FreeBSD/arm64 is Now Tier 1

Arm’s 64-bit architecture, AArch64, is now Tier 1 status in FreeBSD 13. Following from the 32-bit FreeBSD/arm we use the name “arm64.”

Tier 1 means that the FreeBSD release engineering team will build and publish official releases for this architecture, in addition to the existing amd64 and i386. The security team supports the architecture with binary and source updates for vulnerabilities and errata updates. A full set of binary packages is available from the package team.

Arm publicly disclosed the details of the AArch64 architecture in October 2011, and Andrew Turner soon took an interest in a FreeBSD port. The FreeBSD Foundation began supporting the arm64 porting effort in 2014, with funding from Arm and Cavium. Collaborating with Andrew and Semihalf, Cavium’s ThunderX processor was brought up as the first reference platform for FreeBSD/arm64. The Foundation contributed work on release engineering, tool chain support, and other areas.

Support continued improving over the years, but it took a confluence of factors to allow for the promotion to Tier 1.

Early on Hardware availability was limited, especially for server class machines. Today Ampere Computing eMAG and Altra CPUs, Arm’s Neoverse N1 core, and AWS Graviton instances are well-supported. The Foundation purchased eMAG servers to build official package sets. Ampere Computing then donated additional servers. This allowed the project to support multiple simultaneous FreeBSD src and ports tree branches.

The tool chain was an early limiting factor. FreeBSD still used an older version of the GNU linker which did not support arm64, requiring awkward workarounds to use an out-of-tree linker. With Foundation sponsorship, the project migrated to using LLVM’s LLD linker for all support arm64. The Foundation contributed work on release engineering, tool chain support, and other areas.

Thanks to tireless contributions from FreeBSD ports volunteers we were able to iterate on arm64 build failures; over 30,000 packages are now available.

In April 2021 on behalf of the core team I announced that FreeBSD/arm64 would be Tier 1 in FreeBSD 13.

I hope you enjoy the arm64 articles in this issue, and give FreeBSD/arm64 a try!

Ed Maste
Senior Director of Technology
FreeBSD Journal Editorial Board