FLOMERICS
Pioneering Design-Class Analysis

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News Release
For Immediate Release

Thermal Simulation Helps Silicon Graphics Keep Its New Supercomputer Cool

(August 25, 2005) -- As today's leading high performance computing companies continue to pack many more processors into smaller boxes, it becomes critical to get the heat they generate out of the box as quickly as possible. Otherwise, critical integrated circuits will be fried in nanoseconds. Furthermore, it's important to identify and solve these kinds of thermal problems early in the design process in order to avoid any delays that might allow a competitor win the race to market.

Silicon Graphics (NYSE: SGI) faced these challenges when they developed their new SGI® Altix® 3700 Bx2 supercomputer, which supports 64 Intel® Itanium® 2 processors per rack. The Bx2 includes a new NUMAlink™ 4 Router ASIC (application specific integrated circuit), that doubles the flow of information between processors with latency under 1 microsecond – the best interconnect performance in the industry. SGI Altix supports more than 2.5x the memory bandwidth of the nearest RISC-based system and scales to as much as 24 TB of globally addressable memory, making it possible, for example, for Boeing to simulate an entire airframe at one time.

But, the Bx2 dissipates up to 1000 watts of power within each 28 inch by 17.5 inch by 7 inch brick, or modular physical packaging unit. Imagine 10 100 Watt light bulbs burning inside each of the enclosed bricks. Without a way to move the heat quickly out of the brick, component temperatures would quickly reach hundreds of degrees Celsius, creating significant risk of system malfunction. Before they could bring this awesome product to market, SGI engineers had to figure out a way to keep all the components cool.

They turned to Flomerics' Flotherm thermal simulation software, which delivers a better than 50% market share in the increasingly critical area of managing the heat generated by electronic components. SGI engineer Rick Salmonson built Flotherm models of the brick, three high performance axial fans, and the electronic components, which are lined up edge-on to the fan to improve airflow. Salmonson used Flotherm to simulate the flow of air and heat through the brick, making it possible to determine the temperature of each critical semiconductor junction with an accuracy of a few degrees.

Flotherm software from Flomerics reduces the time and skill required to simulate complicated electronics cooling problems, because it is specially designed for them. Flotherm provides tools that allow users to assemble models from libraries, avoiding the need to create them from scratch. It provides an abundant supply of thermal model libraries for existing components. Flotherm provides an environment that enables fast, automated design studies. In conjunction with other Flomerics products, Flotherm makes it possible to address other interrelated performance issues such as electromagnetic compatibility, reliability and stress in a concurrent fashion.

For the processor and the router ASICs, Salmonson simulated many different designs of heat sinks, devices that channel heat from the electronic components into the air where it can be removed from inside the chassis by the fan. By trying many different designs in software before a prototype of the bricks had even been built, Salmonson was able to determine the ideal design for each of the components. He found that a 49 mm tall solid copper heat sink worked perfectly for the processors, while a 41 mm aluminum heat sink was just right for the ASICs. The end result was that the company beat competitors to market with a product whose impeccable reliability matches its blazing performance, gaining an important competitive edge.

For more information, visit Flomerics' Web site at
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