# SGI Government Solutions at Work


## Large-Scale Systems at New Mexico Computing Applications Center, NASA, and Idaho National Laboratory Deploy in Days

Just months after its introduction by SGI several new clusters incorporating the new SGI® Altix® ICE blade platform appear prominently on Top 500's latest ranking of the most powerful computers on Earth. The Top 500 list was announced at Supercomputing 2007 and among the latest entrants:

- A 14,336-core, 28TB SGI Altix ICE system, acquired by state of New Mexico for the New Mexico Computing Applications Center, earns the No.3 spot on the Top 500 list. One of the world's largest systems dedicated to non-confidential projects, the new supercomputer is the largest Altix ICE system purchased to date, and will fuel scientific and engineering breakthroughs both for private industry and public research institutions. The acquisition is part of an economic growth initiative spearheaded by New Mexico Governor Bill Richardson.
- At NASA Ames Research Center, a 4,096-core, 4TB SGI Altix ICE system was up and running in only eight days. Ranked No. 34 on the Top 500 list, the system serves NASA's Aeronautics Research Mission Directorate, supporting research in fundamental aeronautics paving the way to transform America's air transportation system and to support the design of future air and space vehicles.
- In just a day and a half, engineers at Idaho National Laboratory (INL) completed the initial installation of a 2,048-core, 4TB Altix ICE cluster. INL researchers will be using the system to run a range of applications such as computational actinide chemistry, Monte Carlo and deterministic radiation transport, computational fluid dynamics, subsurface flow modeling, and multiphysics modeling. The INL system is ranked No. 64 on the Top 500 list.

## DoD's 'HAWK' Takes Off On Schedule; SGI Altix System Runs Application on 9,000 Cores in Acceptance Tests

**Only Weeks After System's Delivery, Researchers Show Mettle of Defense Department's Largest Computer**
"HAWK," the largest and most powerful computer in the Department of Defense (DoD), has achieved new heights of application scalability for a DoD system by running a single application across 9,000 processor cores. More significantly, the feat was achieved only a few weeks after the system was delivered.

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An SGI® Altix® 4700 system from SGI, HAWK was successfully deployed ahead of schedule at the Aeronautical Systems Center Major Shared Resource Center (ASC MSRC) at Wright-Patterson Air Force Base. The supercomputer is powered by 9,216 Intel® Itanium® 2 processor cores and features 20TB of globally addressable memory and 440TB of usable disk space.

The application-scaling breakthrough was achieved using advanced software codes that study the characteristics of turbulence. A combination of Lattice Boltzmann and quantum turbulence codes were run on HAWK over a period of several weeks – a number of them utilized all available 9,000 cores. Work on the new system includes the study of turbulence that occurs at very low temperatures, could have several real-world implications, such as helping U.S. Government officials detect the presence of the underground tunnels used to illegally cross the U.S.-Mexico border.

## SGI and FedCentric Technologies LLC Announce Memory-Centric Database (MCDB) Accelerator Solution

**MCDB Accelerator Outperforms Disk-Based Systems by as Much as 10 Times, While Consuming Less Power and Less Space**
Companies needing business analysis for applications such as revenue protection, social network analysis, fraud detection, Web analytics, biometrics, RFID and complex event processing can now achieve at least an order of magnitude improvement in application performance with a landmark, memory-centric, energy-efficient computing solution from FedCentric Technologies, an SGI and Oracle Value Added Reseller. The FedCentric MCDB Accelerator solution was demonstrated at Oracle OpenWorld, in November in San Francisco. Powered by SGI® Altix® 4700 or SGI® Altix® 450 servers, the FedCentric MCDB Accelerator solution uses in-memory database technology to provide significant improvement in response time and throughput over traditional disk-based systems.

## SGI Builds World's Largest FPGA Supercomputer, Boosts Nucleotide Query Performance by More Than 900 Times Over 68-Node Cluster

**Unveils RC200 Blade to Bring FPGAs to Xeon-Class SGI System**
In November, SGI announced it built the world's largest Field Programmable Gate Array (FPGA) supercomputer configuration and ran a broadly used bioinformatics application more than 900 times faster than the same application would run on a traditional cluster.

SGI's reconfigurable supercomputer featured 70 FPGAs, more than any single system built to date. SGI's FPGA supercomputer accelerated the performance of a complex BLAST-n query by more than 900 times, completing in less than 33 minutes what took a 68-node Opteron-based cluster approximately three weeks to finish. The application matched 20 nucleotide base pairs against 600,000 queries. SGI configured the system using only off-the-shelf components, including its SGI® RASC™ (Reconfigurable Application Specific Computing) appliance for bioinformatics—Featuring Mitrion™-Accelerated BLAST-n. No hardware or software was modified for the test

## Minnesota Supercomputing Institute Targets More Interactive Research with New SGI Cluster

**Mounting Demand for More Processors Prompts World-Class Facility to Upgrade Infrastructure with 2,048-Core SGI Altix XE Cluster**
On any given day, hundreds of researchers may vie for access to the computing systems housed at the University of Minnesota Supercomputing Institute for Digital Simulation and Advanced Computation. Even with some 2,000 processors at its disposal, the institute has sometimes struggled to keep up with growing demand.

Now, a massive new cluster solution from SGI will help ensure that current and emerging generations of processor-hungry applications won't slow down Minnesota scientists and engineers.

The 2,048-core SGI® Altix® XE 1300 cluster will transform the familiar submit-and-wait research experience into a vastly more interactive and productive one. By distributing complex applications across hundreds or thousands of the Altix XE cluster's processors, researchers will be able to complete calculations faster, run more iterations of a problem in less time, and refine their conclusions more quickly and effectively than ever before.

Outfitted with more than 4 terabytes of memory across 256 compute nodes, Minnesota's new Altix XE cluster will drive research in physical, biological, medical, mathematical and computing sciences, in addition to engineering studies and academic-industry collaboration.

## Naval Surface Warfare Center Selects SGI Altix for Modeling of Warhead Impact

**SGI High Performance, Shared Memory Technology Deliver Enhanced Insight into Predicted Target Damage**
When scientists and engineers at the Naval Surface Warfare Center (NSWC) in Indian Head, Maryland needed to ensure they could make reliable, qualitative predictions regarding the vulnerability and survivability of targets for U.S. Navy warheads, they turned to SGI for a solution.

To obtain accurate assessments of predicted target damage, the NSWC required a high performance server that would allow them to conduct large three dimensional computations for faster 3D analysis of explosive systems. The group found such a system in the SGI® Altix® 4700.

The new Altix system, with its enhanced memory capacity and parallel processing capabilities, was selected after demonstrating its capability to handle the data intensive application's demanding computational fluid dynamics (CFD) and finite element requirements. Running on industry standard SUSE® Linux Enterprise Server 10 fro Novell®, the new system also features 28TB of RAID storage in two SGI InfiniteStorage 220 direct attached systems for data consolidation.

For more information on these and other interesting SGI news and customers visit the SGI Newsroom at *http://www.sgi.com/company_info/newsroom/*

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