

FreeBSD Foundation January 2018 Update



Dedicated to supporting the
FreeBSD Project and community

Upcoming Events

[FreeBSD Mini-Dev Summit 2018](#)

February 2, 2018
Brussels, Belgium

[FOSDEM 2018](#)

February 3-4, 2018
Brussels, Belgium

[APRICOT 2018](#)

February 19-28, 2018
Kathmandu, Nepal

[AsiaBSDCon 2018](#)

[FreeBSD Developers Summit](#)

March 8-9, 2018
Tokyo, Japan

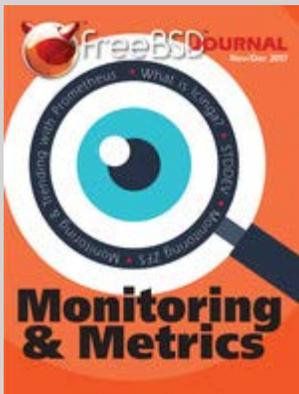
[AsiaBSDCon 2018](#)

March 8-11, 2018
Tokyo, Japan

[SCALE 16x](#)

March 8-11, 2018
Pasadena, CA

FreeBSD Journal



The [November/December](#) issue of the

Message from the Executive Director

Dear FreeBSD Community Member,

Happy New Year! First, I want to thank everyone who donated to the Foundation last year! Your gifts allow us to continue supporting the FreeBSD Project and community worldwide.

You are probably surprised to see our newsletter so early this year. As you recall, last year we experimented with writing more blog posts and publishing a quarterly newsletter. The feedback we received indicated people missed the monthly updates. Therefore, we've decided that we would return to sharing monthly highlights of the support we are providing the Project.

In this update, you'll read up on the work we did to quickly jump on the Spectre and Meltdown issues, upcoming events that you should attend, FreeBSD advocacy efforts, and our support for the GSoC project.

Enjoy!

Deb

January 2018 Development Projects Update: Spectre and Meltdown in FreeBSD

Issues affecting most CPUs used in servers, desktops, laptops, and mobile devices are in the news.

These hardware vulnerabilities, known by the code-names

"Meltdown" and "Spectre", allow malicious programs to read data to which they should not have access. This potentially includes credentials, cryptographic material, or other secrets. They were originally identified by a researcher from Google's Project Zero, and were also independently discovered by researchers and academics from Cyberus Technology, Graz University of Technology, the University of Pennsylvania, the University of Maryland, Rambus, the University of Adelaide and Data61.



FreeBSD Journal is now available. Don't miss articles on What is Icinga?, Monitoring ZFS, and more.

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Sample Issue! If you've ever wanted to read through an entire issue of the FreeBSD Journal, now's your chance. [Download](#) the sample issue and be sure to share with your friends and colleagues.

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See what others are saying about the Journal:

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

"I've found it really practical, and great reading...it caters to all levels of users."
Brooklyn, NY

Why Choose FreeBSD?



"Tarsnap is an online backup service for BSD, Linux, OS X, and other "unix-like" operating systems. I started work on Tarsnap in 2006 when, as FreeBSD Security Officer, I was worried about the security of the information (such as unreleased security advisories) on my laptop; this resulted in a design for a backup system which inspired the tagline "online backups for the truly paranoid".

Tarsnap would never have existed without FreeBSD for another reason: As the name suggests, the Tarsnap software is based on the standard UNIX tar utility, and to that end I started development using the excellent bsdtar utility which was developed within FreeBSD in the preceding years. If I hadn't been able to reuse code from a tar utility, it would have

These vulnerabilities affect many CPU architectures supported by FreeBSD, but the 64-bit x86 family of processors from Intel and AMD are the most widely used, and are a high priority for software changes to mitigate the effects of Meltdown and Spectre. In particular, the Meltdown issue affects Intel CPUs and may be used to extract secret data from the running kernel, and therefore, is the most important issue to address.

The FreeBSD Foundation collaborates with Intel, and under this relationship participated in a briefing to understand the details of these issues and plan the mitigations to be applied to the x86 architectures supported by FreeBSD. We also made arrangements to have FreeBSD's security officer join me in the briefing. It is through the generous support of the Foundation's donors that we are able to dedicate resources to focus on these issues on demand as they arise.

Foundation staff member Konstantin (Kostik) Belousov is an expert on FreeBSD's Virtual Memory (VM) system as well as low-level x86 details, and is developing the x86 kernel mitigations for FreeBSD.

The mitigation for Meltdown is known as Page Table Isolation (PTI). Kostik created a PTI implementation which was initially committed in mid-January and is available in the FreeBSD-CURRENT development repository. This is the same approach used by the Linux kernel to mitigate Meltdown.

One of the drawbacks of the PTI mitigation is that it incurs a performance regression. Kostik recently reworked FreeBSD's use of Process-Context Identifiers (PCID) in order to regain some of the performance loss incurred by PTI. This change is also now available in FreeBSD-CURRENT.

The issue known as Spectre comes in two variants, and variant 2 is the more troubling and pressing one. It may be mitigated in one of two ways: by using a technique called "retpoline" in the compiler, or by making use of a CPU feature introduced in a processor microcode update. Both options are under active development. Kostik's change to implement the CPU-based mitigation is currently in review. Unfortunately, it introduces a significant performance penalty and alternatives are preferred, if available.

For most cases, the compiler-based retpoline mitigation is likely to be the chosen mitigation. Having switched to the Clang compiler for the base system and most of the ports collection some years ago, FreeBSD is well-positioned to deploy Clang-based mitigations. FreeBSD developer Dimitry Andric is spearheading the update of Clang/LLVM in FreeBSD to version 6.0 in anticipation of its official release; FreeBSD-CURRENT now includes an interim snapshot. I have been assisting with the import, particularly with respect to LLVM's lld linker, and will support the integration of retpoline. This support is expected to be merged into FreeBSD in the coming weeks.

The Foundation's co-op students have also participated in the response

taken me years longer to launch Tarsnap; and both the license (BSD) and code quality (excellent) of bsdtar were crucial to my ability to reuse it.

As well as reusing code from FreeBSD in the client software, Tarsnap relies entirely on FreeBSD for its server infrastructure. In addition to being easy to maintain and administer, FreeBSD's separation between the minimalist and internally-maintained "base" system and third-party "ports" code has proven to be extremely useful when responding to security issues: For the recent "shellshock" vulnerabilities, for example, I merely had to confirm that I had never installed bash from the ports tree. If bash had been installed on any of Tarsnap's servers, it would have required a much more time-consuming process to audit all of the ways that it might have been used — and that process would have been required even if the eventual conclusion was that bash had never been used.

Tarsnap Backup Inc. is proud to support FreeBSD, both through my personal work (most recently, maintaining the FreeBSD/EC2 platform) and through its place as a Silver sponsor of the FreeBSD Foundation; and Tarsnap has directly benefited from projects and events which the FreeBSD Foundation has supported. Giving back is not merely an act of charity; it is truly an investment which yields an excellent return."

— Colin Percival, President, Tarsnap Backup Inc.

to these vulnerabilities. Mitchell Horne developed the patch to control the PTI mitigation default setting, while Arshan Khanifar benchmarked the performance impact of the in-progress mitigation patches. In addition, Arshan and Mitchell each developed changes to FreeBSD's tool chain to support the full set of mitigations that will be applied.

These mitigations will continue be tested, benchmarked, and refined in FreeBSD-CURRENT before being merged into stable branches and then being made available as updates to FreeBSD releases. Details on the timing of these merges and releases will be shared as they become available.

I would like to acknowledge all of those in the FreeBSD community who have participated in FreeBSD's response to Meltdown and Spectre, for testing, reviewing, and coordinating x86 mitigations, for developing mitigations for other processor architectures and for the Bhyve hypervisor, and for working on the toolchain-based mitigations.

-- contributed by Ed Maste

Fundraising Update: Welcome to 2018



On behalf of the Foundation, I want to send out a heartfelt thank you to everyone who supported our work last year! We raised \$1,064,000!!

From our humble beginnings in March 2000, with three volunteer board members, to today's staff of nine team members and eight volunteer board members, I'm proud of the work we've accomplished over the

years. In 2017, we stepped in to provide more internal software development work, FreeBSD security support, and FreeBSD advocacy and education.

You always hear us say that we can't do it without you, so let me show you just some of the areas where your contributions have benefited the FreeBSD Project. First, we have full-time staff members who are available to quickly jump on critical issues to get workarounds and/or fixes into the tree as soon as possible. Recently, this proved to be extremely important when it came to the Meltdown and Spectre issues.

We have a full-time staff member leading the release engineering efforts to continually provide timely and reliable releases. We also have a full-time staff member leading the FreeBSD advocacy efforts to help promote and educate about FreeBSD around the world.

We started participating in the University of Waterloo Co-op program, which provides two interns per four month session, and allows us to get more students participating and contributing to FreeBSD.

We've increased FreeBSD awareness in new regions by providing more

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FreeBSD presentations and workshops in places like India, China, Singapore, and Taiwan.

Lastly, one of our staff members stepped into one of the security leadership roles to help improve security team efforts.

I'm excited about some of our plans for 2018. Besides the areas we've historically supported, we are looking to increase our efforts in some important areas, including:

- Increasing software development projects, that are both supported by internal staff and outside consultants. Some of the projects currently on our plate are: the OpenZFS RAID-Z Expansion project, Broadcom Wi-Fi infrastructural improvements (bhnd(4) driver), increasing Intel server support, and extensive progress towards a fully copyfree toolchain.
- Improved testing and quality assurance.
- Additional FreeBSD workshops, presentations, and representation at conferences around the world.
- Providing more FreeBSD training material.
- Kicking off a university representative program designed to bring FreeBSD into more universities.

This is just a sample of work we are planning this year. I am looking forward to working with more FreeBSD contributors around the world while helping to grow the number of people contributing and using FreeBSD.

As I mentioned above, we can only continue this work with your support. Please consider [making a donation](#) today!

P.S. If your company uses FreeBSD, please share our [Partnership Program](#) information! Together we can accomplish even more for FreeBSD.

-- contributed by Deb Goodkin

Submit Your Work! Check Out Open CFPs

Presenting at a conference is an excellent way to spread the word about the work you're doing, while raising awareness for FreeBSD. Below is list of upcoming Calls for Participation.

LinuxFest Northwest 2018: April 28-29, 2018, Bellingham, WA

The Call for Proposals for LinuxFest Northwest 2018 is now open. The

organizers are looking for proposals for presentations, long presentations, tutorials, short tutorials, and BoFs. Proposals should fit in one of the 7 tracks: BAIRS, Code, Education, Humans, Infrastructure,



PostgreSQL, and Security.

Submission Deadline: January 31, 2018

Find out more [here](#).

OSCON 2018: July 16-19, 2018, Portland, OR

The Call for Proposals for OSCON 2018 is now open. OSCON provides groundbreaking companies, communities, and thought leaders in open source the opportunity to work together to create stronger projects and industries. In 2018, the focus of the conference is squarely on open source concepts and technologies that have begun to or have the potential to move entire industries forward.

Submission Deadline: January 30, 2018

More information, including a list of potential topics, can be found [here](#).

Grace Hopper Celebration 2018: September 26-28, 2018, Houston, TX

The GHC 2018 Open Source track provides an excellent opportunity to share your FreeBSD-related work. This year's open source software track will feature hands-on workshops designed to introduce new skills, build confidence, or deepen technical expertise. They are specifically looking for presenters with a range of experience to share from how to get started when you're new to open source to deeper dives into technical topics the audience may not find elsewhere.

Submission Deadline: March 7, 2018

More information, including a list of topics, can be found [here](#).

If you'd like to submit a proposal, but aren't sure how to get started, [contact us](#). We're here to help.

-- contributed by Anne Dickison

Google Summer of Code: Looking for Project Ideas

The FreeBSD Project has again applied to be a part of the Google



Summer of Code (GSoC) and we're looking for additional suggested projects. If you have ideas you think would be suitable for students to do during Summer of Code, you can either add them to [the wiki](#) or fill out the [google form](#).

Please remember that projects should take roughly 10-12 weeks of full time work for a student (including testing, documentation, etc). Ideally, you would also volunteer to mentor for your project. However, if you are not able to, please still send in your idea. While we may not be able to use every submission, the better our list of suggested projects, the more likely we'll be accepted into this year's GSoC.

Google Summer of Code is an excellent pathway for introducing new

people to the FreeBSD Project. Please submit your ideas today.

-- contributed by Anne Dickison

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