

PRESS RELEASE

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Axiado's processor architecture without Meltdown & Spectre vulnerabilities and performance penalties

SAN JOSE, California, November 29, 2018—Axiado today announces a deterministic in-order processing for its firewall processor architecture, delivering high performance without compromising security.

Current high-performance processor architectures use out-of-order processing, exposing digital systems to critical hardware vulnerabilities like Meltdown and Spectre. After-the-fact patches to those vulnerabilities significantly diminish processor performance. Axiado's firewall processor architecture does not have a performance downside from in-order processing due to its efficiencies of intercore- and interprocessor-communication.

Out-of-order processing was introduced in the late 1990s as a response to market expectations of continuous performance enhancement. While offering a potential performance gain of up to 15 percent, out-of-order processing and related predictive execution (speculative branching, speculative caching, and cache dumping by OS debugger) left systems vulnerable to cyberattacks.

"In totality, our processor outperforms existing processors that use out-of-order processing because our OS makes a better use of all cores and accelerators that take care of most computationally intensive programs and subroutines," said Axel Kloth, founder and CTO of Axiado.

According to John Gustafson, inventor of Gustafson's Law of Parallel Speed-Up, former Director of Research at Intel Labs, and Senior Fellow of AMD, "A lot of companies have discovered that things like out-of-order execution, and all these other tricks that processor companies have done to improve performance, are full of holes and allow people to penetrate and abuse the systems." Attempts to remedy these vulnerabilities by software patching diminishes processor performance, resulting in incomplete security and zero gain in processor performance.

Nick Tredennick, developer of Motorola's MC68000, AMD's Nx686, and IBM's Micro/370 processors affirmed, "Out-of-order execution within the current CPUs requires speculative execution, speculative branching, and speculative caching. These caching and aging algorithms are very complex and highly

prone to error, causing high latency for cleanups. An in-order processor does not have this challenge, and the remaining issue of per-core performance can be mitigated using other methods.”

“The most valuable thing that a company can do is to protect individuals and make sure that their sensitive information is not exposed on the internet,” said Ashok Babbar, CEO of Axiado. “Our response to the need for uncompromised security is a processor architecture that employs in-order processing that is immune to the vulnerabilities of all other processors today without giving up high performance. Our processor architecture has been specifically designed to protect itself and other processors from known and unknown cyberattacks at the first point of intrusion. We believe this technology is invaluable to network systems companies who want to deliver impenetrable firewalls with high performance to their customers.”

See more about Axiado’s high-performance in-order processing at <https://axiado.com/hpiop/>

About Axiado

Axiado is a firewall processor company securing the digital infrastructure At the 1st Point of Intrusion™. By architecting both the computational and networking stacks, the company has developed the most advanced security platform from the ground up. Axiado’s security platform, comprising a secure microprocessor, firmware, OS kernel and APIs, is free from the attack surfaces that other processors and operating systems exhibit today.

Press kit available at <https://axiado.com/press/>

Discover more at <https://axiado.com> and follow us on Twitter at [security@axiado.corp](https://twitter.com/security@axiado.corp).

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