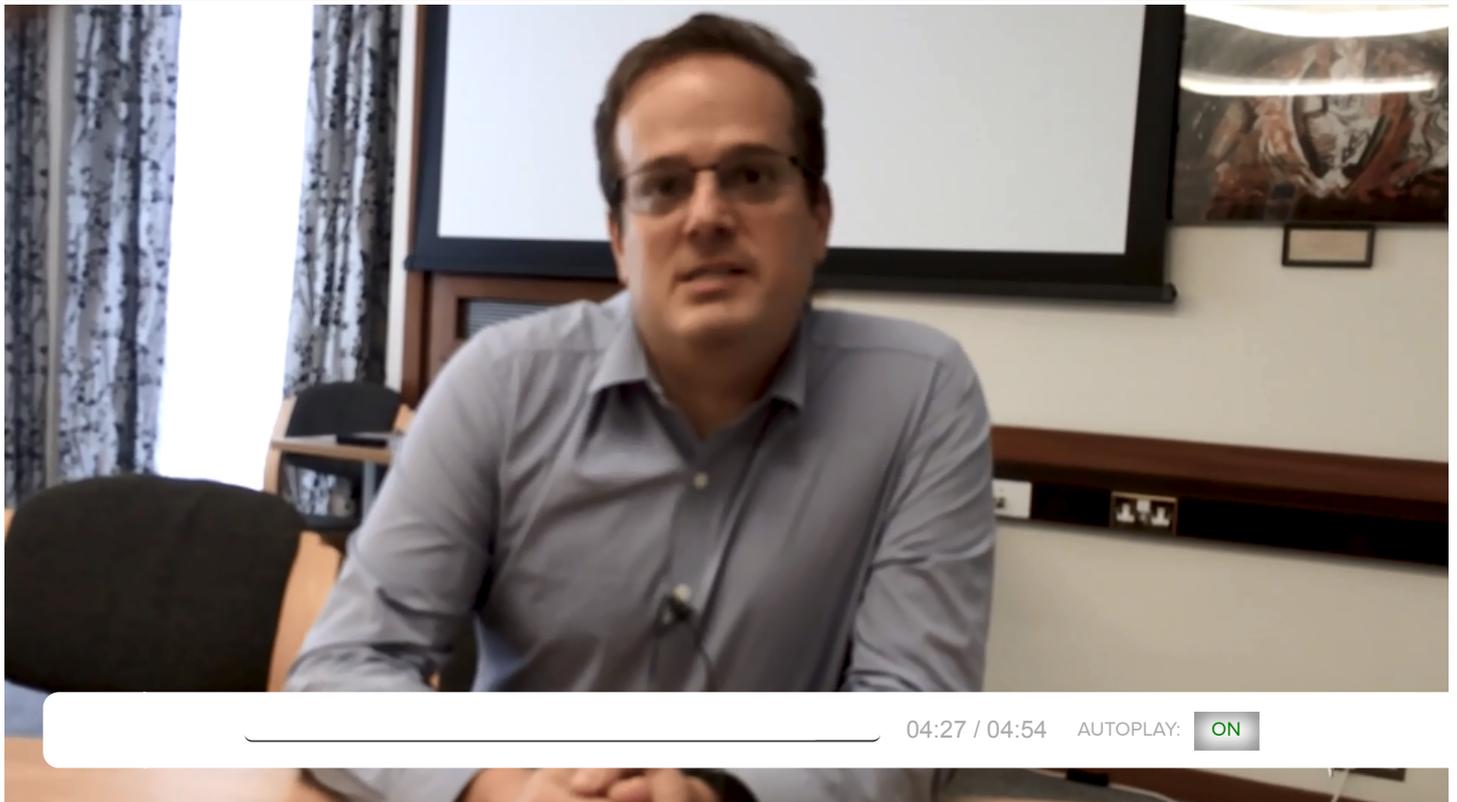


Cavium ThunderX2 getting significant performance boost as glibc optimizations inbound

By **James Sanders**  in **Hardware**  on May 6, 2019, 6:59 AM PST

The GNU/Linux ecosystem is embracing Arm-based server processors, as challenges to Intel's hegemonic control of enterprise compute increase.



Optimizations are coming to the GNU C Library (glibc) for **Cavium's ThunderX2 Arm-powered server CPU** (<https://www.techrepublic.com/article/caviums-thunderx2-is-an-arm-chip-for-servers-that-could-be-a-good-fit-for-hpc/>), as a recent commit changes the behavior of **MEMMOVE** (<http://man7.org/linux/man-pages/man3/memmove.3.html>) in glibc 2.30, expected for release around the start of August. The commit, according to Cavium developer Steve Ellcey, provides improvements of "about 20-30% for larger cases and about 1-5% for smaller cases," and uses "SIMD load/store instead of GPR for large overlapping forward moves."

Differences in how SIMD (Single Instruction, Multiple Data) instructions are handled

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A post in 2018 about optimizing jpegtran (<https://blog.cloudflare.com/neon-is-the-new-black/>) indicates the program was 1.3x faster in NEON than a comparable Xeon after optimization, though was only about half as fast as the same Xeon for the unoptimized program. This optimization process involves NEON instructions, and how gcc handles intrinsics on Arm.

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Other optimizations in the update, noted by Linux performance benchmarking website Phoronix (https://www.phoronix.com/scan.php?page=news_item&px=Thunder-X2-memmove-glibc-2.30), include fixes to MEMCPY for overlapping backward moves, and using the existing version for smaller moves, as well as simplifying loop tails, using "branchless overlapping sequence of fixed length load/stores, instead of branching depending on the size," according to Ellcey.

The ThunderX2 is a 64-bit, ARMv8 CPU available in a variety of differing SKUs, from 16-core/1.6 GHz to 32-core/2.5 GHz, with eight DDR4 controllers for 16 DIMMs per socket, allowing for up to 4 TB of RAM in a dual-socket setup. Many ISVs offer ThunderX2-based solutions in a "4U in 2U" architecture, allowing for four dual socket servers in a 2U chassis, for increased compute density. ThunderX2 is also used to power the [Mont-Blanc supercomputer](https://www.montblanc-project.eu/) project.

While this specific fix is targeted to the ThunderX2, increased visibility of Arm-powered CPUs is important for the health of the Arm ecosystem for enterprise computing. Amazon, through the purchase of Annapurna Labs, designed and released [Arm-powered Graviton servers for AWS](https://www.techrepublic.com/article/aws-graviton-brings-arm-servers-to-public-cloud-for-the-first-time-heres-how-to-get-started/) (<https://www.techrepublic.com/article/aws-graviton-brings-arm-servers-to-public-cloud-for-the-first-time-heres-how-to-get-started/>). [challenging](https://www.techrepublic.com/article/faq-what-arm-servers-challenging) (<https://www.techrepublic.com/article/faq-what-arm-servers-challenging>)

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aims-to-bridge-the-arm-developer-gap-with-a-16-core-workstation-board/), which is an accessible platform to test and optimize applications.



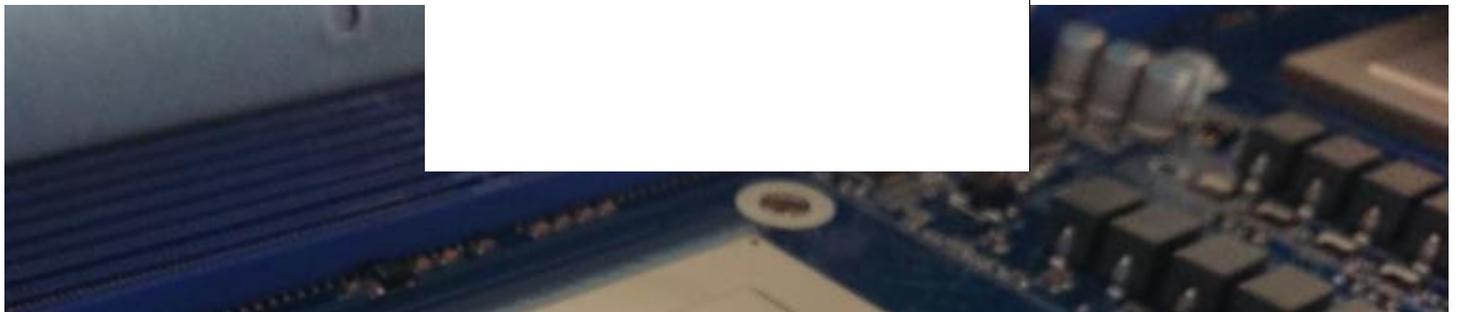
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