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Abstract

Multi-FPGA Systems

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Multi-FPGA systems are a growing area of research. They offer the potential to deliver high performance solutions to general computing tasks, especially for the prototyping of digital logic. However, to realize this potential requires a flexible, powerful hardware substrate and a complete, high quality and high performance automatic mapping system.

The primary goal of this thesis is to offer a disciplined look at the issues and requirements of multi-FPGA systems. This includes an in-depth study of some of the hardware and software issues of multi-FPGA systems, especially logic partitioning and mesh routing topologies, as well as investigations into problems that have largely been ignored, including pin assignment and architectural support for logic emulator interfaces. We also present Springbok, a novel rapid-prototyping system for board-level designs.