

Mittrion Virtual Processor Mittrion Software Development Kit

Use FPGAs to Run Software 10 to 30 Times Faster Compared to CPUs

The Mittrion Platform by Mittrionics unleashes the massive performance benefits of hardware application acceleration long promised with Field Programmable Gate Arrays, FPGAs

Run faster

FPGAs allow you to run critical supercomputing applications up to 100 times faster compared to code executing on a CPU. With the Mittrion Platform you will be able to use familiar software development methodologies to quickly develop and modify your supercomputing solutions.

Develop faster

The Mittrion Platform lets you concentrate on application algorithms, not the complex details of implementing them in FPGA hardware. No other programming solution is designed from the ground up to address the challenges faced by scientists and software developers who are implementing supercomputing applications on a wide range of FPGA systems.

How is this supercomputing feat accomplished?

THE VIRTUAL PROCESSOR

The core of the Mittrion Platform is the Mittrion Virtual Processor, a fine-grained, massively parallel, configurable soft-core processor. Software written in the Mittrion-C programming language is compiled into a configuration of the processor. The configured processor is then downloaded and run in the target FPGA. The Mittrion Virtual Processor completely separates the software from the FPGA hardware it is running on. This allows a true high-level software approach to implementing computational algorithms on FPGAs. Compared to VHDL or C-based Electronic System Level (ESL) design tools, this means implementation at a fraction of the cost and time.

UNPARALLELED PARALLELISM

The exceptional acceleration is achieved through massively parallel execution at the most fine grained level of the algorithm. This is made possible by the unique features of the Mittrion Virtual Processor architecture.

The Mittrion-C programming language is an implicitly parallel programming language with syntax very similar to C. With Mittrion-C it is easy for programmers to write software that takes advantage of all the parallelism available from the Mittrion Virtual Processor.

The Mittrion Software Development Kit compiles Mittrion-C programs and configures a Mittrion Virtual Processor that is optimized to the FPGA surface, allocating processing resources where they are most beneficial for the specific algorithm. It also provides a graphical simulator and debugger that helps the programmer find performance bottlenecks in his algorithm.

TRULY RAPID DEVELOPMENT

Scientists and other users of computing intensive applications often need to modify algorithms or move them to other systems. The Mittrion Platform is designed to make updates and changes quick and easy. Mittrionics' development process helps reduce lead times to days or weeks rather than months or years so typical for hardware design based methods.

THE FUTURE OF FPGA-BASED SUPERCOMPUTING

The programming speed combined with outstanding performance and extremely low power consumption make the Mittrionics offering a uniquely flexible solution with unparalleled price-performance. With FPGA development continuing to outperform the development of conventional CPUs, the Mittrion Virtual Processor will increasingly offer unparalleled access to parallel performance and make supercomputing massively available.

Who will benefit from Mittrion?

Any scientist or other user with serious computational needs using regular CPUs who is frustrated by lack of speed, massive power requirements or the cost of building large clusters will benefit from the Mittrion Platform.

The Mittrion Platform is as applicable as any high level programming language like C, C++, Java etc and the areas of application are as varied. To date, the Mittrion Platform is successfully implemented for applications in as diverse environments as:

- Gene sequencing
- Image analyses
- Oil and gas exploration
- Industrial automation
- Financial simulations
- Weather forecasting



Product Details

SUPPORTED HARDWARE

The Mitrion Software Development Kit runs on Windows and Linux/UNIX platforms supporting Java Runtime Environment 1.4 or later.

The Mitrion Virtual Processor is currently supported for the following FPGA based systems:

- **Cray XD1™ Supercomputer**
- **Nallatech BenDATA™ PCI boards**
- **SGI RASC Technology™**

More systems are added continuously. Check the Mitronics web site, www.mitronics.com, or contact Mitronics' sales for the latest information (sales@mitronics.com).

PROCESSOR LICENSE

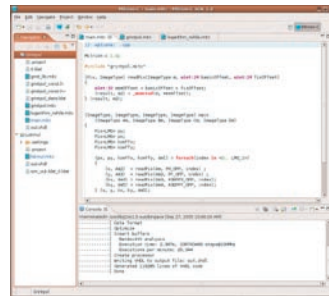
A Mitrion Virtual Processor License is required for each FPGA on which Mitrion Virtual Processors will be running. The license is either device-locked and valid for a single FPGA, or floating and valid for any FPGA belonging to the same system.

DEVELOPMENT KIT

The Mitrion Software Development Kit consists of a compiler, a simulator and debugger and a processor configurator. It is made available to all users with a valid Support, Maintenance & Updates agreement.



The Mitrion simulator and debugger uses a graphical interface to make it easy for the developer to find bugs and performance bottlenecks in the code.



The Mitrion Integrated Development Environment makes managing Mitrion-C projects a breeze

Support Services

The Mitrion Platform makes it easy for users with basic C-language skills to implement applications. To make sure that you are successful in this pursuit we assist users with the following services.

TRAINING

Mitronics offers regular training at our offices and on-site at our customers' request. Our one-day Basic Training gives an in-depth understanding of the Mitrion technology and how to make valuable use of the Mitrion Software Development Kit.

TECHNICAL SUPPORT

Technical support is available for customers with a valid license agreement for Support, Maintenance & Updates.

MITRION TEST-RUN

The Mitrion Test-Run implementation service offers fast answers on what performance increase to expect for any specific Mitrion-C algorithm. Included in this fixed price service is the work needed to take a tested and simulated Mitrion-C program through synthesis and place & route and run it on a Mitronics test platform. If iterations are needed, these are available at a reduced rate.

IMPLEMENTATION SERVICES

Mitronics also offers full implementation services including development of applications in Mitrion-C.

High Performance Reconfigurable Computing Partners

Mitronics works with industry leaders to provide superior standard platforms for FPGA-based algorithm acceleration. Together we deliver revolutionary computer power for your most critical applications. The Mitrion Platform supports turnkey FPGA-computer platforms from partners such as Cray, Nallatech and Silicon Graphics.

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The Mitrion Platform compared to VHDL or Electronic System Level (ESL) design tools:

	VHDL or ESL design tools	Mitrion
Typical application speedup	10-30 times**	10-30 times**
Application development time	Months or years	Days or weeks
Program without hardware considerations	No	Yes
Easily move applications to new platforms or FPGAs	No	Yes
Built-in support for floating-point numbers	No	Yes
Automatically find and utilize parallelism in software	No	Yes
Graphical simulator lets you visualize parallelism of software and find performance bottlenecks	No	Yes
Code efficiency: simple example adding two vectors	about 400 lines	7 lines of code
**Up to 100 times for some applications		



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