

The Next Level of Energy-efficient Edge Computing

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Arm and its partners continue to see ever increasing demands for at-the-far-edge computation, and a drive for increased signal processing and machine learning capabilities within microcontroller-based systems. In this presentation we will introduce the recently announced Armv8.1-M architecture, and its new M-Profile Vector Extension (MVE), which forms the foundation of Arm Helium™ technology. MVE delivers single-instruction multiple-data (SIMD) capabilities, more commonly associated with application type processors, but deployed in such a way as to retain the microcontroller fundamentals of low interrupt latency, low gate count, and very high energy efficiency. Yielding up to 5x the DSP and 15x the ML computation capability of a standard microcontroller, when combined with Arm TrustZone technology, Armv8.1-M delivers on the three key technologies for the next wave of embedded applications: System-wide security, DSP for signal conditioning and ML for decision making. The addition of MVE to the M-Profile architecture and future Cortex-M products enables the unification of efficient-compute and embedded-control onto a single processor architecture, removing the need for software writers to comprehend disparate toolchains, and offering increased portability of computational libraries between systems; as a result, this presentation aims to expose software writers and system designers to Arm's next level of energy-efficient edge computing.