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by **Evan Schuman**
Contributor

Leap second proposal will keep software stacks in sync

News

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To keep atomic clocks and those based on the earth's rotation in sync, GCWM periodically adds a second to UTC; the prospect of having to subtract one, potentially causing major disruption, is prompting it to rethink leap seconds entirely.



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For decades, global time experts have mapped atomic clock time to the earth's rotation, periodically adding a second (aka a leap second) as rotation slowed. But the planet's rotation has now slightly sped up, which could mean that a negative adjustment will be required.

The problem is that computer systems have not been programmed to do that.

To avoid this issue, the General Conference on Weights and Measures (GCWM) in October will vote on a proposal to maintain the **Coordinated Universal Time** [<https://www.utctime.net/>] (UTC) as a continuous time from May 20, 2027, without adjustment via leap seconds, allowing **UT1** [<https://www.nist.gov/pml/time-and-frequency-division/time-realization/leap-seconds>], the measure of time based on the earth's rotation, and UTC to drift apart by up to one hour.

It pointed out, "a negative leap second has not previously been applied, and it is considered to pose a high risk of causing anomalies and disruption to critical infrastructures that are largely unprepared, and the preparation would create, for the industries that rely on time synchronization, a need for financial investment, whose amount is estimated to be similar to their preparations for the millennium bug."

The **group said** [<https://www.bipm.org/documents/d/guest/cgpm-2026-draft-resolutions>] that a 2025 workshop which included experts on Earth rotation estimated that the probability of a negative leap second will increase rapidly in the near future, reaching 30% by 2035. Acceptance of the proposal, it said, will ensure the long-term continuity for UTC for several centuries.

Unexpected requirement

Jeremy Roberts [<https://www.infotech.com/profiles/jeremy-roberts>], senior director at Info-Tech Research Group, said that authorities never expected the need to reverse time.

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“We have been adding leap seconds for decades, basically to keep atomic time in line with observed time, but this is the first time we’d have to take one away. The problem is that computer systems aren’t designed to work this way,” Roberts said. “Rather than introduce a negative leap second, the proposal here is to let the two clocks go out of sync rather than keep adjusting to keep synchronicity with UT1 time and atomic time, which is much more consistent and not impacted by changes in the Earth’s rotation. This would make it easier for those building and maintaining infrastructure, because the clock would behave in a predictable way.”

Still, Roberts stressed that the proposed approach might eventually cause problems.

“As with all things, this will require work to implement, and because the proposal includes a provision that allows for the clocks to go up to an hour out of sync, that would presumably create a problem for our descendants when we eventually reach that point,” Roberts said. “[But] being indecisive could cause fragmentation in standard time as different entities move to different standards, which could come with its own set of problems.”

Frank Dickson [<https://www.linkedin.com/in/frankdickson/>], principal analyst at Dickson Research, added that this proposed move is revolutionary in time-keeping circles.

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“This is the biggest change to civil timekeeping since the leap second itself was adopted in 1972,” Dickson said. “Earth’s rotation has historically been slowing down, so that’s the only direction the system has ever had to handle. What’s crazy is that the Earth’s rotation has been speeding up in recent years, requiring a negative leap second, subtracting a second instead of adding one. Nobody has ever run that in production, at global scale, on the systems the world actually depends on.”

Dickson said that it is critically important that the vote pass, because the IT community has seen what happens when clocks malfunction.

“In a world of interlocking software applications, you cannot always predict how a global change will impact digital systems. In 2012, one ordinary positive leap second took down Reddit, LinkedIn, and Qantas’s booking system,” Dickson said. “It also triggered a race condition in the Linux kernel that spiked CPU load across servers worldwide. Nobody had tested for it because it had never happened before.”

And another incident involving timekeeping took down the Telstra network in Australia [<https://www.theguardian.com/business/2026/jul/17/telstra-missing-software-update-undocumented-design-change-outage>] just last month.

A ‘more rational’ engineering decision

Mike Wilkes [<https://www.linkedin.com/in/eclectiquis/>], enterprise CISO at Aikido Security, pointed out that the consequences of a negative leap second could be significant. “Skipping a second can expose assumptions buried in databases, distributed systems, authentication systems, schedulers, market infrastructure and logging platforms,” he said. “The CGPM proposal is effectively saying that, rather than forcing the entire digital economy to prepare for a novel failure mode, we should make UTC continuous. That seems like a far more rational engineering decision.”

Most consultants and analysts agreed that if the vote to adjust current time procedures fails, the resultant problems would likely happen gradually, and possibly dramatically.

“The most likely problem would not necessarily be one spectacular global outage. I would be more concerned about thousands of smaller inconsistencies occurring simultaneously,” said **Boris Kolev** [<https://www.linkedin.com/in/boriskolev/>], global head of technology at JA Worldwide. The problems he anticipated included timestamps appearing out of order, distributed transactions behaving unexpectedly, authentication tokens being interpreted incorrectly, monitoring and audit trails becoming inconsistent, or different systems disagreeing about the sequence of events.

Systemic technology risk

But Kolev warned of a potentially more severe problem, as different companies sharing varied technology dependencies with enterprises try tackling the time problem differently.

“That means an enterprise does not only have to worry about what its own servers do. It has to consider what happens when its cloud provider, operating system, identity provider, database, external APIs, and on premises systems interpret the same moment differently,” Kolev said. “This is precisely the type of systemic technology risk that concerns CIOs: individually, every dependency may look manageable, but globally there are millions of interconnected systems maintained by different organizations, written in different eras, and operating under different assumptions.”

Justin Greis [<https://acceligence.com/talent/profiles/justin-greis/>], CEO of consulting firm Acceligen, also said that he hoped the proposal would pass.

“I think this is one of those cases where delaying what appears to be the technically correct answer may actually be the more responsible engineering decision. At some point, you have to ask whether preserving the relationship between civil time and the Earth’s rotation to within a second is worth introducing operational risk across financial systems, telecommunications networks, cloud platforms, power infrastructure, transportation systems and countless other technologies that depend on precise synchronization,” Greis said. “For the overwhelming majority of enterprise technology, I don’t think it is.”

*This article originally appeared on **Network World** [<https://www.networkworld.com/article/4219986/leap-second-proposal-will-keep-software-stacks-in-sync.html>].*

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