High-throughput asynchronous datapath with software-controlled voltage scaling

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Abstract

We describe the development of a high-performance asynchronous micropipelined datapath that provides robust interfaces across voltage domains, performing appropriate voltage level conversions and operating between stages with fanout-of-four delays differing by almost two orders of magnitude. With software-specified throughput requirements, the power supply of the datapath is scaled from 2.5 V to 650 mV using an on-chip dc-dc conversion system that combines linear regulators and switched-capacitor power supplies.