

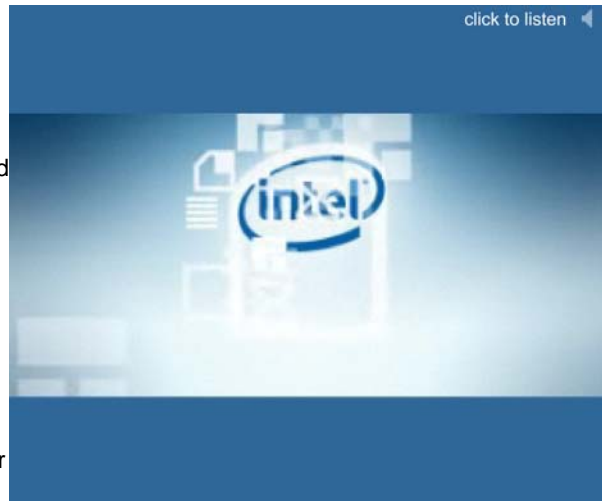
## Can supercomputers help save the economy?

### Universities, state officials push to broaden corporate access to high-performance systems

[Patrick Thibodeau](#) 01/12/2008 07:15:00

President-elect Barack Obama will soon outline an economic stimulus plan that likely will include billions of dollars for infrastructure projects, such as roads, bridges and new schools. Obama also is hearing calls for new funding to improve the information infrastructure and the virtual highways it runs on, and to broaden access to high-performance computing (HPC) systems.

Thus far, the use of supercomputers to increase the industrial might of the US has amounted to little more than an asterisk from a financial standpoint in both the federal budget and the economy as a whole. Market research firm IDC estimates that the public and private sectors spent a combined total of just over US\$10 billion on HPC systems last year.



To provide some perspective, consider this: since September, the US government has spent US\$150 billion to keep insurer American International Group afloat. Meanwhile, HPC resources are inaccessible to many companies that could benefit from using the technology.

On the surface, all looks well with HPC. US federal agencies continue to fund the development of massive systems, such as IBM's Roadrunner, which this year became the first machine to break through the [petaflop performance barrier](#). Cray's XT5 Jaguar, another system bought and paid for by the government, also topped the petaflop mark this month and was [neck-and-neck with Roadrunner](#) on the latest [Top500 list](#) of the world's fastest supercomputers.

Supercomputers provide something akin to a Second Life for engineers. Instead of building physical models of new products, HPC users can create them in virtual environments and then use the supercomputing horsepower to test how the products work and change design elements and materials as needed. That can cut weeks or even months off of the design and testing process, potentially giving a company a critical edge over its competitors.

But there's a problem in getting HPC capabilities into the hands of companies that create jobs. Thousands of businesses could conceivably make use of the systems, but many can't afford them -- leaving HPC's economic potential largely unrealized.

That has prompted some universities and academic institutions to launch programs under which they provide companies with access to high-performance systems as well as technical help. One such approach is being tested by the Ohio Supercomputer Center (OSC) in Columbus and the Edison Welding Institute (EWI), a nonprofit organization that does research and consulting work on welding processes and technologies.

Last fall, the EWI, which is based in Columbus, began a beta program that makes a Web-based user interface available to welding engineers at its client firms. The institute's software lets the engineers input a wide range of data related to the joining of various materials. The data is run on a supercomputer at the OSC, and the engineers can view simulations that show how certain welds will work. The program gives companies access to HPC resources via a browser, with no programming required.

The EWI is building modules to address specific industrial needs, but it has no interest in running its own HPC systems. "Our business is welding technology, not operating supercomputers," President and CEO Henry Cialone said, adding that the institute eventually will develop a revenue-sharing program with the OSC.

Cialone said that in his view, US industries are just scratching the surface on the use of HPC-based simulation modeling technologies. "We can enhance the competitiveness of manufacturing in the US with tools like this," he claimed.

The state of Indiana is also trying to help boost HPC use. Last March, Indiana University and Purdue University, along with the state government, announced a project to make 20 teraflops of computing capacity on an IBM system available to Indiana businesses. So far, the companies that have taken advantage of the HPC program are primarily in the pharmaceutical and automotive industries, which already know what high-performance systems can deliver to users.

Brad Wheeler, CIO and vice president of IT at Indiana University, thinks that offering supercomputing as a shared utility to companies makes a lot of sense because it can provide them with standardized software packages as well as the means to host their application code and help in parallelizing it. The initial steps involve corporate legal counsels checking to ensure that proprietary research will be safe on a shared system. But once that bridge is crossed, "you start to see a lot more acceleration in its use," Wheeler said.

The role that HPC technology can play in developing new economic opportunities was illustrated in August, when Louisiana State University and the Louisiana government announced an agreement to open a quality assurance center with Electronic Arts Inc., a Redwood City, Calif.-based developer of computer games and other interactive entertainment software. The announcement followed the development of a digital media academic program that includes increased research in visualization on HPC systems.

Stacey Simmons, associate director of economic development at LSU's Center for Computation & Technology, said the state wants to build a visual-media economy. "We really wanted something that was an economic engine," Simmons said. But first, it was important to develop a computing, software and networking environment that can support that kind of economic activity, she added.

#### [Cloud computing](#)

offers another way to gain access to HPC resources, and researchers at Rice University in Houston have used Amazon.com's Elastic Compute Cloud, or EC2, service. But access to computing capacity is only one aspect of the problem. Applications and codes have to be adapted to run in parallel environments, and there is a need for people with the skills to make that happen, said Charles Koelbel, a research scientist at Rice.

The university is trying to make training in parallel programming as affordable and accessible as possible. As part of that effort, Rice is developing books that can be downloaded online, partly through a competition that challenges people to write about various parallel computing topics. A number of companies are backing the contest, including Chevron, Sun Microsystems and Nvidia. "These firms really need to have good people to help them do scientific computing," Koelbel said.

Gerry McCartney, Purdue's CIO and vice president of IT, said that until recently, investment banks were hiring virtually all of the college graduates with computer modeling skills. But, he added, communities of interest are now organizing and collaborating in other areas as well. For instance, Purdue has a Web 2.0 site called Hubzero.org that can be used to create scientific research communities with access to technical resources, including research algorithms and interactive simulation tools.

"We need to remember what made this country successful in terms of technology," McCartney said. "It was aggressive adoption of technology."

Earl Joseph, an IDC analyst who spoke at the SC08 supercomputing conference in Austin last week, said competitive

concerns are one of the reasons that HPC use is growing. Joseph warned attendees that manufacturers in Asia are using HPC systems to develop products, a move that he said is already hurting some US companies.

IDC has been forecasting that the HPC market would grow at an average annual rate of 9 percent over the next four years, to more than US\$15 billion in revenue. But the firm is revising that estimate based on the current economic conditions and their [likely affect on IT spending](#).

HPC development may benefit from an Obama administration economic stimulus package, through the government's funding of national laboratories and university research centers. "When the government got interested in climate modeling, we saw big advances in HPC," said Todd Thibodeaux, president and CEO of the Computing Technology Industry Association, an Oakbrook Terrace, Ill.-based trade group known as CompTIA. Thibodeaux also hopes to see education funding that could help with IT training in the expected stimulus package.

The Council on Competitiveness, a Washington-based group with members that include many large companies and universities, has continued to cite increased HPC adoption as a major goal. In a report issued this month, the council urged the federal government to revitalize the Department of Defense's role as a developer of "dual use" breakthrough technologies and help "put the power of high-performance computing into the hands of all American producers, innovators and entrepreneurs."

Cynthia McIntyre, a senior vice president at the council, said the group sees HPC technology as one of the country's strategic assets.

#### Computerworld Buyer's Guide - Vendors Matched to this Article

[WebReq](#) , [GFI](#)

More about [Nvidia](#), [VIA](#), [IDC](#), [Jaguar](#), [Electronic Arts](#), [Chevron](#), [Cray](#), [Computing Technology Industry Association](#), [Rice University](#), [Billion](#), [Amazon.com](#), [Sun Microsystems](#), [AMP](#), [Asterisk](#), [CompTIA](#), [IBM](#)

[Login](#) or [register](#) to post comments

#### BUYING GUIDES

1. [Portable Multimedia Players](#)
2. [Digital Cameras](#)
3. [Digital Video Cameras](#)

#### LATEST PRODUCTS

1. [Samsung YP-U4](#)
2. [Samsung M310W](#)
3. [Sony HDR-FX1000](#)

1. [Banning Workplace Bullies](#)
2. [Making Storage Easier for Non-IT Execs to Understand](#)
3. [Translation Software Aid CIOs With Global Ambitions](#)
4. [Getting in Harmony with Customers](#)
5. [How to Get More from Mergers and Acquisitions](#)

1. [Niche ICT skills still in demand despite economic downturn](#)
2. [Telstra accuses Optus of NBN non-compliance](#)
3. [MYOB says no to Manhattan takeover](#)
4. [Samsung cuts distributors](#)
5. [HP partners at the races](#)

1. [2008 geek gadget gift guide](#)
2. [Vendors air the cloud's pros and cons](#)
3. [Can supercomputers help save the economy?](#)
4. [Cloud computing. More than blue sky thinking](#)
5. [Slideshow -- Tech of Yesteryear: Where Old Computers Find Their Final](#)



Copyright 2008 IDG Communications. ABN 14 001 592 650. All rights reserved. Reproduction in whole or in part in any form or medium without express written permission of IDG Communications is prohibited.  
IDG Sites: [PC World](#) | [GoodGearGuide](#) | [Australian GamePro](#) | [CIO Australia](#) | [CSO Online](#) | [LinuxWorld.com.au](#) | [Techworld](#) | [ARN](#) | [CIO Executive Council](#)