NPACI ONLINE

Volume 3, Issue 16 - August 4, 1999

Calendar - Search - Archives

NPACI Partner San Diego State University Tests New Fiber-optic Data Network Technology

Technology that "pumps more data through existing fiber" may hold promisefor distance education and on-line libraries

SAN DIEGO STATE UNIVERSITY -- Tests conducted Friday, July 23 at San Diego State University (SDSU) successfully demonstrated the feasibility of a radical new technology for fiber-optic data communications by blasting a 411-megabyte data file from the campus computer center to the Education Center on Computational Science and Engineering (EC/CSE) in only 8.21 seconds -- an effective speed of 50 megabytes per second. Ordinary wide-area network links at T-1 or Asynchronous Digital Subscriber Line (ADSL) rates would have taken almost an hour to transmit the same file.

"We had a killer demo here Friday," said Kris Stewart, EC/CSE director and SDSU computer science professor. "It was just so fast, it was incredible."

Kris Stewart, director of SDSU's Education Center on Computational Science and Engineering, and Jacob Diedjomahor, an oil and gas explorationspecialist with SDSU's Geological Sciences department, at the EC/CSE test site.

SilkRoad, Inc., a San Diego-based optical networking technology company, has developed a relatively inexpensive way to boost the amount of information that can be beamed through optical fiber communications lines. The company's "Refractive Synchronization Communication" technology uses a high-powered laser to send information through a fiber-optic cable using a single wavelength of light. In the test at SDSU, the fiber-optic link required no optical amplification or optical repeaters in the data path.

"One important aspect of this technology is that it doesn't require new data cables to be installed -- it pumps more data through existing fiber," Stewart said. "The new equipment can plug into fiber-optic lines originally intended for slower data communications, so educational and research institutions won't have to spend a lot of money upgrading their on-campus infrastructure."

SDSU's EC/CSE, an NPACI Partner Site, is evaluating the technology for distance educationand digital library applications. To illustrate the potential for distance education, the test transferred a 3-D geological visualization data set, a very large digitized representation of the subsurface structure of the Niger delta derived from 3-D seismic cubes of the region. "The image files were tranferred by Silicon Graphics Origin 2000 computers at each end and displayed on a 1600x1280 color monitor at the Ed Center," Stewart explained. "This level of computing and graphics capability is on the high end of things today, but will become more available for distance education in the near future. The biggest single data files we encounter in distance education and digital library work tend to be high-res color photos and multimedia, and you need high-performance equipment to take full advantage of the material."

The data set was provided and manipulated by Jacob Diedjomahor, a specailist in high-end visualization for oil and gas exploration for a major oil company. Diedjomahor is completing a Master's thesis in SDSU's distance learning program in Geological Sciences and soon will enter the cooperative Ph.D. program between SDSU and CICESE, the Mexican earth science institute in Ensenada. CICESE and SDSU are partners in an Internet2 project, which this demonstration previewed.

David Bullock, SilkRoad's director of information systems, and Skip Austin, SDSU telecommunications and network services engineer, prepare the computers and networks for the test.

"The ability to share this type of information and expertise with others around the world is the reality that comes out of the technology. This capability can help change not only SDSU and CICESE, but also whole countries and businesses," said Eric Frost, a professor in SDSU's Geological Sciences department and an EC/CSE Faculty Fellow. "This new means of collaborating with our colleagues in Mexico has staggering implications for not only global educational collaboration, but also telemedicine and business partnerships between our two countries."

The test took place at SDSU as part of the Statewide Application of California-Mexico Technology Infrastructure Link meeting. Attendees included members of the California Assembly Select Committee on California-Mexico Affairs led by Assemblyman Marco Firebaugh, three trustees of the CSU system, San Diego State University President Steve Weber, representatives from information technologies and leadership teams at SDSU, and other local and regional industry representatives. The meeting's objective was to showcase the development and enhancement of ongoing educational, research, business and health programs utilizing new technologies to meet California's needs and to build an international partnership with Mexico and other nations.

Dean William Locke, SDSU's Director of Global Program Development in the Office of the President, and developer of the university's relationship with SilkRoad, "There is extraordinary potential ... to establish a template for communications to other countries that could profoundly affect the world."

The new communications technology has applications beyond distance education. As a feature story on SDSU's test in the *San Diego Union-Tribune* put it, "some analysts say there are potentially staggering implications for business, consumers and the telecommunications industry."

"Today's exhibition demonstrated that we are at a threshold of communications improvements that will broaden the reach of critical information worldwide," Frost said.