FreeBSD Foundation October Update

Dedicated to supporting the FreeBSD Project and Community
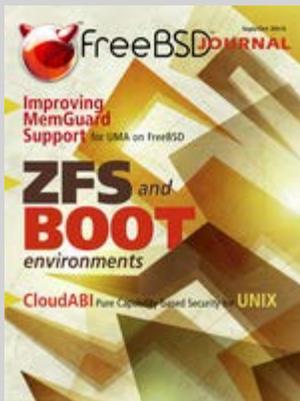
FreeBSD Journal

The September/October issue of the *FreeBSD Journal* is now available! Don't miss articles on CloudABI, FreeBSD Virtualization Options, ZFS and BOOT environments, and more. Not a subscriber? Sign up today!

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"Awesome! This is the best way to popularize FreeBSD!!" San Jose,

Message from the Executive Director

October is coming to a close and what a productive month it's been at the Foundation. We furthered our outreach by attending and sponsoring conferences like Grace Hopper and BSDcon Brazil. Our projects team shares their recent work to audit and rationalize the FreeBSD kernel's atomic operation primitives, and there's a new issue of the Journal.

The Foundation has made great connections over the month and we look forward to kicking off the year-end fundraising campaign next month with an expanded network and renewed energy. Please take a moment to read up on what we've been up to and thank you for all you do to support the Foundation and the Project.
Deb

Development Projects Update

For this month's projects update we'll take a look at Foundation staff member Konstantin Belousov's recent work to audit and rationalize the FreeBSD kernel's atomic operation primitives. This work was performed in collaboration with FreeBSD project members.

Atomic operations are the building blocks for expressing synchronization algorithms in a machine-independent way. Atomics also provide barrier operations that allow software to control the effects of out-of-order and speculative execution found in modern processors.

Most FreeBSD development and testing today is done on x86 machines, which have a strongly ordered memory model. This can lead to errors in the use of atomics and specifically barriers, as guarantees provided by the x86 architecture mask the effects of incorrect atomic use. The FreeBSD project is working to bring up ports to new architectures, and working on bringing additional architectures to Tier-1 status. As a result, it is important that kernel code is properly written to FreeBSD's abstract memory model.

Why Choose FreeBSD?

"NGINX is the secret heart of the modern web, powering 1 in 3 of the world's busiest sites and applications. The NGINX open source project started in 2002 and has grown exponentially during the past 10 years thanks to the vision of Igor Sysoev and the enthusiasm and support of our loyal community of users.

The company offers award-winning and industry-leading high performance web application technology that delivers the scalability, speed, and security to more than 130 million sites on the Internet, ensuring a seamless web user experience. Companies rely on NGINX technologies for load balancing, content caching, media streaming, web serving, and more. More than 40 percent of the Internet's busiest websites rely on NGINX to drive the performance of their web applications, including giants such as Netflix, Pinterest, Airbnb, Box, Instagram, SoundCloud, and Zappos. The company is headquartered in San Francisco.

Historically, the NGINX team have been big fans of the FreeBSD Project. Some of us are active FreeBSD committers, code contributors and users.

In 2002 when Igor started to work on the NGINX project, his main development platform was FreeBSD. These days we continue to use FreeBSD as a reference platform for

FreeBSD models its atomics and barriers on the acquire/release model. This is the same model used by the C11 and C++11 language standards, and the new 64-bit ARM architecture. As a result, documentation on the C11 memory model and algorithms implemented using C11 atomics can be trivially applied to FreeBSD.

Due to the strong memory model implemented by x86 processors, the load-acquire and store-release operations can be implemented as plain load and store instructions with a compiler barrier. These simplified operations have now been committed to FreeBSD.

This project added bi-directional barrier operations (C11 fences) to the set of FreeBSD atomics.

It also produced a number of preemptive fixes to address the misuse of atomic operations. This included changes to timekeeping, SMP synchronization, and the pthread userspace threading library. FreeBSD's documentation for atomic operations (the atomic(9) man page) was also corrected and clarified.

Having permanent technical staff allows the Foundation to take on projects like this one, and ensure that FreeBSD's low-level infrastructure is maintained and kept current.

-- contributed by Ed Maste

Conference Recap: BSDCon Brazil 2015

Earlier this month I attended a new and exciting BSD-themed conference called BSDCon Brazil. This two-day event took place at UNIFOR in Fortaleza. This conference was in part sponsored by the FreeBSD Foundation, and two departments of the Instituto Federal do Ceará (IFCE/PPGCC and IFCE/LIT). Approximately 50 BSD enthusiasts attended this conference.

Thursday: Arriving in Fortaleza

When I arrived in Fortaleza, I took a taxi over to the hostel where we stayed, and quickly dropped off my bags and headed out. The organizers had invited the speakers to join them at the pub around the corner from the hostel.

At the pub I ran into some familiar faces, namely Jim Thompson and George Rosamond from the US who also spoke at the conference, and Renato Botelho, one of our Brazilian FreeBSD developers. Unfortunately, I didn't manage to stay long, due to my jet lag.

Friday: Conference, Day One

After a quick breakfast at the hostel we took a taxi to the university. The university campus looked really nice. I was pleasantly surprised by the amount of vegetation. I later saw that they have some monkeys roaming around as well, was pretty cool.

The conference started off with a talk about CloudABI which I happened to give, similar to my presentation at EuroBSDCon one week earlier. My talk was followed by Lourival Vieira Neto who talked about the use of Lua in the NetBSD kernel, which was pretty interesting.

In the afternoon I went to see Andre Oliveira, who talked about a NetBSD-based radar system deployed at the Alcântara Launch Center. He showed some videos of the radar in action as well. The day was closed off with a presentation by Luiz Otavio Souza, who talked about a packet forwarder based on Netmap, which is FreeBSD's infrastructure for efficiently processing network traffic in userspace.

In the evening we had dinner together with the organizers. We bought a large bag of fresh fish at a market stand and walked over to a terrace right on the beach where they would prepare it for you. Just lovely.

Saturday: Conference, Day Two

The second day started off with a talk by Jim Thompson, who talked about the network performance measurements infrastructure he and George Neville-Neil are currently working on. Jim's talk was followed by a presentation given by Edicarla Andrade, an undergraduate student at IFCE who talked about her experiences using FreeBSD on BeagleBoards to power small robots.
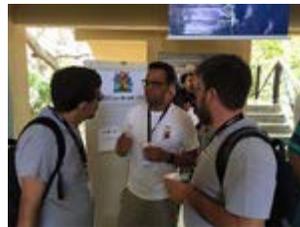
After lunch, George Rosamond talked about Tor on BSD. He discussed both technical and political aspects of using Tor, but also what work needs to be done to improve the experience of using Tor on BSD-based systems. This talk was highly successful, as Brazil has gained 9 new exit nodes since the conference. Danilo Egea Gondolfo gave a talk where he demonstrated some of HardenedBSD's features. The last talks of the day were given by Patrick Tracanelli, who demonstrated a Netmap-based firewall, and Andre Oliveira, who spoke about the Bitrig project.

After the closing ceremony we went to a restaurant with a small number of people, where they had a cold buffet and would bring around different kinds of grilled meat. We then headed to the pub we also went to on Thursday. This evening they also had live music.

Sunday: Enjoying Fortaleza

As my flight only departed at 20:00, I still had time left to explore Fortaleza. In the morning I went to the beach and took a swim in the

ocean. When I headed back to the hostel to freshen up, I ran into George Rosamond, who was about to head out to the Mercado Central. I tagged along with him and later shared a taxi with him to the airport.

Closing Words

I really enjoyed attending BSDCon Brazil. The atmosphere was really nice and the attendees showed a lot of interest in the topics that were presented. Fortaleza was also a nice place to visit. The people seemed very friendly and always wanted to help out, even if we couldn't speak the same language. Though I haven't seen any other places in South America, I think Fortaleza is a nice location for holding a BSD conference.

I am looking forward to seeing what the next editions of the conference will look like. In my opinion this conference may have the potential of becoming the EuroBSDCon of Latin America.

-- *contributed by* Ed Schouten <ed@FreeBSD.org>

The Faces of FreeBSD Series: Michael Dexter

Next up in the Faces of FreeBSD series reboot is Michael Dexter. You can find his full interview on [the blog](#).

Please take a minute and read more about Michael and stay tuned for future interviews with FreeBSD enthusiasts who are advocating for FreeBSD, improving FreeBSD, writing for FreeBSD, running conferences, and helping in other various ways.

-- *contributed by Anne Dickison*

Fundraising Update: The Foundation Needs Your Support!

I love our monthly newsletter. It gives me a chance at the end of each month to reflect on what we did to help further FreeBSD. It takes my focus away from the day-to-day work of running our organization, to recognizing the work we do that makes a positive impact on the FreeBSD Project and community.

When I look back on this month, I think conferences. We had another busy month full of BSD and non-BSD conferences that we sponsored and attended. These included, EuroBSDCon, Stockholm FreeBSD Developer Summit, the Grace Hopper Conference, and the OpenZFS Summit. We were also a sponsor of BSDCon Brazil, but unfortunately, weren't able to attend. Right now, we are preparing to head to California for the Sunnyvale FreeBSD Developer and Vendor Summit, and ARM TechCon the

following week. We support these conferences for many reasons, some of which include to: promote FreeBSD, help facilitate face-to-face opportunities for developers to work together, help provide venues for people to give and attend presentations on FreeBSD, recruit to the Project, and talk to organizations about using FreeBSD.

Attending the Grace Hopper Conference made the most impact on me. It confirmed there are many opportunities for us to expand, improve, and grow FreeBSD. I came back inspired by the people I met and the talks I listened to. Participating in a conference with 12,000 women in computing is amazing, and I hope we are able to attend next year. You can read more about the conference [here](#).

After participating in this and other non-BSD related conferences recently, I am convinced that there are many people interested in getting involved in the Project, and to get those people hooked and actively involved, we need to make the "how to get started' path easier to navigate. At these recent conferences, I've had the opportunity to talk to many college instructors, who would like to introduce FreeBSD to their students and get them involved in the Project, or even directly work on FreeBSD projects with the help of developers in their classes. This confirms the need for teaching material and FreeBSD curriculum that we are working to provide to universities.

Earlier in the month, I attended EuroBSDCon and the preceding FreeBSD developer summit. After participating in the womENcourage conference the weekend before, I decided to hold a "Recruiting to FreeBSD" session at the developer summit. Only one person signed up for my session, so I wasn't sure what to expect. However, I was pleasantly surprised when I walked into the room and it was filled with over half the attendees! We had a vibrant discussion on things that can be done to make it easier for people to get involved in the Project. To keep this interest and momentum going, we will be asking for more community involvement to refine and implement easy to follow guidelines on how to get involved, complete with a list of people available to mentor newbies, including ideas of small projects to help people get started.

We can drive a lot of these efforts. We can continue to attend these types of conferences to promote FreeBSD and recruit to the Project. We can provide outreach to get more FreeBSD contributors to give FreeBSD presentations and classes at conferences, universities, and various organizations around the world, and we can provide more documentation on how to get started on FreeBSD. But, it takes funding and people to do this.

Take a look at our recently published Q1-Q3 financial reports [here](#). You'll see that as of 9/31/15 we've spent $735k, where $570k was direct project spending. But, we've only raised $450k so far this year. Our spending budget is $1,250,000, and with our current plans and outstanding expenses, we will come close to spending this amount by the end of the year.

Though, I highlighted the conferences we attended and the advocacy,

education, and recruiting work we want to support, this is in addition to all of the project development and release engineering work we do. Ed Maste's article highlights some of the development work we've been engaged in this past month. Looking forward, we are reviewing some great project proposals we recently received, and are working on our project development planning for 2016. Finally, to continue our support of FreeBSD infrastructure, George Neville-Neil is busy purchasing hardware to improve our testing capabilities and support other development work going on.

The bottom line is that *we can't do this alone*. We need your help to continue supporting the work that we do.

Help us continue to:

- Keep a full-time release engineer on staff to provide on-time and reliable releases.

- Keep in-house staff members to work on software development to continue fixing problems, implementing features, and supporting other development work going on.

- Purchase hardware to improve and upgrade the FreeBSD infrastructure.

- Protect FreeBSD IP and provide legal services to the Project.

- Sponsor conferences around the world and provide travel grants to FreeBSD contributors so they can attend these conferences.

- Promote FreeBSD, by attending and having FreeBSD representatives at non-BSD conferences, providing informative literature available online and to hand out at events, and providing instructors at universities the tools to teach and promote FreeBSD.

If you have benefited by the work we do and from FreeBSD in any way, I am asking that you [make a donation](#) of $10 or more. If you are one of our 10,000+ FreeBSD Journal subscribers, you are benefiting from a resource we are providing and funding. The subscription cost doesn't come close to what this publication costs us. I'm asking every subscriber to consider making a donation of $10 or more, to help us continue this professional quality, informative publication, and all the other work we do to help keep FreeBSD innovative, reliable, and powerful.

Lastly, if your company is benefiting from FreeBSD, please ask them to make a contribution. Or, connect me [deb@freebsdfoundation.org] with someone at your company, so I can tell them about all the work we are doing to keep FreeBSD the best operating system solution for their products and use.

Please help us continue our efforts for FreeBSD by [making a donation](#) today!

Thank you for your support!l

-- contributed by Deb Goodkin