SGI® Altix® ICE: Achieving Breakthrough Performance Density for Scale-Out Computing

SGI® introduces SGI Altix ICE, a high density integrated blade platform that offers a revolutionary new approach to scale-out high performance computing (HPC). SGI Altix ICE provides breakthrough scalability, manageability, reliability, and price/performance without the compromises inherent in many traditional HPC systems. SGI Altix ICE drives performance density to a new level, creating an environment that can support critical high-throughput applications.

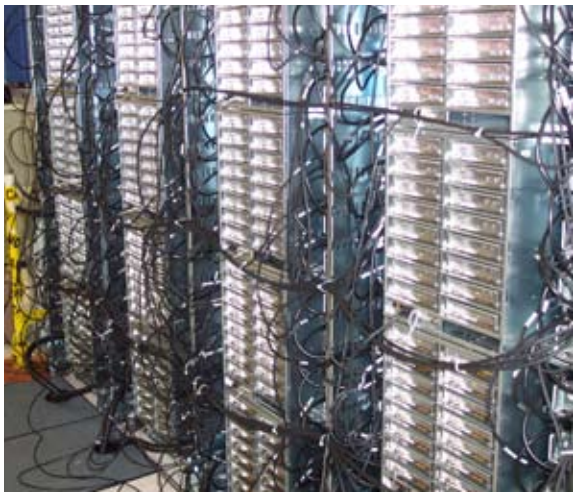
Today's Data Centers: No Room at the Inn?

Space is an issue of primary concern in today's data centers. Data centers are running out of room to house the compute resources necessary to support their organizations. This issue is particularly critical in the high performance computing, scale-out market, where high-throughput applications can require co-location of large numbers of compute nodes within a single data center. Even where space is available, HPC clusters often bump up against the data center's power and cooling limitations. An industry survey by Data Center Users' Group (http://www.datacenterug.org/) projects that 96 percent of existing data centers will run out of capacity by 2011.[1]

To deal with the crisis in the data center, SGI introduces SGI Altix ICE: a lean, integrated blade platform for scale-out computing.

Density – From Blade to Rack

The SGI Altix ICE blade has been designed with performance density in mind, all non-essentials pared away. The result is a highly dense platform, supporting up to 512 Intel® Xeon® processor cores per 42U rack. In raw compute power, this equates to 6 teraflops per rack. Despite this level of performance density, the fully loaded SGI Altix ICE rack stays within data center flooring constraints, with a footprint of 246 lb/ft.[2] Among its key features, the SGI Altix ICE blade has no onboard storage, instead employing diskless booting from the individual rack unit (IRU) level. This increases blade performance density but also improves reliability by eliminating a common point of hardware failure.



Power and Cooling Efficiency

Data center environmental constraints extend beyond space limitations to encompass electrical power and cooling. SGI Altix ICE uses power supplies rated at 90% efficiency in the transformation of electrical power from AC to 12VDC. The optional water-based cooling system nearly eliminates any impact on ambient data center temperatures by managing to dissipate up to 95% of the rack heat in chilled water – all the while achieving significant savings in power cooling costs. The SGI Altix ICE high efficiency cooling system, combined with the IRU blade enclosure's innovative thermal design, also enables higher overall performance density. Because of its unprecedented efficiency at cooling, SGI Altix ICE is able to provide the ultimate in performance density, but at the same time efficiently dissipate the heat generated.

Additional Performance Innovations

To further drive performance, SGI Altix ICE includes an impressive array of other performance-enhancing features in the areas of networking and integrated software.

The SGI Altix ICE compute network runs on 4X DDR InfiniBand for optimal network performance, with low latency and minimal hops. Further boosting throughput, management communications run across a separate GigE administrative network, segregated entirely from the InfiniBand compute network.

SGI Altix ICE also includes software innovations to address a key performance issue often encountered in parallel systems: operating system synchronization. An SGI-engineered software mechanism synchronizes operating system overhead – OS jitter and noise – to improve performance significantly on parallel workloads.

Capping the SGI Altix ICE performance story is its factory-integrated and tested software solution stack, while highly cost-effective also ensures maximum manageability and utilization of compute resources.

Manageable Scalability

The SGI Altix ICE design supports scale-out computing, from single IRU 16-blade configurations all the way up to massive configurations of racks networked together. A hierarchical approach to system management, with management functions split across the blade, IRU, rack, and system levels, simplifies the scaling and management of platform functions. The platform's integrated blade approach, with all InfiniBand and switches onboard the IRU, also makes it easy to scale systems to whatever level necessary. SGI Altix ICE requires only minimal cabling to network multiple IRUs and racks, avoiding the cabling nightmare inherent to many cluster platforms. A fully loaded 512-core rack requires just 24 cables total, reducing cost, complexity, weight, and usage space.

Bottom Line Advantage: SGI Altix ICE Sets the Bar for Performance Density

SGI Altix ICE achieves a new level of performance, density, and scalability for HPC scale-out applications. It rolls back the crisis in the HPC data center, providing support for new levels of scale-out configurations in critical application areas like bioinformatics, media render farms, and high-throughput CAE.

About SGI

SGI is a leader in high-performance computing. SGI delivers a complete range of high-performance server and storage solutions along with industry-leading professional services and support that enable its customers to overcome the challenges of complex data-intensive workflows and accelerate breakthrough discoveries, innovation, and information transformation.

SGI helps customers solve their computing challenges, whether it's enhancing the quality of life through drug research, designing and manufacturing safer and more efficient cars and airplanes, studying global climate, providing technologies for homeland security and defense, or helping enterprise manage large data. With offices worldwide, the company is headquartered in Sunnyvale, California, and can be found on the Web at www.sgi.com .

1) Bob Bauer, Emerson group vice president and Liebert Worldwide president, previewed the results of a survey conducted by the Data Center Users' Group during his keynote address at Emerson's AdaptiveXchange 2006™ (pr dated 11-16-06). See http://www.liebert.com/bottom_news2.asp?id=2386 .

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