

QUOTE
UNQUOTE

"When you talk about space, people still roll their eyes and say, 'Oh, I don't know about that.' Frankly, I don't think rocket science is really that much harder than what the computer people are doing."

—Narayanan Komerath, a professor in the School of Aerospace Engineering, on the growing privatization of space exploration and travel.

(Atlanta Journal-Constitution)

Data reveal trends to help researchers build better e-mail filters

Jane Sanders
Research News

A database of more than 10 million spam e-mail messages collected at just one Internet "spam sinkhole" suggests that Internet service providers could better fight unwanted junk e-mail by addressing it at the network level, rather than using currently available message content filters.

Also, the research — conducted at Georgia Tech's College of Computing — identified two additional techniques for combating spam: improving the security of the Internet's routing infrastructure and developing algorithms to identify computers' membership in "botnets," which are groups of computers that are compromised and controlled remotely to send large volumes of spam. The findings are now directing the researchers' design of new systems to stem spam.

"Content filters are fighting a losing battle because it's easier for spammers to simply change their content than for us to build spam filters," said Nick Feamster, an assistant professor of computing. "We need another set of properties, not based on content. So what about network-level properties? It's harder for spammers to change network-level properties."

From 18 months of Internet routing and spam data collected in one domain, Feamster and doctoral student Anirudh Ramachandran have learned which network-level properties are most promising for consideration in spam filter design.

Specifically, they learned that:

- Internet routes are being hijacked by spammers;
- they can identify many narrow ranges within Internet protocol (IP) address space that are generating only spam; and
- they can identify the Internet



photo by Gary Neek

Internet service providers could better fight unwanted junk e-mail by addressing it at the network level rather than using currently available message content filters, says Nick Feamster, an assistant professor in the Georgia Tech College of Computing.

service providers (ISP) from which spam is coming.

"We know route hijacking is occurring," Feamster said. "It's being done by a small, but fairly persistent and sophisticated, group of spammers who cannot be traced using conventional methods."

Route hijacking works like this: By exploiting weaknesses in Internet routing protocols, spammers can steal Internet address space by briefly advertising a route for that space to the rest of the Internet's routers. The spammers can then assign any IP address within that address space to their machines. They send their spam from those machines and then withdraw the route by which they sent the spam. By the time a recipient files a complaint related to this IP address, the route is gone and the IP address space is no longer reachable.

"Even if you're watching the hijack

take place, it's difficult to tell where it's coming from," Feamster explained. "We can make some good guesses. But Internet routing protocols are insecure, so it's relatively easy for spammers to steal them and hard for us to identify the perpetrators."

Feamster and researchers elsewhere are actively working to improve the security of Internet routing protocols, he added.

Better spam filtering will also result from a system, which Feamster hopes to design, based on collaborative, network-level filtering among ISP operators.

"Within the single domain that we are studying, it's interesting that you don't see the same IP addresses repeatedly being used to send spam to that domain," Feamster said. "So ISP operators need to be able to securely share information about IP addresses associated with spam."

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drastic. The veterans were usually older and more focused than traditional students and many were married, had children or were disabled.

"The youngsters coming in had a particularly tough time," said Marilyn Somers, director of Living History at the Alumni Association. "When they heard the 'look to your left' routine, all they saw were these gnarly vets who weren't there for foolishness — they partied some on the weekends but they kept their noses to the grindstone from Sunday through Friday."

Dan Blitch, a self-described "wet behind the ears" 17-year-old from Statesboro, Ga., enrolled at Tech in 1949.

"Like most students, I needed money so I was given a job working for Fred Ajax, director of job placement," Blitch said. "He put me in

charge of explaining how to apply for GI Bill benefits. Here I was just a kid sounding like a drill sergeant instructing a roomful of war veterans how to fill out their forms. It was very intimidating."

Ron Yeakle endured four months in a German prisoner of war camp after his bomber was shot down in 1944. Following his discharge from the Army in 1945, he enrolled at Tech.

"We felt like we had missed some of our life, so our idea was to get in school, do the work and get out as soon as we could," he said. "We took a lot of classes — 22 or 23 hours each quarter. That's where the term 'getting out' originated — we didn't think of it as graduating."

Yeakle said there was a shortage of classroom and dormitory space, so administrators found some very creative ways to deal with the problem.

Tech was the first school to offer

low-cost housing — the barracks at Lawson Naval Air Station in Chamblee, now Peachtree-DeKalb Airport — for married veterans.

"It was very spartan, like you would expect a military barracks to be," Yeakle said. "For \$35 a quarter, you got a kitchen, a bathroom and a living area. There was no refrigerator, just an ice box, and the city buses didn't run that far, so we were on our own for transportation."

The 1,514-member graduating class of 1950 was the largest in Institute history and by 1951 the postwar enrollment boom began to ebb. In six years, more than 14,500 veterans enrolled at Tech.

"The maturity and leadership of the veterans was mixed with the youth and brashness of the civilian students," Blitch said. "It was a wonderful time to be at Tech."