

# Light-speed computer connection will slash genetic data transfer time between TGen-ASU

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Hot on the heels of a new supercomputer, plans for a new light-speed data line between the Translational Genomics Research Institute and Arizona State University could slash the time it takes to transfer genetic information.

Accelerating the flow of information could help speed discoveries that eventually could help produce treatments and cures for diseases such as Alzheimer's, autism, diabetes and various cancers.

Because of the huge amounts of data generated by TGen's experiments, it now takes as long as 12 days using conventional cables to transmit 7 terabytes of information from a typical experiment 10 miles between TGen's downtown Phoenix labs and ASU's new Saguaro 2 supercomputer in Tempe.

But through a partnership between ASU and Obsidian Strategies Inc., an Edmonton, Alberta-based defense-intelligence contractor, the same voluminous data – the equivalent of 3.5 million iPod songs – soon could be transmitted in as short as 1 hour.

The difference is something called "dark fiber," unused fiber optic cables installed years ago throughout the nation in anticipation of future growth and development.

"The primary advantage of a link like this is it will allow us to move data faster from the instruments at TGen to the computation and storage at ASU," said Dan Stanzione, director of the High Performance Computing Initiative at ASU's Ira A. Fulton School of Engineering.

"This particularly applies to the next-gen sequencers," said Stanzione, referring to TGen's deployment of ever-faster tools for analyzing DNA in its quest to discover the causes, treatments and possible cures of various diseases.

Dr. Edward Suh, TGen's Chief Information Officer, said such capabilities will help expedite the translation of biomedical research from TGen labs into clinical drug treatments.

"The proposed high-speed data communication link, using Obsidian's network, will significantly reduce the time it takes to run complex data analyses and systems simulations on TGen's supercomputer systems," Suh said.

James Lowey, TGen's Director of High-Performance Biocomputing, said, "The high-speed link between TGen and ASU will enable TGen scientists to transfer data between their labs and the computational resources at ASU at an unprecedented rate, accelerating the pace of discovery.

"With the ever-increasing amount of data being generated by both proteomics and next-generation sequencing, it is critical to have state-of-the-art communications networks between locations where data is generated, and where it is analyzed," Lowey said. "Having this very high-speed link helps position TGen as being a leader in biomedical data analysis."

Stanzione said ASU still is looking for a partner to provide the fiber

optic cable, but that a planned pilot dark-fiber link would be between ASU and TGen.

A single experimental run from DNA sequencers can generate 7 terabytes, or 7,000 gigabytes, of data, Stanzione said. Existing ASU-TGen connections can move about 30 gigabytes an hour, he said, meaning the transfer of scientific experimental information can take more than a week.

The proposed system using Obsidian Strategics technology is expected to hit 8,000 gigabytes per hour, or about 8 terabytes, reducing the time it takes to move data between TGen scientific instruments and the ASU supercomputer to as little as 1 hour, Stanzione said.

Reducing transmission time will become more critical in the future, with TGen's next generation sequencers easily producing as much as 30 terabytes of data, or the equivalent of an iPod with 15 million songs.

Obsidian Strategics is the leading developer of InfiniBand range extension, routing and encryption technology. ASU and Obsidian will join with others in a venture supported by the Canadian Consulate-Phoenix to advance the capabilities of the optical network, linking higher education facilities in Arizona, as well as in adjacent states.

Obsidian's Longbow technology leverages existing optical networks, and originally was designed to meet the demands of the U.S. Department of Defense's next generation large data communications architecture.

Saguaro 2, the TGen-ASU supercomputer dedicated Oct. 3 at ASU's Barry M. Goldwater Center for Science and Engineering, is capable of 50 trillion mathematical operations per second.

Source: The Translational Genomics Research Institute

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