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GA Tech Accelerates Drug Discovery with IBM Supercomputing Cluster

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Description

IBM and the Georgia Institute of Technology today announced that one of the world's most powerful supercomputing clusters will anchor Georgia Tech's new Center for the Study of Systems Biology.

Newswise — IBM and the Georgia Institute of Technology today announced that one of the world's most powerful supercomputing clusters will anchor Georgia Tech's new Center for the Study of Systems Biology.

The Center will use IBM technologies to advance research into new drugs for the treatment of some of today's most life-threatening diseases, including cancer. The Center's research will be headed by one of the world's leading systems biologists, Dr. Jeffrey Skolnick, the Georgia Research Alliance Eminent Scholar in Computational Systems Biology.

Funded by $8.5 million in grants from the State of Georgia, the Georgia Research Alliance and the National Institutes of Health, the new Center for the Study of Systems Biology merges Dr.Skolnick's biomedical research expertise with IBM's high-performance computing capabilities to create a brand new supercomputer. The new supercomputing cluster running Linux will be among the fastest in the world, and one of the most powerful among research universities in the Southeastern United States. The cluster is hosted by BellSouth's world-class facilities in Midtown Atlanta.

"By using IBM technology for our research, we can significantly shorten the time to market for new drugs," said Dr. Skolnick. "Systems biology integrates mathematics, physics, chemistry and biology with advanced, high performance computing and engineering. Bioinformatics and systems biology allow us to utilize the vast information growing out of the sequencing of the human genome, enabling drug developers to reduce the number of compounds they must screen by a factor of 10."

The 1000-node Cluster 1350 system built on IBM BladeCenter® systems and powered by dual-core AMD Opteron™ processors is capable of performing more than 8.5 trillion calculations per second, which would place it as the world's 41st most powerful supercomputer based upon the November 2005 TOP500 list (http://www.top500.org) of supercomputers. The system performance and scalability will offer students and faculty the ability to quickly and accurately analyze complex DNA and proteins to determine the biological and chemical processes of human cancer genes and proteins, to aid in the

development of more targeted drugs to treat such diseases.

“Universities today are looking for the fastest, most innovative and cost-efficient systems to help their intellectual communities translate the research they generate into viable information for the commercial market,” said Doug Balog, vice president, IBM BladeCenter. “With the Cluster 1350 system based on the AMD Opteron LS20 IBM BladeCenter, students and faculty of Georgia Tech are gaining the processing power and system resources they need to make more accurate decisions in research and raise the profile of the Institute among the nation’s most elite research facilities.”

“Only the most technologically savvy universities are able to compete in the field of drug discovery and bioinformatics,” said Mike Cassidy, president and CEO of the Georgia Research Alliance. “Georgia Tech’s focus on top-of-the-line technology and research facilities and the attraction of Dr. Jeff Skolnick and other world-class scholars will raise its presence in this competitive market and attract some of the nation’s brightest students to join our research team to advance medicines that will improve the well-being of people everywhere.”

BellSouth worked closely with Georgia Tech and IBM to design a unique, reliable hosting environment to support the high power density supercomputing cluster.

“With our hosting background, we had the flexibility and experience to quickly create a one-of-a-kind solution that could support Georgia Tech, IBM and the supercomputing cluster that will power the groundbreaking research of Dr. Skolnick,” said Bill Smith, BellSouth’s Chief Technology Officer.

The new supercomputer, capable of a peak performance of more than 16 TeraFlops, consists of a cluster of 1,000 AMD Opteron processor-based LS20 nodes for IBM BladeCenter systems (total of 4,000 core processors) running Red Hat Linux 4 on the infrastructure nodes and Scientific Linux on the compute nodes. The supercomputer forms the basis of the IBM Cluster 1350, a pre-packaged and tested super-cluster that is ultra-dense and easy to manage.

“AMD64 technology delivers the processing power needed to run some of the most demanding supercomputers, without sacrificing performance-per-watt efficiencies,” said Kevin Knox, vice president, Worldwide Commercial Business, AMD. “By working closely with IBM on their AMD Opteron processor-based BladeCenter cluster, we feel confident that researchers at Georgia Tech will be better equipped to execute against demanding timelines and ultimately help bring critical drugs and research to market even faster.”

The technology from IBM also includes 28 terabytes of IBM DS4800 storage and 20 terabytes of IBM DS4100 storage to house the large volumes of research data and provide a disaster recovery backup. Force10 TeraScale E-Series family of switch/routers are also integrated into the IBM BladeCenter cluster to provide resilient interconnectivity enabling predictable cluster performance and scalability that will allow Georgia Tech to seamlessly expand its cluster.

“Network resiliency is key to ensuring computing cycles are not interrupted and that researchers gain the reliable computing power they need to efficiently analyze massive amounts of data,” said Marc Randall, president and CEO at Force10 Networks. “IBM has taken its leading server technology and combined it with our leading switch/router in a single high performance cluster solution to provide organizations like the Center for the Study of Systems Biology with the computing power they require to for advanced scientific research.”

Also included with the solution is IBM Rear Door Heat eXchanger (code named "Cool Blue,") a technology component that can use the existing chilled water supply for air conditioning systems already located in the majority of customer datacenters to reduce server heat emissions into the room by up to 55 percent. Georgia Tech has deployed “Cool Blue" on 12 racks, reducing noise and easing the burden on existing air conditioning units. The Rear Door Heat eXchanger can reduce first-time installation costs by as much as 40 percent while lowering energy costs by almost 15 percent.

The cluster solution helps increase the overall performance of the Center’s datacenter while lowering its total cost of ownership. The speed and flexibility of the systems also reduce the time it takes to complete research projects, allowing the Center more time to

explore new commercial opportunities in the fields of pharmaceutical science and healthcare.