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The Stuxnet worm that disrupted Iran's ability to enrich uranium into bomb-grade nuclear fuel was jointly created by Israel and the U.S., the New York Times said Saturday. Citing confidential sources, the U.S. newspaper claimed that Israel's covert nuclear facility at Dimona was used to test the worm's effectiveness on centrifuges like the ones Iran employs at its Natanz complex, which has been plagued by technical problems. The Times also spelled out other clues it said "suggest[ed]" that the virus was designed as an American-Israeli project to sabotage the Iranian program. "Stuxnet, which first came to light in June 2010 but may have been aimed at Iran as early as mid-2009, has been extensively analyzed by security researchers, most notably a three-man team at Symantec, and by Ralph Langner of the German firm Langner Communications GmbH. According to both Symantec and Langner, Stuxnet was most likely designed to infiltrate Iran's nuclear enrichment program, hide in the Iranian SCADA (supervisory control and data acquisition) control systems that operate its facilities, then force gas centrifuge motors to spin at unsafe speeds. Gas centrifuges, which are used to enrich uranium, can fly apart if spun too fast. Symantec's analysis gained credence last November after the International Atomic Energy Agency (IAEA), the United Nations' nuclear watchdog, reported that Iran had stopped feeding uranium hexafluoride gas to its centrifuges at Natanz for about a week. Speculation quickly focused on Stuxnet as the reason for the shutdown. On Nov. 29, Iran President Mahmoud Ahmadinejad admitted that a "limited" number of centrifuges had been affected by software he claimed had been installed by the country's enemies. It was the first time that an Iranian official had acknowledged the worm had struck its enrichment machinery. Ahmadinejad has frequently blamed Israel and the U.S. for trying to destabilize his regime. The New York Times' story amassed other circumstantial evidence that Stuxnet was a joint Israeli-U.S. creation. According to the newspaper, Siemens -- the German maker of the SCADA systems purportedly used by Iran -- cooperated in 2008 with the Idaho National Laboratory (INL) to help experts there identify vulnerabilities in the control systems. The lab -- located about 30 miles east of Idaho Falls, Idaho -- is the U.S. Department of Energy's lead nuclear research facility. Also in 2008, Siemens asked the Department of Homeland Security to conduct a security assessment on its popular PCS 7 control systems, a fact highlighted in a conference hosted by the IHL and Siemens that year in Chicago. Stuxnet targeted Siemens' PCS 7 control systems and its Step 7 software. Israel, meanwhile, set up an unknown number of gas centrifuges at its top-secret Dimona complex, then tested Stuxnet on the machines and their control systems, according to the New York Times. The centrifuges were virtually identical to the ones used by Iran. Dubbed "P-1" centrifuges because they were Pakistan's first-generation design, the machines are notoriously unpredictable, and often fail at rates much higher than more sophisticated designs. Iran's centrifuges are knock-offs of the P-1, and are usually identified as "IR-1" models. But the Israelis, and perhaps the Americans at their own Oak Ridge National Laboratory in Tennessee, succeeded in getting several P-1 centrifuges up and running, the New York Times said. The publication cited an anonymous American expert in nuclear intelligence, who told the paper that the Israelis had used the P-1 centrifuges at Dimona to test Stuxnet's effectiveness. An Israeli link to Stuxnet has been long suspected, both because Israel has been vocal about the danger posed by a nuclear-armed Iran and because of several obscure clues buried in the worm's code. Rather than launch a military strike, as it did against an unfinished Iraqi nuclear reactor in 1991, the scenario goes, the country decided to wage cyber warfare. Other hints came from security researchers, who unanimously agreed that Stuxnet's complexity pointed to a state-sponsored project, probably one that involved a large team of programmers, SCADA experts and intelligence analysts. Langner, who has spent months pulling the worm apart, said earlier this week that Stuxnet was a natural weapon for opponents of Iran's nuclear program to unseat. "If any target would justify a full-blown cyberwar strike for the first time in history, those centrifuges certainly would," Langner said Jan. 10 on his blog, where he has spelled out his findings and speculations. Langner believes that Stuxnet's creators had access to what he called a "mockup test system" to try out their worm on actual centrifuges. Although Stuxnet has apparently not crippled Iran's nuclear program, it seems to have seriously hindered it, perhaps more than some have thought. Just last week, for example, the outgoing head of Israel's Mossad intelligence service said setbacks meant Iran wouldn't be able to create a bomb before 2015. Langner was more skeptical about Iran's chances of solving the problems created by Stuxnet. "In the moment when they will have cleaned up all systems, a new dropper exploiting new Windows zero-day vulnerabilities will likely be underway already," Langner asserted last week, echoing research last September that said systems scrubbed of Stuxnet could be easily re-infected. "The cyberwar nightmare for Tehran may have only just begun," said Langner. Gregg Keizer covers Microsoft, security issues, Apple, Web browsers and general technology breaking news for Computerworld. Follow Gregg on Twitter at @gkeizer or subscribe to Gregg's RSS feed. His e-mail address is gkeizer@computerworld.com. Copyright © 2011 IDG Communications, Inc. I apologize. Last week in Tech 911, Lifehacker's technology-advice column, I took a question from Lifehacker Editor-in-Chief Melissa. She's technically a Lifehacker reader, so it still fits this column's theme, but it feels like a cheat. I'm doing the same thing again this week, not because you haven't been sending in valuable questions—you have!—it's just that another Lifehacker staffer had a great question about a topic we recently explored, and I bet some of you will have similar thoughts. Lifehacker Social Media Editor Tim writes (via Slack): "How the fuck do internet speed tests work and why am I getting wildly different results on different tests?!" I explored this question a bit more, and it turns out that Tim has been seeing quite a few different numbers when running various web-based speed tests on his home connection. On one? 178.4 Mbps—not too shabby. On the other? 187. Still doing great. On a third, though, is where we encounter a strange issue: 22.7 Mbps, which looks like a catastrophe. It could also be a red herring, launching a person into a tornado of troubleshooting they might not even need. First, all the speed-testing sites have a slightly different way they calculate statistics like your download/upload rates, but the general principles are pretty similar. For example, here's how Speedtest.net describes its process. G/O Media may get a commission. To measure latency, the site looks at the time it takes for a message to bounce from you, to the server, back to you again, and repeat this process over and over—the lowest value becomes your latency result. For downloads and uploads, Speedtest measures how long it takes to process multiple data chunks, while simultaneously working to stuff the pipe full of data (as it were) throughout the test. Here's Netflix's approach for fast.com: "Depending on network throughput, the fast.com client runs the test using a variable number of parallel connections. For low throughput networks, running more connections might result in each connection competing for very limited bandwidth, causing more timeouts and resulting in a longer and less accurate test. When the bandwidth is high enough, however, running more parallel connections helps to saturate the network link faster and reduce test time. For very high throughput connections, especially in situations with higher latency, one connection and a 25MB file might not be enough to reach maximum speeds, so multiple connections are necessary. For each connection, the fast.com client selects the size of the chunk of the 25MB file that it wants to download. In situations where the network layer supports periodical progress events, it makes sense to request the whole file and estimate network speed using download progress counters. In cases where the download progress event is not available, the client will gradually increase payload size during the test to perform multiple downloads and get a sufficient number of samples. Even if this sounds like a bunch of networking gobbledeyook to you, that's OK. The point is that you should approach throughput testing scientifically, because there are lots of variables that can affect atypical internet speed test—beyond the inherent differences of the tests, that is. Perhaps you have an artificially slow connection to whatever server(s) the test is using or the test is messing up. Your ISP might be prioritizing or throttling your performance, depending on how the test operates. Even your browser, packed with add-ons and extensions, might be interfering with a specific test somehow. Or you're running tests at different times and misinterpreting a "poor" internet connection for what's actually network congestion stemming from every other person in your neighborhood streaming Netflix at the same time—that kind of thing. And don't get me started on running these tests on a wirelessly connected device. When possible, use a wired connection to eliminate variables (if you're only trying to find out whether your house or apartment is actually getting the speeds you're paying for). Adding wireless networking into the mix makes the troubleshooting considerably more difficult, since you'll have to run more tests to isolate the issue to your ISP, your router, or your device. Treat web speed tests like a science project! You don't want to rely on the results of one test from one service, even if they appear great. You should run multiple tests from multiple providers to see if you can get a sense of the trend. Are you speeds, on average, 75 percent slower than what you're paying for? There's a problem. Are one or two tests reporting so-so speeds, but every other site is blazing? You're probably doing fine, especially if you haven't noticed any major issues in everyday use. Are you having trouble getting gigabit downloads on your fiber connection? Maybe your laptop—with its mechanical hard drive and low memory—can't process a firehose of data, and that's affecting the test results (to simplify the process greatly). When I want to get a good sense of my internet speeds, I run a variety of tests and see how things go before getting stressed. This list includes: This sounds like a lot, but these tests are all simple to run—you hit a button, you let it chug, and you go do another one. It's easy. If one or two of tests are off, it's not that big a deal. If I can't get the speeds I'm expecting on any of them, I then consider how much I want to tear up the house's networking setup (or my desktop system) because I'm not getting the full 100+ Mbps that my roommates and I should be enjoying. Fun times! Do you have a tech question keeping you up at night? Tired of troubleshooting your Windows or Mac? Looking for advice on apps, browser extensions, or utilities to accomplish a particular task? Let us know! Tell us in the comments below or email david.murphy@lifehacker.com.





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