Research study hopes to improve Internet performance

Volunteers needed to collect end-user data

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Ever notice your Internet connection seems slow? Ever wonder what’s causing it? You are not alone. Millions of users bemoan sluggish downloads and slow e-mail, but rarely know the cause of the delays.

Researchers at Georgia Tech have developed a technology to find out how the Internet is performing from the “regular” end-users’ perspectives. With this information, they can design and develop network solutions to relieve the bottlenecks. To do this, they need volunteers for the NETI@home project, which stands for “network intelligence.”

Currently industry and academia use data on the Internet’s performance measured at various router points out in the Internet, before it reaches the individual user. Georgia Tech researchers think a better approach is to find out how the Internet is performing from the user’s point of view — at each personal computer.

“We think a better solution is to measure performance at the individual user level to determine what affects Internet traffic, but currently this data doesn’t exist,” said George Riley, professor of electrical and computer engineering and adjunct professor in the College of Computing. “We need thousands of computer users to use our free NETI@home software to help us gather this data.”

To do this, Riley and graduate student Bobby Simpson developed an open source software application that collects network performance statistics such as average response time, connection times and download times. The application reports these statistics to the NETI@home server at Georgia Tech.

NETI@home is designed to be an unobtrusive software system that runs quietly in the background with little or no intervention by the user. The reports sent to Georgia Tech are little or no intervention by the user. NETI@home comes in,” said George Riley, professor of electrical and computer engineering and adjunct professor in the College of Computing. “We need thousands of computer users to use our free NETI@home software to help us gather this data.”

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Student simulates life on Mars

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Aerospace engineering student Daniel Hegeman didn’t party at the beach this spring break. He went to Mars. Not the actual planet, but the Mars Desert Research Station in the Utah desert as part of an ongoing project studying how humans adapt to remote environments.

The station is run by the Mars Society, a group dedicated to furthering the exploration and settlement of Mars. Every two weeks a group of six volunteers head out to the desert to take part in a simulation of a Mars settlement. The red soil, rocky terrain, remote location and restricted living quarters are similar to the conditions the first astronauts on Mars are expected to experience. While at the station, crew members are asked to do many things that are outside of their field of expertise.

“We have to be amateurs in our fields, because the astronauts will be doing many tasks on Mars that they aren’t experts in,” explained Hegeman. Although NASA isn’t officially involved in the project, the Society estimates that 25 percent of the participants are NASA scientists and researchers. The crew spent the week taking rock samples, looking for biological signs in the soil, working with a robotic rover and recording their data so experts at mission control can analyze it.

Hegeman learned about the project from Georgia Tech Research Scientist Jan Osburg, who has spent time at both the desert station and the Society’s Flamehine Mars Arctic Research Station on Devon Island, Canada.

The extraordinary distance from Mars to Earth means the crew will have less guidance from mission control than other astronauts, said Osburg.

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Using Internet traffic data collected from volunteers, doctoral student Robby Simpson and Assistant Professor George Riley hope to improve network speed.
Teaching high school students a new respect for math

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Math is a four-letter word. Intimidated by its perceived complexity or convinced that the subject has no relevance outside the classroom, many students shun math for more literary pursuits. But the universal language is everywhere. The world economy is built on math. From the computing revolution, to advances in medicine and space exploration, to shopping over the Internet, nearly all the major advancements of this and the past century have their foundations in math. Yet despite the subject’s pervasiveness, many students and parents continue to fear math.

Georgia Tech is working to change that perception through educational outreach programs and a new math competition. Earlier this month, the School held its first high school mathematics competition in nearly 50 years. The goal is to attract both students who are experienced in mathematics competitions as well as untapped talent.

“Math opens doors to almost every discipline,” said Math Professor Yang Wang. “It teaches students analytical abilities that are valued in a number of non-math professions.”

Tech alumna Mary Beth Young, who received a master’s degree in math, said that studying math has helped her tremendously in her law clerk for U.S. Supreme Court Justice Antonin Scalia.

“Math accustoms you to rigorous thinking and following through the implications of an argument. It helps you identify logical problems, which is useful in law and many other disciplines,” she said.

Tech used the competition as a recruiting event with activities for both students and parents. Approximately 250 high school students from Georgia and neighboring states participated in a competition that consisted of two hour-long tests followed by fun activities centered around math. While the students were busy with the exams, parents and teachers listened to presentations from Tech’s admissions counselors and mathematics professors. During the afternoon, students, parents, and teachers toured the campus.

“Here’s a lot of talent that can be cultivated,” said Wang. “The competition is one way we’re hoping to do that.”

Graduate students such as Gail Rosen are another way. Rosen is a fellow in Georgia Tech’s Student and Teacher Enhancement Partnership program (STEP). She spends several days a week teaching trigonometry, pre-calculus and physics at Tri-Cities High School, a visual and performing arts magnet school in Fulton County.

“A lot of students will say they don’t like math, but I think they don’t realize how important it is,” said Rosen. “Even the honors students don’t all understand why they need to know math.”

Rosen said she’s been teaching her students how math comes up in everyday life from simple things such as calculating credit card interest to creating music, a topic that hits home at the magnet school. She’s bringing eight students from Tri-Cities to the competition.

“Music is math you can hear,” Rosen demonstrated how computer programs use sine waves to make sounds. “I have the students add two sine waves and they make a dial tone and then I have them add more, and they see they can make other sounds,” she said. The demonstrations, said Rosen, gave the musically inclined a new respect for math.

A new respect is needed. According to an assessment done by the National Center for Educational Statistics (NCES) in 2000, Georgia still lags behind the national average in math performance in grades four and eight. And Georgia had the lowest average math SAT score of any state in the country last year. To boost performance, the Georgia Department of Education is proposing the adoption of a more challenging math curriculum, modeled after Japan’s curriculum.
Remembering Ivan Allen Jr.

As part of Ivan Allen College’s Founders Day celebration last week, a morning panel discussion sought to provide history and context for the years (1962-1970) that Ivan Allen Jr. was mayor of Atlanta. Allen died in July 2003 at the age of 92.

As the only Southern elected official to support the Civil Rights Act of 1964, Allen stands out as a progressive, realistic and peaceful voice during a turbulent period. Much of the discussion centered around the racial tensions of the time, noting how Allen, according to Public Policy Professor Georgia Persons, “stood against a strong tide of bigotry, amending the socio-political soil so that deep social change could take place without bloodshed.”

From left, George Washington University Professor Clarence Stone; History, Technology and Society Professor Ronald Baylor; author Paul Hemphill, and Professor Persons participated in the panel.

IN BRIEF:

EDI to run development center for minority business

The Economic Development Institute (EDI) has been awarded a cooperative agreement from the U.S. Department of Commerce’s Minority Business Development Agency (MBDA) to manage the Georgia Minority Business Development Center (GMBDC). The new center will provide business and technical assistance to minority entrepreneurs in Georgia, helping them gain access to capital and markets, improve their business operations, and grow both revenue and jobs.

The center is part of MBDA’s new strategic direction that will focus resources on the 16 to 20 percent of minority firms responsible for more than 90 percent of the revenue and jobs generated by minority-owned companies in the United States. Thus, the GMBDC will concentrate its efforts on those firms that have annual sales in excess of $500,000, have rapid growth potential, or the capability to generate significant employment and long-term economic growth.

Donna Ennis, manager of product marketing and program services with EDI, has been named project director of the GMBDC. Ennis’ past experience has involved directing marketing programs, providing training and program advice to customers, and developing special programs.

“Strategic alliances and partnerships with key individuals at lending institutions, government agencies and corporations will be our top priority,” said Ennis. “We are committed to knowing where the capital and markets are, and more importantly, how to get access to them for our clients.”

Bracket busters

For those who follow men’s college basketball, Joel Sokol, an assistant professor in the School of Industrial and Systems Engineering, has done some research.

“With so many NCAA tournament games coming down to a last-second shot,” he said, “one might wonder what the chances are that the better team will win.”

The answer, it seems, is not much more than 50 percent. By compiling home-and-home data from the 1999-2000 through 2002-2003 seasons, he has learned that a team that wins by one point is only 4 percent more likely to win the rematch than a team that loses by one point. If the better team generally won close games, that number would be significantly higher.

“So, the next time your bracket is busted on a made or missed last-second shot, don’t blame the teams,” he said, “blame bad luck instead.”