FreeBSD Foundation

2024 Dublin Developers Summit

Deb Goodkin – Executive Director

Joe Mingrone - Project Manager

Ed Maste - Sr. Director of Technology

Who Are We?

❏ US-Based 501(c)3 Non-Profit

❏ 100% funded by donations

❏ Support the FreeBSD Project and community (YOU)

Foundation Staff

Leadership

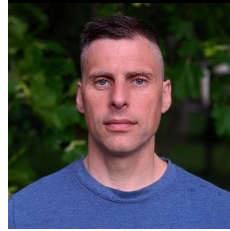**EXECUTIVE DIRECTOR**

Deb Goodkin

SR. DIR. TECHNOLOGY

Ed Maste

SR. DIR. ADVOCACY & COMMUNITY

Kim McMahon

Technical

PROJECT MANAGER

Joe Mingrone

SR. SW ENGINEER

Konstantin Belousov
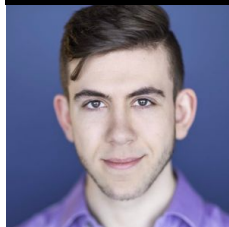
SOFTWARE ENGINEER

Li-Wen Hsu

USERLAND SW DEVELOPER

Pierre Pronchery

Advocacy & Community

DIR. OF MARKETING

Anne Dickison

DIGITAL & COMMUNITY

Drew Gurkowski

WRITER

Jason Perlow

ADMIN MANAGER

Loren Gurkowski

Technology Team Update

September 19, 2024

Technical Staff

SR. DIR. TECHNOLOGY

Ed Maste

SR. SW ENGINEER

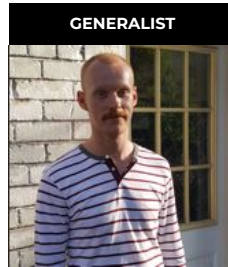Konstantin Belousov

SOFTWARE ENGINEER

Li-Wen Hsu

SECURITY DEVELOPER
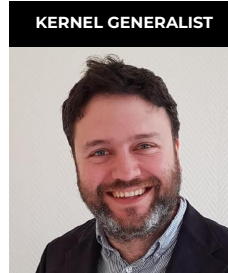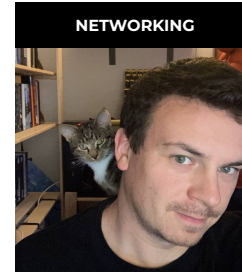
Pierre Pronchery

PROJECT COORDINATOR

Joe Mingrone

Long-term Contractors

GENERALIST
Mark Johnston

KERNEL GENERALIST
Olivier Certner

NETWORKING
Tom Jones

WIFI
Björn Zeeb

RISCV, TOOLS
Mitchell Horne

BHYVE, SECURITY
John Baldwin
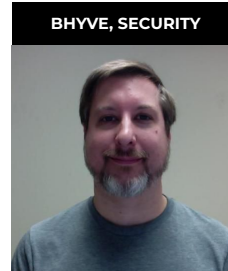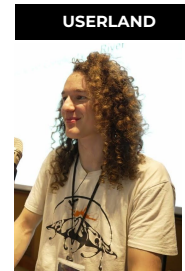
USERLAND
Isaac Freund

Project Contractors
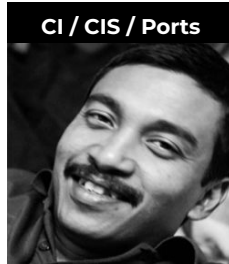
CI / CIS / Ports

Moin Rahman

CLOUD-INIT

Mina Galić

ZFS Hier. Limits

Paweł Dawidek

CLUSTER ADMIN

Philip Paeps

USERLAND

Charlie Li

AUDIO

Christos Margiolis

ACCESSIBILITY
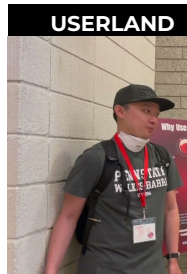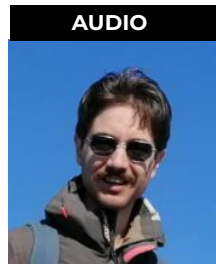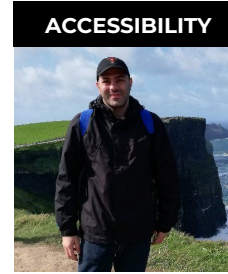
Alfonso Siciliano

OPENSTACK

Chih-Hsin Chang

Technology Team Impact

Sponsored src Commits (Sept 2023 - Sept 2024)
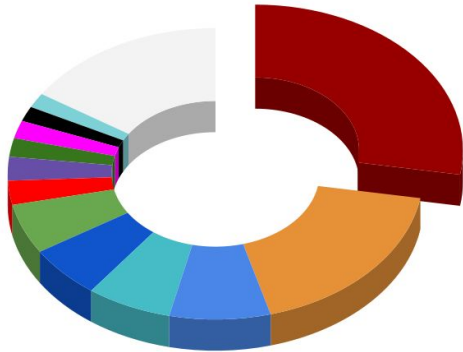
- Foundation
- Netflix
- Klara
- Arm
- Netgate
- Chelsio
- Innovate UK
- Beckhoff
- Serenity CS
- Juniper
- DARPA
- Stormshield
- All Others

About ⅓ of sponsored src commits are from the Foundation.

Proportion of src commits from Foundation
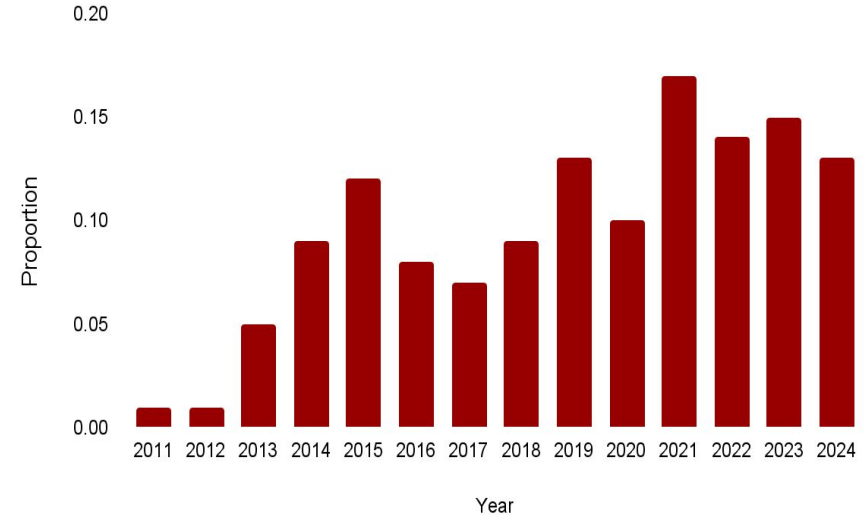
Google Summer of Code 2024

- Participating every year since inception in 2005
- Total projects: 274 (11 in 2024)
- FreeBSD dev community consists of GSoC Alumni (past Core Member)
- Technical contributions from GSoC
  - DTrace providers
  - Sound mixer overhaul
  - pkg contributions

GSoC 2024

Contributor	Project	Mentor(s)
Ajeet Singh	Improving FreeBSD User Emulation For Various Architectures	Warner Losh
Benjamin Stuerz	UFS4fuse: support FreeBSD's UFS2 with fusefs	Alan Somers, Kirk McKusick
Chun Cheng Yeh	Improving Repair Ability of the FreeBSD Installer	Pierre Pronchery, Li-Wen Hsu
Hans Lu	Capsicumizing the Base System	Mariusz Zaborski, Li-Wen Hsu
I-Hsuan Huang	Improve netgraph concurrency	Gleb Smirnoff
Isaac Cilia Attard	Speeding up the FreeBSD Boot Process	Colin Percival
Getz Mikalsen	Porting amd64 libc SIMD enhancements to arm64	Robert Clausecker, Ed Maste
Marko Vlaic	Zero-cost conditional execution mechanism	Bojan Novkovic
Strahinja Stanisic	Port amd64 SIMD libc optimizations to riscv64	Ed Maste, Robert Clausecker
Tyler Baxter	Refactor Syscall Creation Script	Warner Losh, Kyle Evans
Yan-Hao Wang	IPv6 support and cleanup of address family dependency in userland utilities	Hiroki Sato, Li-Wen Hsu

Funded Development

AMD IOMMU Driver

Project goals and overview

- AMD and The Foundation are working to support AMD's newest systems with 256 or more cores.
- AMD is sponsoring Konstantin Belousov to develop the driver.
- Konstantin has FreeBSD booting in single-user mode on a yet-to-be released large-core system.

Port VPP to FreeBSD

Project goals and overview

- The Foundation and RG Nets have a shared interest in FreeBSD support for a Vector Packet Processing (VPP) port in FreeBSD. VPP is a key enabler for high-speed networking on FreeBSD
- RG Nets sponsored the development of porting VPP to FreeBSD through a financial donation and by making its personnel available for technical consultations
- The Foundation implemented a work plan to develop a stable port of VPP to FreeBSD with the ability to run multiple concurrent instances bridging network interfaces and memory interfaces

EIM NAT

Project goals and overview

- RFC4787 Endpoint Independent NAT (aka "Full Cone")
- UDP flows from a given source are mapped to the same IP:port pair
- Greatly improves NAT traversal for P2P connections (gaming, video, VPN)
- D11137 three authors, including a UW co-op student and Tom Jones

Alpha-Omega Mission

Catalyze sustainable security improvements within the most critical open source projects and ecosystems.

Alpha-Omega Explained

$$\alpha \longrightarrow \textbf{Leverage}$$

$$\Omega \longrightarrow \textbf{Scale}$$

Alpha-Omega Engagements
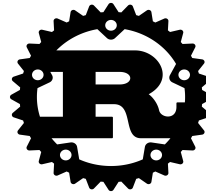
Slide from "Here is a clean section of the beach" at OSS Europe 2024
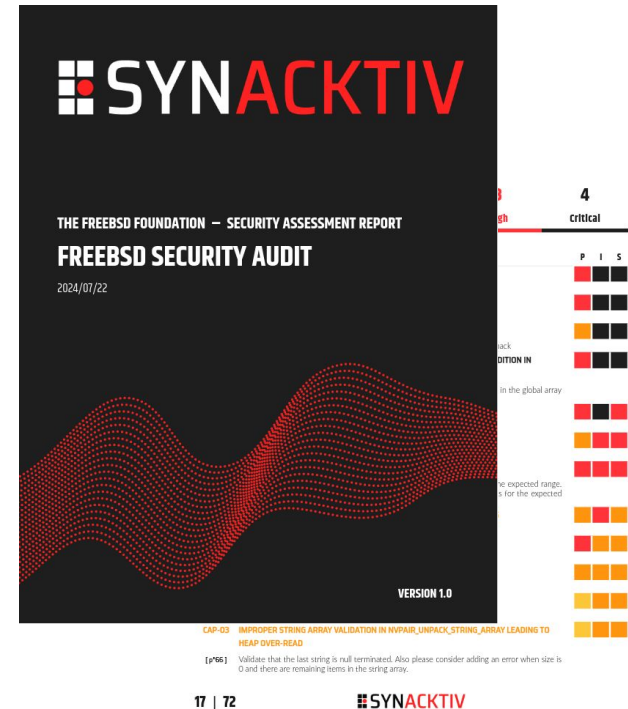
Code Audit

- Code reachable from within a Capsicum capability mode
- Bhyve hypervisor and device models
- SAs
  - FreeBSD-SA-24:09.libnv
  - FreeBSD-SA-24:10.bhyve
  - FreeBSD-SA-24:11.ctl
  - FreeBSD-SA-24:14.umtx
  -
- Minor   cleanup
  - pipe: keep uio_iovcnt consistent
  - acl_copyin: avoid returning uninitialized memory
  - bhyve: avoid updating fbaddr when vm_mmap_memseg fails

Code Audit Next Steps

- 14 outstanding issues (5/5/4 remark/low/medium severity)
- Publish Synacktiv Report
- Apply lessons learned more broadly
  - Same error in other code
  - Code annotations (e.g. `__result_use_check`)
  - Signals from static analysis, bug reports
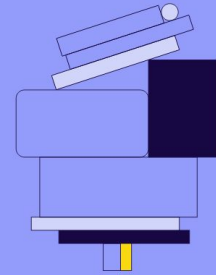- Publish our report

Sovereign Tech Fund

Strengthening Digital Infrastructure and Open Source Ecosystems in the Public Interest

The Sovereign Tech Fund supports the development, improvement, and maintenance of open digital infrastructure.

Our Mission →

https://www.sovereigntechfund.de/

Project goals and overview

- Five work packages
  - Pay down technical debt
  - Improve process and tooling for "zero trust builds"
  - Improve CI/CD
  - Modernize and extend security controls in ports & packages
  - Improve / implement tooling for SBOM

Laptop Usability

Project goals and overview

- Financial, development or in-kind support from Quantum Leap Research, Framework, Foundation
- Out of the box laptop / desktop usability
  - Suspend: s2idle, s0ix, hibernate
  - Bluetooth: drivers, management/configuration utility
  - Audio: headphone auto-switching, SOF/dmic
  - Camera: kernel UVC driver
  - WiFi: 802.11n/ac/ax in net80211/LinuxKPI/drivers, additional drivers
  - Graphics: Linux drm 6.6, 6.7+
  - Infrastructure: heterogeneous core scheduling
  - Usability: laptop function buttons, ALS, firmware updates, full disk encryption
  - Bhyve: manageability and end-user use cases

Ask Us Anything!

Thank you