Scale-Out Processors

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— **Abstract** —

Big data is revolutionizing the way we live, work, and socialize. At the same time, big data is taxing our compute infrastructure in unprecedented ways. In many domains, data expansion rates are dwarfing the pace of technology improvement as measured by Moore's law, challenging our ability to effectively store and process the data. Moreover, with the hardware industry hitting fundamental limits on its ability to lower operating voltages, energy requirements in big-data applications are skyrocketing. Sustaining the pressure of big data, and delivering on its promises, requires significant improvements in the efficiency of our compute infrastructure.

In this talk, I will focus on data-intensive online applications, such as web search and social networking. I will explain how the mismatch between application demands and existing processor architectures leads to significant inefficiencies at the datacenter level. I will then describe Scale-Out Processors, a processor design methodology and microarchitectural support for data-intensive online processing. By tuning the processor organization to the needs of the application domain, Scale-Out Processors improve datacenter performance by up to 7x within a fixed power budget versus state-of-the-art server processors.

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