Building Giga-Transistor [Enterprise] Microprocessors

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Abstract

Over 3 decades, since the introduction of the first microprocessor in 1971, Moore’s Law has propelled semiconductor technology along an exponential trajectory of integration. The advances, to date, in semiconductor technologies have enabled unprecedented opportunities in microprocessor development, realized only by overcoming daunting engineering challenges. Semiconductor technologies going forward, promise to continue the torrid pace of development – leading to Gigascale designs well before the end of this decade. The space of design opportunities is vast and the list of design challenges commensurately complex. The talk will highlight the salient features of the semiconductor developments to date – provide a glimpse of the anticipated developments and relate those developments to microprocessor design alternatives. To realize some of those alternatives, the numerous hardware and software engineering challenges that will need resolution will be developed. The axes for realizing ever higher levels of parallelism in mainstream server processors/platforms will also be presented.