FPGA Based High Performance Compute Platforms

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Since their invention Field Programmable Gate Arrays (FPGAs) have been experimented with and have been used to accelerate high performance applications on custom computing machines. Historically, the high cost of FPGAs and inability to perform massive computations on a single chip restricted their use to a narrow set of high-performance computing applications. With the introduction of FPGAs with multimillion gate capacity and process technology advancements, there has been significant increase in the FPGA compute efficiency. This increased compute efficiency of present FPGAs makes it a viable option to augment or even replace microprocessors in high-performance computing systems.

Though the compute efficiency of FPGAs is attractive compared to microprocessor, there are some hurdles to widespread deployment of FPGAs in high-performance computing systems; one being that of programmability. There is still a need for design methodologies and tools that enables ease of use of FPGAs in high performance systems.

This talk will present the current research activities in Xilinx Research Labs that is aimed at increasing the ease of programmability of FPGAs. Also, research in improving the compute efficiency of FPGAs will be presented.