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Grid will improve security, research

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In January, a partnership between Purdue University and the University of Notre Dame to create a super computing grid will become a reality thanks to \$6.5 million in congressional appropriations from the U.S. Department of Energy.

The Northwest Indiana Computational Grid, a network of fiber optics, will create a technology triangle linking Purdue West Lafayette, Purdue Calumet and Notre Dame with government research facilities, including Argonne National Laboratory in Chicago.

The high-speed grid will provide researchers with more timely data, enhanced visualization and simulation, and improved data storage capabilities.

Projects using the grid -- from energy conservation to national security -- could have a huge impact on the lives of everyday Americans, said Chris Hoffman, a computer science professor at Purdue's main campus.

"We all remember the blackout of 2003," Hoffman said. "We need to be very aware of where everything is that requires power or generates power. Those types of things take an incredible amount of computations to figure out what the details are."

Researchers need high-speed computer grids, capable of storing vast amounts of data, analyzing it and running simulations based on changing variables to stay on top of issues like the efficiency of America's power system, he said.

"The times of looking at a map to decide where to redistribute power, those kind of days are not with us anymore," he said. "What we are doing on the research side is studying strategies for these kind of increases in efficiencies."

Over the past two years, the funding push for the supercomputer grid was headed by Sen. Richard Lugar, R-Ind., and Rep. Pete Visclosky, D-Ind. A \$5 million appropriation in late November helped formalize the program.

Building the economy

Visclosky believes the new Northwest Indiana Grid will help the Hoosier state attract industry and create jobs.

"In order to build a new economy, we must have the high-technology infrastructure in place to attract

the jobs of the future," Visclosky said in a statement.

James Bottum, vice president for information technology at Purdue's West Lafayette campus, said simply having that kind of resource nearby could entice companies to locate in the area.

"When you talk grids, you're building new technologies and capabilities that will be interesting to industry," Bottum said. "You're working on problems that are not too far off from having commercial potential. It doesn't take too much of a stretch to imagine spin-off companies."

Security scenarios

Lugar is interested in homeland security applications.

"This investment in technology is important for many reasons, including the innovative research it will foster in enhancing the national security of the United States," Lugar said in a statement.

Hoffman, who has expertise in the areas of geometric computing and modeling, said Lugar's hopes are well-founded.

The speed of the new grid will allow researchers to run terrorist-related simulations with thousands of variables that government and first-responders can use as practice for a real problem.

"In the context of crashing airliners and setting off bombs, you can beforehand study scenarios," he said. "You study 'What would happen if?' Can we do something to the structure of a building to make it more robust? Based on the geometry of the streets and the weather reports, you can predict where a biological cloud will spread. You can selectively proceed."

Such highly detailed simulations takes time, Hoffman said, adding that he would like that information in less than six hours.

"The resources that we're getting are certainly giving us hope that we can get that (fast) pretty soon."