Spotlight on the Foundation—
GRATITUDE / by Deb Goodkin

As the year comes to a close, many of us tend to reflect on the past year and think about what we are grateful for. Because of you, I love my job. This community—from all pockets of the world—supports one another, works side-by-side, graciously challenges the ideas of others, and ensures contributions to the Project are held to the high standards that are expected in the FreeBSD community. Though it's a technical community, it's a community that shares common interests with their passion for FreeBSD while demonstrating compassion for others. Our entire Foundation team believes in you, and will do everything we can to continue our support to make this operating system and community grow, prosper, and thrive.

There are three major areas to which the Foundation directs funding and energy in order to keep the path of innovation coherent, while making FreeBSD a widely accepted, universally known and loved operating system. Those areas are: Adovocacy—FreeBSD based teaching materials, recruiting, technical publications; FreeBSD Project Infrastructure—hardware and tools that make our community more effective; and Software Development—implementing and managing projects that make FreeBSD more robust or add to its capabilities.

Advocacy

We recognize that for FreeBSD to grow and be sustainable, we need to continually bring in new people to the Project. We are helping with this effort by promoting FreeBSD at conferences, providing more informational and training material, and supporting work on creating curriculum that can be taught in schools and universities.

This year we put more funding into sponsoring and attending non-BSD conferences. Our main goals were to promote FreeBSD for end-users and commercial users; to recruit more people to the Project and help get them started on the right path; and to encourage teachers and professors to include FreeBSD in their computer science classes.

Some of the non-BSD conferences we sponsored and attended this year were:

Grace Hopper Conference, in Houston, Texas;

womENcourage, in Uppsala, Sweden; OSCON, in Portland, Oregon; SNIA, in Santa Clara, California; and USENIX LISA, in Washington, DC.

The feedback we received from attending these conferences was overwhelmingly positive. The constant buzz around our tables confirmed the latent curiosity about FreeBSD and FreeBSD's relevance to today's computing challenges. Speaking to the many conference attendees has further convinced me that there are many people interested in getting involved in the Project. However, to get those people hooked and actively involved, we need to help make the "how to get started" path easier to navigate.

We also sponsored many highly successful BSD conferences, including AsiaBSDCon, BSDCan, Ottawa Developer Summit, vBSDCon, Santa Clara Vendor/Developer Summit,
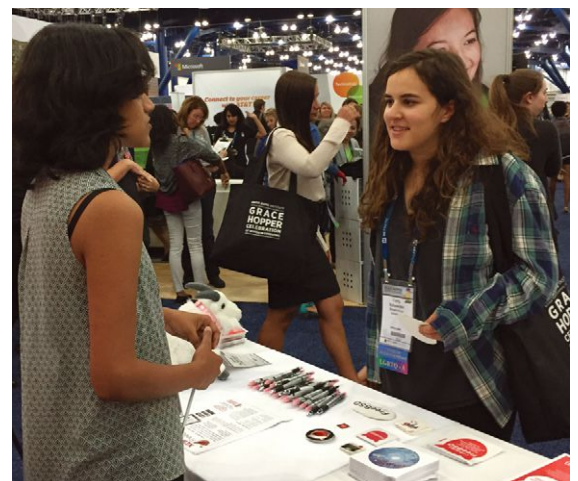
Cambridge FreeBSD Developer Summit, and EuroBSDCon. Through our travel grant program, 21 developers received sponsorship to attend these conferences. Attending events like these provides a venue for FreeBSD contributors to work together on projects, see presentations to learn about different features in FreeBSD, and share their knowledge of FreeBSD and the work they are doing.

Educating the World on FreeBSD

The above-mentioned conferences also confirmed the need for teaching material and FreeBSD curriculum. In order to get more young people exposed to FreeBSD, we are supporting efforts to develop class curriculum, and to improve the "out of box" experience when running FreeBSD on inexpensive platforms (Raspberry Pi, BeagleBone Black, etc.) that enhance hands-on, classroom learning.

Foundation board members George Neville-Neil and Robert Watson recently announced that materials, sponsored in part by the Foundation, are now available for their Teaching Operating Systems with Tracing courses. This curriculum is designed to develop crucial systems skills for both university students and seasoned software practitioners. You can find more information about the materials and the courses at www.teachbsd.org.

Justin Gibbs completed teaching our first middle school class on computers and FreeBSD this past fall in Boulder, Colorado. We're processing what we have learned so we can put this into a package to offer to others to teach in the future. The opportunity to tap into these young people and teach them about FreeBSD will open up their world to open source and hopefully spark their interest in pursuing more learning opportunities with FreeBSD, operating systems, and computers in general.

Sharing Knowledge through the *Journal*

It's been exciting to watch the growth and success of this magazine over the past two years. With subscriptions still increasing, it's clear there is pent-up demand for the high-quality, FreeBSD-focused, technical content FreeBSD Journal provides. Seeing almost all first-year subscribers renew for a second year further confirms the strength of this content. Our team is actively involved in producing the *Journal*. George Neville-Neil, Foundation secretary,

is the Editorial Board Chair, who oversees putting this publication together. Many of our team members write monthly columns and articles. Our marketing director, Anne Dickison, promotes the magazine and makes sure our website is up-to-date for you to subscribe and get more information. As with most publications, we're always looking for more advertisers to help defray our costs. Reaching out to our readers through advertising in the *Journal* is a great way for companies looking to hire FreeBSD developers, or to promote their FreeBSD-related products! Let us know if you'd like more information about advertising in the *Journal*.

I want to send out a big thank you to all of you who have subscribed, and to the committed authors and editorial board members who volunteer their time on this publication. Lastly, I'd like to say thank you to the people who've made donations to the Foundation. Your donations enable us to fund this magazine!

Infrastructure for Testing and Developing FreeBSD

We allocated $100,000 this year toward purchasing new hardware to upgrade and improve FreeBSD infrastructure. This includes providing the latest technologies and platforms for developing and testing FreeBSD. We purchased Intel x86_64 servers for FreeBSD.org production use. Providing this hardware increased the security, reliability, and redundancy of the data and services critical to running the FreeBSD Project. We also upgraded the test clusters used by FreeBSD developers with the latest in Intel X86_64, POWER8, and 32/64-bit ARM platforms.

We want to thank NYI, Sentex, Yahoo!, ISC, Yandex, Bytemark, LimeLight, RootBSD, and APNIC for providing colocation hosting, bandwith, and hardware resources. This support is a critical component of giving the FreeBSD Project

the resources it needs to be successful.

In addition, we would like to thank NYI for generously hosting much of the hardware purchased by the FreeBSD Foundation and Sentex for providing hands to reconfigure hardware for FreeBSD developers performing tests and benchmarking runs.

Our team members are directly involved in getting the right equipment ordered and shipped to the appropriate facilities. Foundation release engineer, Glen Barber, is never afraid to get his hands dirty by working at some of these facilities to get the systems up and running.

Accelerating New Features in FreeBSD, Support for New Platforms, and Improvements in FreeBSD

This is the area where we spend most of our time. It's the nuts and bolts of the operating system, so half of our budget and the majority of our staff are allocated to this area.

We have four full-time staff members who work on FreeBSD development, release engineering, and system administration. By having full-time developers on staff, we can focus on code fixes and improvements, new features and functionality, and in areas that volunteers may not be interested in or are not available to work on. Because of the diverse knowledge of our staff, when we're made aware of an area needing attention, most likely one of our developers will be equipped to provide immediate help.

Over the past year our full-time staff was responsible for both incremental improvements and new features. We improved the performance and correctness of atomic operations in the kernel, introduced modern x86 platform support, resolved libthr compatibility with dynamic loading, and refined UEFI booting and the vt(4) system console. We developed a new autofs-based automount daemon, implemented root remount functionality, added initial secure boot support, integrated our new in-kernel iSCSI stack, and added binary utilities from the ELF Tool Chain project.

In addition to the development work our staff provides, we fund outside development projects. This year we funded and managed the port of FreeBSD to the new AArch64 64-bit ARM architecture, funded university research on Multipath TCP for FreeBSD, and improved kernel cryptographic support.

Hardware implementing the 64-bit ARM architecture is not yet widely available, but interest is growing and availability will increase significantly over the coming year. We need FreeBSD to be a viable, stable, and high-performance operating system choice for this platform. Rapid progress is being made toward this goal. Snapshot releases, installation media, and a large number of third-party software packages are available today for those wanting to test and help development of this platform.

Multipath TCP (MPTCP) extends the Transmission Control Protocol (TCP) to use multiple, simultaneous paths in a single overall connection. It will become increasingly important, especially in wireless and mobile communications. Funding a master's student supports the development of this protocol in FreeBSD and helps keep FreeBSD relevant as a networking research platform.

Our funded project on improving the use of AES cryptographic instructions in Intel processors directly translates into significantly higher performance for IPsec communications.

The Foundation provides full-time release engineering support, which results in on-time and reliable releases. In fact, by having Foundation staff member Glen Barber focusing on release engineering efforts, FreeBSD 10.2- RELEASE was available in mid-August, which was two weeks ahead of the planned schedule.

You Make This Possible!

As we reflect on this year's successes, we are grateful to you for making it possible. Our next year's ambitious goals can also be met with your ongoing support. We can do this important work together. Please go to www.freebsdfoundation.org to learn more about the Foundation, or sign up for the monthly e-newsletter to stay up-to-date on how we are spending your money to keep FreeBSD the high-performance, reliable, and secure operating system you rely on. While you're here, please consider making a donation today at https://www.freebsdfoundation.org/donate!

Thank you for your support—we can't do this without you! •

Deb Goodkin is the Executive Director of the FreeBSD Foundation. She's thrilled to be in her 11th year at the Foundation and is proud of her hardworking and dedicated team. She spent over 20 years in the data storage industry in engineering development, technical sales, and technical marketing. When not working, you'll find her on her road or mountain bike, running, hiking with her dogs, skiing the slopes of Colorado, or reading a good book.