

identity? Most victims spend a considerable amount of time trying to recover their identities and recreate information they've lost. What is that time worth?"

The true cost of cybercrime, he adds, involves looking at all these questions and adding them up "using a strong, clear, defensible methodology." Many companies and think tanks do not have the time or the money to do that kind of extensive research, he says.

Symantec chose not to comment or participate in this story.

Meanwhile, Cormac Herley, principal researcher at Microsoft Research, says he has "no faith whatsoever that either one of the numbers—Symantec's or McAfee's—is anywhere close to the truth. You can call anything an estimate," he says, "but that doesn't mean it's a reasonable reflection of the underlying reality."

Herley and his co-researcher, Dinei Florencio, recently wrote a paper, "Sex, Lies and Cybercrime Surveys," after reading cybercrime estimates "that varied by orders of magnitude. I mean, many things have some wiggle room. But if physicists couldn't agree on the speed of light to within four orders of magnitude, they would just confess they didn't know."

Herley blames the methodologies in the cybercrime surveys that, he says, almost always exaggerate the numbers on the high side. He believes the actual numbers are far smaller.

The problem, he says, is that cybercrime surveys are not like voting surveys where everyone's answer counts equally.

"When you ask people what they lost from cybercrime, you have no ability to verify that they understood the question and that they answered truthfully," he explains. "And then, when even a single person gives you a number that is grossly incorrect, they have the ability to destroy the entire survey. It almost always results in a major upward bias in the numbers."

To illustrate how one person can make nonsense out of a survey, Herley suggests a study to determine how many people have pet unicorns. "If you ask 100 people (which substitutes for a population of 100 million people in the country), it means that whatever number you get you need to multiply by one million. Then you conduct

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the survey and everyone truthfully answers "zero," except for one person who misunderstands the question and says that, yes, they have one unicorn because their daughter has a stuffed one in her bedroom. Your estimate now shows there are one million unicorns in the U.S. It's completely incorrect and it's based on that one incorrect answer."

If that is the case, does it even make sense to try and determine the cost of cybercrime given the likelihood the results will be hugely inflated? Experts say "yes;" that if an organization uses the same consistent method repeatedly, trends emerge and that is valuable for those battling cyber losses.

In addition, from an awareness standpoint, experts say it is important to get the business world, private individuals, and government organizations to understand the magnitude of the problem. Otherwise, the usual attitude is "we've never had a problem so it's likely we won't have one in the future."

Cynics have charged that cybercrime stats are artificially inflated to scare more people into buying security software. And, they suggest, companies that profit by selling anti-malware software should not be the ones reporting on the size of the malware problem.

On the other hand, say observers, who else is going to conduct analyses of security other than the security companies who know the field, know whom to ask, and generally have respected names so people are likely to respond to them with good information.

"You're not likely to see a survey in this area conducted by Hostess Snack Foods," said one. "As for the government doing it, many organizations simply don't want to report to the government that they've had losses be-

ACM Member News

HANAN SAMET, A TRAILBLAZER IN SPATIAL DATABASES



When Apple CEO Tim Cook found it necessary to apologize for the quality of Apple Maps and

iPhone users began using Google Maps instead, it underscored the importance of the pioneering work Hanan Samet has been doing on spatial information for the past 36 years. In fact, his recent paper, "Duking It Out at the Smartphone Mobile App Mapping API Corral: Apple, Google, and the Competition," won a "best paper" award at the recent 1st ACM SIGSPATIAL International Workshop on Mobile Geographic Information Systems.

Samet, a professor of computer science at the University of Maryland, says he is particularly honored to have won the 2011 Paris Kanellakis Theory and Practice Award for his research on quadrees and other multidimensional spatial data structures for sorting spatial information. "It is well known that leading vendors such as Google and Microsoft use Hanan's results in their GIS and commercial mapping systems," notes Dinesh Manocha, a CS professor at the University of North Carolina. "He can be regarded as the world's leading authority on spatial databases and multidimensional data structures." Samet referred to Kanellakis as "a friend who reached out to me when he heard of my work and involved me in the 1992 PODS conference after I co-authored the first paper on spatial data mining in the 1990 PODS Conference." He quipped that he was proud to have seemingly solved problems that were deemed unsolvable "primarily because I did not know they could not be solved."

Samet is currently working on building spatial indices based on textual specifications of spatial data, in contrast to geometric ones, for enabling text and queries to be accessed with a map query interface.

—Paul Hyman