

NIST's internet time service serves the world

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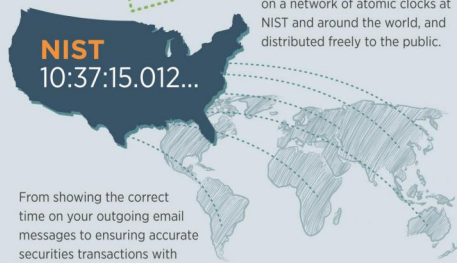
NIST DELIVERS ACCURATE TIME TO YOUR COMPUTER-- *and Billions Around the World*

HOW IT WORKS

The **Internet Time Service (ITS)** at the National Institute of Standards and Technology (NIST) enables you to set your computer clock to the official NIST U.S. time with an accuracy that's measured in thousandths of a second.



ITS servers obtain their data from NIST's time signal, based on a network of atomic clocks at NIST and around the world, and distributed freely to the public.



From showing the correct time on your outgoing email messages to ensuring accurate securities transactions with moment-to-moment price changes, the ITS helps to enable many aspects of modern life.



NIST STATS

20

Number of Internet Time Service servers run by NIST.



2

Number of servers studied for the new paper published in the NIST Journal of Research.



16 billion*

Number of time requests the servers handle every day
*latest number available as of January 2016



71%

Registered Autonomous Systems (i.e., independently operated networks on the Internet) that requested time information.



98%

Countries/regions in the international GeoIP database (or 244 out of 250) that requested time information.

About half of the usage was in the United States with China being the next biggest user. Antarctica was among the few countries/regions that did not request information.

25%

Service traffic handled by the two servers studied.



316 million

Number of unique Internet Protocol (IPv4) addresses requesting time from two of the servers during a four-week period. This represents at least 8.5% of the entire Internet.

DESIGN BY NATASHA HANACEK/NIST

NIST delivers accurate time to your computer -- and billions around the world.
Credit: Hanacek/NIST

The Internet Time Service operated by the National Institute of Standards and Technology (NIST) serves much of the Earth, with customers from around the globe. In one month of study alone, just two of the 20 NIST servers that supply time information to Internet-connected devices received requests from 316 million unique Internet Protocol (IP) addresses, according to detailed data about the service published for the first time. This represents at least 8.5 percent of devices on the entire Internet.

"NIST should be very proud of the Internet Time Service, which is an important public resource," says NIST physicist Jeff Sherman, who collected the statistics and co-authored the new report. (The study focused on just two servers because they are local to NIST and easy to access, and they carry 25 percent of the total traffic, a statistically representative sample.)

NIST has operated the Internet Time Service since 1993. The service receives about 16 billion requests per day (as of January 2016). The 20 timeservers are located at 12 sites around the country, including NIST campuses in Gaithersburg, Md., and Boulder, Colo. The servers are linked to the NIST time scale, an ensemble of [atomic clocks](#) that maintain the U.S. version of Coordinated Universal Time. The time scale is calibrated by the NIST-F1 and NIST-F2 cesium fountain atomic clocks, the U.S. civilian time standards.

Importantly, the Internet Time Service provides a reliable source of time

independent of the satellite-based Global Positioning System. Demand may increase with the growth of the Internet of Things, in which more devices will be connected to the Internet without any direct human intervention.

NIST Fellow Judah Levine came up with the original idea of distributing time over the Internet and wrote most of the software. The service is just one of the ways NIST distributes time-of-day information. Other methods include NIST radio stations, telephone call-in services, and the website <http://time.gov>.

More information: J.A. Sherman and J. Levine, "Usage Analysis of the NIST Internet Time Service," *NIST Journal of Research*, March 8, 2016. [DOI: 10.6028/jres121.003](https://doi.org/10.6028/jres121.003)

Provided by National Institute of Standards and Technology

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