

## **Students seek bits, bytes for project**

### **Goal of Ball State independent study effort is making supercomputer from discarded PCs.**

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April 12, 2002

Ball State University Professor Fred Kitchens and his students are searching for a few good personal computers -- a few thousand, actually.

They're developing the university's first supercomputer from used, unwanted PCs at a fraction of the cost of buying a new one.

"A typical supercomputer cost an average \$8 million; or if you want to lease one for a year, it's \$1 million," said senior Alan Johnson, 22, of Greenwood, one of seven students involved in the independent study project this semester for class credit.

"We have spent so far just \$500 on hardware," said Johnson, a management information systems major. "Our budget is based on how much we beg and plead."

What looks like a graveyard for junked computers in an office at the College of Business is actually the building grounds for a network of computers that together work in parallel, processing and analyzing thousands of bits of data.

The more, the merrier. More PCs means greater speed and more information the system can process.

The goal, said Kitchens, is for faculty to use the system for research requiring complex mathematical problem-solving, and for firms to use it



Mark Cheeseman (left) and Al Johnson remove computer parts to help create their supercomputer. (Sonya Bordeau / staff photo)

for economic forecasting, data storage and other purposes.

"We're trying to bring it to the business world," said Kitchens, a professor of management and information systems. "That's the unique focus here. As far as I can tell, we're the first College of Business to do this."

Most supercomputers are used for engineering and scientific purposes, including chemical analysis, cancer research and weather predictions. Some have been built by students at other

colleges, including at the University of Kentucky.

At Indiana University in Bloomington, officials invested \$15 million in an IBM SP supercomputer last fall as part of its genomics initiative to help researchers unravel the mysteries of human genetics.

In July 2000, Purdue put into operation its latest supercomputer, an IBM SP worth \$13.8 million. It's used campuswide for research in chemistry, engineering, biology and other areas.

Ball State's Cluster-Computing Research Project will allow faculty to do cutting-edge research and bring that knowledge to class.

Businesses would benefit, too.

Firms could use the supercomputer, for example, to conduct "data mining" marketing research by analyzing purchasing information gleaned from grocery store customer discount cards. Or the technology could be used to simulate the flow of foot traffic in huge malls or highway traffic patterns -- anything that requires processing huge amounts of data at one time to solve a problem, Kitchens said.

Last semester, business students came up with the idea.

Kitchens was initially skeptical; so much equipment would be needed. But he became convinced it could be done. Now, students have converted parts from 45 computers into 15 usable computers that work with a master computer.

The new system is based on the Beowulf-class supercomputer, first built by NASA in 1994. At this point, the system operates just faster than supercomputers did in 1984, allowing 250 million operations per second.

That's not fast enough.



Ball State University students Alan Johnson, Stan Lynn, Kevin Dunn and Mark Cheeseman (from left) need thousands of computers manufactured within the past five years for their project. -- Sonya Bordeau / staff photo

Kitchens would like to add enough computers to permit 1 billion operations per second. That could mean thousands more.

Students are making presentations to civic and other groups in search of computers. To be useful, the computers need to be manufactured within the past five years.

"The most challenging part is acquiring hardware," said senior Mark Cheeseman. The management information systems major works about 12 hours a week on the project, which he hopes to duplicate as a doctoral thesis project at the University of Arizona.

The next challenges are developing software -- and finding a business sponsor willing to donate computers or give money for graduate fellowships and new equipment.

Johnson, who plans to work on the project as a graduate student, is anxious to see it through.

"I'd love to see the project go to the next phase, where it will be powerful enough to run complex equations and develop business applications."

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