

ABSTRACT: The closed-source IP model in the processor community is proving to be a hindrance to build scalable solutions. A similar struggle in the software industry against closed-source IP led to the rise of the open-source Linux kernel in the 1990s. Since then the software community has seen a plethora of open-source software and tool-chains which have been adopted by industry and academia both. The hardware community, however, hasn't seen such a revolution yet and is probably in dire need of the same. An open-source processor ecosystem will not only boost customization but also allow bright minds of the industry and academia to collaborate and provide a stable and viable framework competent enough with modern-day products. Shakti, an open-source initiative by IIT-Madras (Indian Institute of Technology Madras) is primarily aimed at building such open-source processor development ecosystems which can equip the community with enough ammunition to build custom and industrial grade processors without the hassle of licensing, royalties or any other sort of restrictions.

Shakti today offers 2 stable processors based on the RISC-V ISA: the E-Class and the C-Class processors for mass consumption. These processors are capable of booting Linux, FreeRTOSs, bare-metal applications. Shakti also offers a wide range of device IPs like I2C, UART, DMA, AXI-4 Fabrics, QSPI, etc. Each of these IPs has been proven on FPGA and Silicon. SHAKTI also provides tools to accelerate the verification of processors. This talk will cover some of the offerings listed above and provide a quick highlight of where Shakti stands today and its future goals.

BIO: Neel received his Bachelor's degree (B-Tech) from the National Institute of Technology Warangal (NITW) in Electronics and Communication Engineering in the year 2010. By January 2012, he joined the Computer Science and Engineering Department at IIT-Madras (IITM) as a Direct Ph.D. Candidate. Neel was also the recipient of the TCS-PhD fellowship for 2 consecutive years and received his Ph.D. Degree in the last quarter of 2016. Since then Neel has been leading the technical team of the Shakti Processor Program and has recently co-founded InCore Semiconductors Pvt. Ltd. as well.