

TimeKeeper, Clouds, Big Data

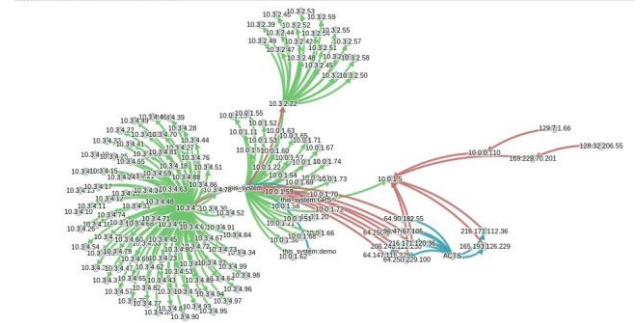
- Cassandra depends on clock synchronization to simplify data synchronization.
- Google uses clock synchronization to enable low cost data synchronization with its distributed “Spanner” database¹.
- Oracle requires clock synchronization for distributed “grid” infrastructure².

Time synchronization involves continuous adjustment of the clocks on distributed computers to keep them locked to some reference clock –often this clock pulls time from the Global Positioning Satellites (GPS). As transaction speeds increase, more precise and more reliable clock synchronization becomes essential. Wall Street is on the cutting edge of high speed transaction systems (for automated trading) and many of these systems now depend on clocks that must be within microseconds or less of the reference time. Other enterprise data systems, particularly big data and cloud based systems are encountering the same issues as they increase transaction rates.

Making high speed distributed data systems operate correctly, particularly in the cloud, requires high precision clock synchronization. Furthermore, performance analysis of distributed, networked applications also depends on clock synchronization. It is impossible to correctly determine something as simple as the message latency between two sites if the clocks on those sites are not synchronized. Application instrumentation and tools like Splunk and other data analysis systems that rely on logs also depend on accurate and synchronized time stamps.

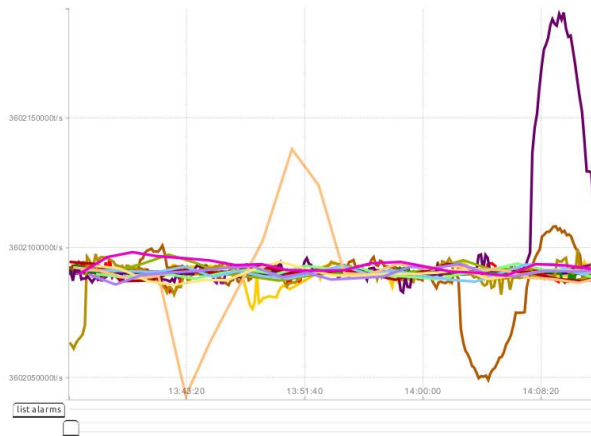
TimeKeeper is a highly reliable, easy to manage, low total cost of ownership solution for time synchronization significantly outperforming the cobbled together “hand made” approaches that rely on free software, expensive clock appliances, and even more expensive sync enabled network router/switch equipment upgrades.

Legacy clock synchronization technology does not satisfy requirements of new distributed data systems. Some of the leading financial trading firms in the world depend on TimeKeeper to keep their automated trading systems operating including leading hedge funds, tier one banks, technology providers and cutting edge startups. That technology is now available for wider data management.



¹ http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en/us/archive/spanner-osdi2012.pdf

² <http://www.oracledistilled.com/grid-infrastructure/prvf-5439-ntp-daemon-does-not-have-slewing-option-%E2%80%9C-x%E2%80%9D-set-on-node/>



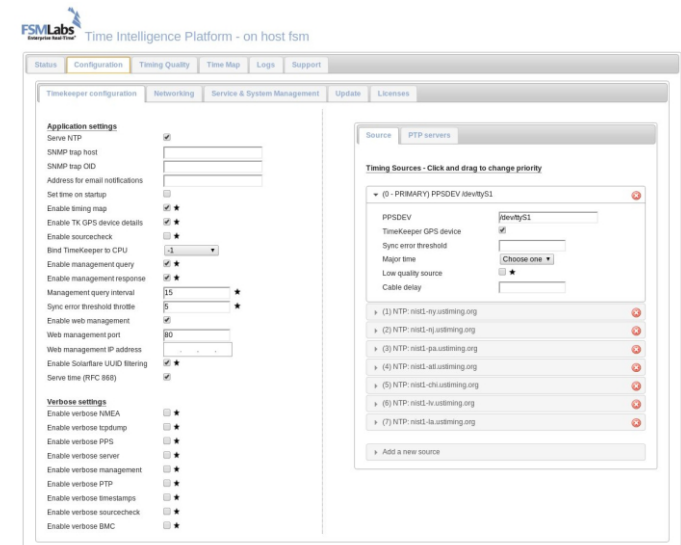
Cassandra is a highly-distributable NoSQL database with tunable consistency. What makes it highly distributable makes it also, in part, vulnerable: the whole deployment must run on synchronized clocks³.

TimeKeeper Software provides:

1. Powerful management tools: to minimize engineering time, optimize performance, and provide centralized management and visibility.
2. Data visualization and Analysis to provide high level, high value information in a clear form, and to extract critical, illuminating information from time distribution data.
3. Traceable audit with capability of monitoring and cross checking multiple time source to provide a record of validated synchronization for forensic and regulatory compliance.
4. Automatic failover and notification.
5. Superior performance with both PTP and NTP on both dedicated and virtual application servers.

TimeKeeper Appliance Hardware provides superior quality GPS clock, high end oscillator, and rugged server (with dual power supplies) combined with TimeKeeper Server software. TimeKeeper automatically utilizes hardware timestamp capabilities on network cards to drive submicrosecond accuracy on dedicated hardware and submillisecond or better on virtual machines/cloud equipment. The management tools make it simple to set up and permit reliable operation through multi-source operation, source check, alarming, and other proprietary features.

For more information please email sales@fsmllabs.com



³ <https://blog.logentries.com/2014/03/synchronizing-clocks-in-a-cassandra-cluster-pt-1-the-problem/>