 Committers

### Documentation

<table>
<thead>
<tr>
<th>ID</th>
<th>Committer Name</th>
<th>Start Year</th>
<th>End Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2760</td>
<td>Ryusuke Suzuki (ryusuke)</td>
<td>2009-12</td>
<td>2023-02</td>
</tr>
<tr>
<td>2677</td>
<td>Glen Barber (gjb)</td>
<td>2010-09</td>
<td>2023-11</td>
</tr>
<tr>
<td>2428</td>
<td>Marc Fonvieille (blackend)</td>
<td>2002-06</td>
<td>2024-05</td>
</tr>
<tr>
<td>1962</td>
<td>Wolfram Schneider (wosch)</td>
<td>1996-02</td>
<td>2024-05</td>
</tr>
<tr>
<td>1496</td>
<td>Murray Stokely (murray)</td>
<td>2000-04</td>
<td>2013-07</td>
</tr>
</tbody>
</table>

### Ports

<table>
<thead>
<tr>
<th>ID</th>
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<th>Start Year</th>
<th>End Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>87166</td>
<td>Po-Chuan Hsieh (sunpoet)</td>
<td>2010-09</td>
<td>2024-05</td>
</tr>
<tr>
<td>20256</td>
<td>Martin Wilke (miwi)</td>
<td>2006-06</td>
<td>2020-01</td>
</tr>
<tr>
<td>20221</td>
<td>Yuri Pankov (yuri)</td>
<td>2017-11</td>
<td>2024-05</td>
</tr>
<tr>
<td>19675</td>
<td>Jan Beichc (jbeich)</td>
<td>2015-01</td>
<td>2024-05</td>
</tr>
<tr>
<td>17236</td>
<td>Dmitry Marakasov (amdmi3)</td>
<td>2008-06</td>
<td>2024-05</td>
</tr>
</tbody>
</table>

### Source

<table>
<thead>
<tr>
<th>ID</th>
<th>Committer Name</th>
<th>Start Year</th>
<th>End Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>13103</td>
<td>John Baldwin (jhb)</td>
<td>1999-09</td>
<td>2024-05</td>
</tr>
<tr>
<td>12456</td>
<td>Warner Losh (imp)</td>
<td>1996-09</td>
<td>2024-05</td>
</tr>
<tr>
<td>11420</td>
<td>Konstantin Belousov (kib)</td>
<td>2006-06</td>
<td>2024-05</td>
</tr>
<tr>
<td>8117</td>
<td>Alexander Motin (mav)</td>
<td>2007-04</td>
<td>2024-04</td>
</tr>
<tr>
<td>7101</td>
<td>Jordan K. Hubbard (jkh)</td>
<td>1993-06</td>
<td>2004-11</td>
</tr>
</tbody>
</table>
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:


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