SGI® RASC™ Technology

A Complete FPGA Solution for Orders-of-Magnitude Performance Improvement and Dramatic Application Speedup

System Highlights

- Provides orders-of-magnitude performance improvement and application speedup
- Tightly coupled integration with high bandwidth/low latency SGI® NUMAflex™ fabric for dramatic applications performance improvement
- FPGA access to globally shared system memory
- A complete solution stack for enhanced performance and ease of deployment
- Real time user configuration of FPGA
- Scalable to hundreds of reconfigurable nodes per system

Provides Orders-of-Magnitude Performance Improvement and Application Speedup

SGI® RASC™ technology, or SGI Reconfigurable Application Specific Computing technology, uses FPGAs (field programmable gate arrays) as peer attached reconfigurable programming elements, enabling users to develop application specific compute systems. For users whose applications spend a majority of their run time working on a set of specific algorithms, RASC technology can provide orders-of-magnitude performance improvement and application speedup. It is particularly beneficial when running data-intensive applications critical to oil and gas exploration, defense and intelligence, bioinformatics, medical imaging, broadcast media, and other data-dependent industries. This new reconfigurable computing technology is an add-in module that seamlessly operates with SGI's servers and visualization systems.

Tightly Coupled Integration with High Bandwidth/Low Latency SGI® NUMAflex™ Fabric for Dramatic Applications Performance Improvement

The SGI RASC module is connected directly to the SGI® NUMAlink™ 4 interconnect—the industry's fastest at 6.4GB/sec bandwidth and less than 1 microsecond MPI latency. This is different from the typical instantiation where an FPGA is in a co-processor model, with the FPGA available via an I/O bus or behind a CPU. The tight coupling with the NUMAlink interconnect means that the SGI RASC module has significant bandwidth advantages over competitors that drives dramatic applications performance improvement over traditional processors. SGI® NUMAflex™ architecture gives each FPGA access to globally shared system memory, meaning that there is no need to load and unload data when reprogramming the FPGA—resulting in faster system level reprogramming of the FPGA. Shared memory access also means that SGI RASC technology can provide virtually limitless levels of scalability, with configurations up to 128 NUMAlink/FPGA nodes in a single system image.

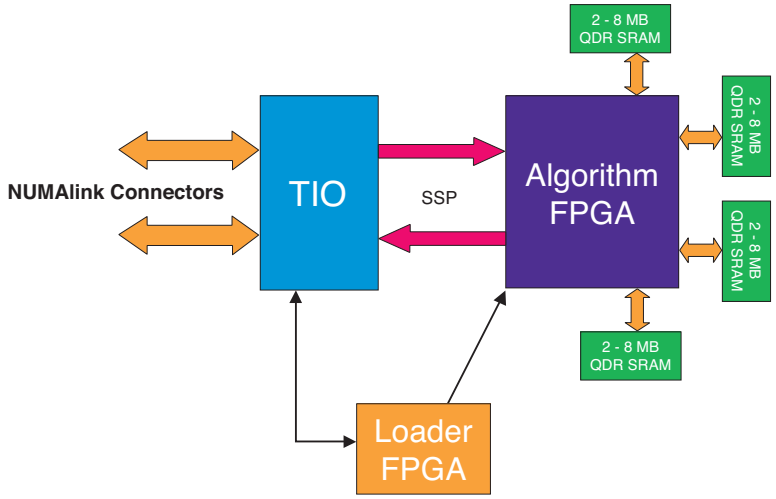
A Complete Solution Stack for Enhanced Performance and Ease of Deployment

One of the biggest challenges facing FPGA users is that FPGAs require specialized expertise for reprogramming and deployment. SGI RASC technology solution is specifically designed to overcome this challenge by providing a unique combination of capabilities aimed at both enhancing performance and optimizing ease-of-deployment, including:

- An FPGA-aware version of the GNU Debugger (GDB) built on the current GDB command set, allowing simultaneous debugging of both the application and the FPGA
- A RASC Abstraction Layer (RASCAL) that enables serial or parallel FPGA scaling
- RASC API and core services library that provides tools to develop reconfigurable computing elements in a multi-user, multi-processing environment
- Collaborative development with third-party HLL tool vendors to provide tools such as Celoxica Handel-C and DK Design Suite, Mitrionics Mitrion-C and Starbridge Systems Viva

Together, these capabilities allow RASC technology-enhanced instances of SGI Altix® servers and Silicon Graphics Prism™ visualization systems to speed computationally intensive applications up to hundreds of times over non-optimized systems.

SGI RASC Technology



Technical Specifications

- Dual NUMAlink 4 ports
- Xilinx® Virtex™ II-6000 FPGA
- 76,000 logic cells
- 16MB on-board QDR SRAM

Supported Systems

- SGI® Altix® 350 server
- SGI® Altix® 3700 Bx2 servers and supercomputers
- Silicon Graphics Prism visualization system

Advanced Features

- 6.4GB/s system bandwidth
- 6.4GB/s memory bandwidth
- Atomic memory operations
- SGI RASC library and core services

Software

Operating Systems (On Host Server)

- SGI Advanced Linux™ Environment with SGI ProPack™ software

RASC Software Bundle

- SGI's RASClib RASC library and Core Services

Dimensions and Weights

- 2U (3.5") H x 19"W x 26"D
- Weight 38 lbs

Environmental

Environmental (Operating)

Temperature

- +5°C to +35°C, altitude 5,000' MSL
- +5°C to +30°C, altitude 10,000' MSL

Humidity

- 10% to 90% non-condensing

Environmental (Non-operating)

Temperature

- -40°C to +60°C, altitude 40,000' MSL

Humidity

- 10% to 95% non-condensing

Electrical and Power

Voltage

- 100-240 VAC (North America/Japan and International)

Frequency

- 50 or 60Hz

Power requirements (max)

- .8 Amp @ 100V & 50 Hz (80 Watts)
- .5 Amp @ 240V & 60 Hz (120 Watts)

High Level Language Vendor Support

- Celoxica Handel-C and DK Design Suite
- Mitrionics Mitrion-C
- Starbridge Systems Viva

Ordering Information

• RASC-A1V26K	SGI RASC Technology
• SC5-RASC-1.0	RASC Software Bundle

Support and Services

SGI provides full support for SGI RASC technology and software. SGI Professional Services also offers services to implement and integrate RASC technology into your environment. For more information, please contact your SGI representative.

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