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Florida's Novo-G Uses Altera, GiDEL and Impulse C

Researchers demonstrate computing architecture that optimizes hardware for software

KIRKLAND, Wash., July 14 -- Altera, GiDEL and Impulse C are supporting Florida's Novo-G, being built at CHREC, the NSF Center for High-Performance Reconfigurable Computing. Novo-G will be the most powerful reconfigurable computing (RC) machine ever fielded for research. It links 24 PCI Express PROCStar III Gidel boards, equipped with 96 top-end Altera Stratix III FPGAs and 408GB of memory. These boards are hosted in 24 servers with 576 GB of memory and 20 Gb/s InfiniBand.

"Altera is pleased to have a long-standing relationship with the University of Florida and CHREC," said Stephen Brown, supervising architect of software and IP engineering at Altera Corporation. "As a leading research center for FPGA-based computing, CHREC provides valuable access to key research results, and is helping to advance the state-of-the-art in this important field. Altera remains committed to working in partnership with CHREC and its member institutions and looks forward to the possibilities created by FPGA-based computing."

The Novo-G project is led by Professors Alan George and Herman Lam. The project goal is to prove RC technologies at a level of scale, performance, and productivity unprecedented in this field, for applications from satellites to supercomputers. Novo-G is based on PCI Express GiDEL FPGA cards with Altera Stratix III FPGAs and huge banks of onboard memory for high sustained bandwidth.

"We are thrilled to see our 12 year vision turn into a reality," said Reuven Weintraub, founder and CTO of Gidel. "C language is used for data entry then data streaming and host communications are automatically generated. Thereby, Nova-G opens the door for many designers with no HDL knowledge to benefit from the high performance offered by FPGAs. We believe the Nova-G project will be an HPC milestone for new performance records while dramatically reducing power."

Major Novo-G component selection was prioritized towards reliable, easy to use, scalable elements. Emphasis was placed on achieving the widest design entry point. Accordingly C-based entry was specified. Within this criterion, Impulse C proved particularly accessible for non-hardware engineers. In one test, a student team used Impulse's automatic C to ModelSim test bench generator to expose three processes which got "stuck" checking for an EOS on the sequence stream. This was re-confirmed using Impulse's graphical stage delay analysis.

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Support for C programming of the GiDEL cards is enabled by an Impulse C Platform Support Package (PSP) developed by Rafael Garcia at the CHREC lab. Several scalable applications are being developed for Novo-G by CHREC researchers. A tomographic algorithm has also been shared by Professor Scott Hauck's University of Washington team.

Impulse C has a growing community of universities and corporate researchers creating portable, optimized, C-based FPGA designs. www.ImpulseC.com.

About Altera - Altera programmable solutions enable system and semiconductor companies to rapidly and cost-effectively innovate, differentiate and win in their markets. Find out more about Altera's FPGA, CPLD and ASIC devices at www.altera.com.

About GiDEL - GiDEL is one of the market leaders in cutting-edge reconfigurable technology utilizing FPGAs. Customers in military/aerospace, semiconductor, consumer product, machine vision, medical imaging and communications use GiDEL boards for SoC and ASIC verification, as COTS acquisition and accelerator boards, and to validate complex algorithms. www.gidel.com

About Impulse - Impulse provides software-to-FPGA solutions for embedded and high performance computing. Impulse is used by 8 of the top 10 government contractors, half the worldwide automotive manufacturers and by a wide range of medical, industrial and consumer processing designers. www.ImpulseAccelerated.com

About CHREC - the NSF Center for High-Performance Reconfigurable Computing (pronounced "shreck") is comprised of more than 30 leading organizations in this field from the academic, industry, and government sectors with synergistic interests and goals in reconfigurable, adaptive computing. www.chrec.org