



TimeKeeper®: Competitive Survey

The TimeKeeper suite of products are more accurate, more reliable, and far more capable than the seemingly free and “nearly free” alternatives for time synchronization. Total cost of ownership is actually lower due to TimeKeeper’s powerful management, data analysis capabilities, smart installation and easy configuration. That’s not even taking risk costs into account. TimeKeeper offers capabilities other tools do not and has a long track record of being the reliable solution when time matters. With TimeKeeper you get a solution that’s proven and solves problems.

TimeKeeper in use throughout Wall Street

TimeKeeper hardware and software is in use by exchanges and large investment banks all the way to small trading shops. TimeKeeper is there because it’s been evaluated, vetted and found to be the most reliable and solid solution both technically and commercially. TimeKeeper delivers accurate time and correct behavior in the face of errors. A few comments from our customers:

“We were reluctant to purchase TimeKeeper when we could download free software, but in the end the performance, reliability, and total cost of ownership advantages were too compelling to ignore.”

- Tamir Nitzan, Partner/Lead Technologist Virtu Financial

“KCG has been using TimeKeeper Client and Server Software for two years in our trading environment with great success. TimeKeeper delivers accurate time, and has helped us to reduce operational risk with its built-in failover and event notification. We use TimeKeeper Client Software on our servers, using NTP or PTP to sync them to our GPS Based TimeKeeper Servers.”

- Steve Newman, Managing Director, Corporate IT and Infrastructure, KCG

“Technology is readily accessible for synchronizing to the microsecond, and there is no excuse for not having this in place today. Without it, this surveillance system will suffer the same shortcomings as current systems such as OATS, where aggregation and sequencing is rendered impossible by timestamp resolution and the lack of any clock synchronization. A simple call to a firm such as FSMLabs will quickly and cost effectively solve this issue.”

- Doug Lauer, President and Managing Partner, KOR Group LLC [testimony on “The Role of Regulation in Shaping Equity Market Structure and Electronic Trading”, Senate Committee on Banking, Housing, and Urban Affairs](#)

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TimeKeeper is also in use by TradeWorx, which was chosen by the Securities and Exchange Commission to help develop MIDAS (Market Information Data Analytics System) for monitoring market structure and trading. Many other firms that rely on TimeKeeper consider it to be a competitive advantage that they want to keep confidential

TimeKeeper support is second to none

When you have a question about ideal network setup or which NIC cards give you better performance you can always contact us. We're available via phone and email to put you in touch with our developers – not dedicated support staff – so you get clear and certain answers from experts who are able to draw from experience. We have the latest network cards, drivers and other gear to test with. Our partnerships with hardware and software providers mean we work closely together to make sure you get a well tested and verified solution. When you're looking to upgrade hardware/software or change your configuration we're able to help you decide on expected accuracy based on our testing, tune that as appropriate for your needs, give you an idea of the cost/accuracy benefit and finally provide you with tools to test on your own before investing in infrastructure. That's just a regular part of what we do every day.

If you pick one of the TimeKeeper alternatives you end up on a mailing list for a free software project created by non-experts in their spare time (not their career) and developed in this way:

"I'll be honest with you. I had two terminals open side by side when writing this. One was ptpd source, the other was ntpd source. The ntpd code relies on constants I could not find the definitions of, so I got scared and didn't copy the code as is. Apart from the open terminals, I also had a bottle open."

<http://sourceforge.net/p/ptpd/mailman/message/31414460/>

TimeKeeper features are unique and necessary

✓ All-in-one solution

TimeKeeper is able to track and serve NTP, PTP and other protocols. No other tool can do that yet it is essential when bridging time technologies (legacy and next generation) into a single network. This allows you to avoid having islands of time with multiple pieces of equipment and configuration to solve a single problem – providing time. The end result is cost savings from reduced software and hardware purchases along with reduced manpower to configure and maintain the system.

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TimeKeeper is able to take advantage of a variety of network cards and all Linux versions unlike the alternatives. Managing what works and what does not with open-source options means tracking what works on a specific set of network cards, Linux versions and time protocol support. Open-source time software users find themselves spending time installing and maintaining multiple open-source projects and versions. This creates a fragile and often inconsistent/incompatible deployment. What you get with TimeKeeper is a complete end-to-end solution.

✓ Best available accuracy

TimeKeeper is able to transparently take advantage of any hardware assist technology you have yet even without it is able to maintain under a microsecond level synchronization in many cases using PTP and NTP. That's something you won't find elsewhere. Further, TimeKeeper includes the tools to verify that accuracy and alert when it is out of spec.

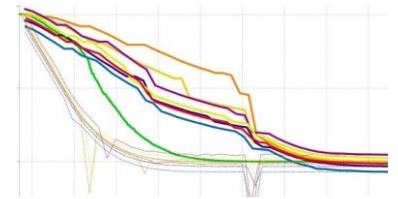
✓ Visibility into what is happening

TimeKeeper provides a GUI that allows you to visualize the accuracy of all places you're receiving time from and compare them directly, quickly and easily. The same interface allows you to do that for systems that you are providing time to. So, on one "pane of glass" you can see your whole network and how it's behaving.

At the same time TimeKeeper creates a map of your timing network. This auto-discovers resources (hardware and software), problems and network layout without you needing to enter information by hand. When something changes – see it immediately.

Compare Time Sources

You can quickly compare multiple NTP, PTP, PPS and GPS time sources on one graph



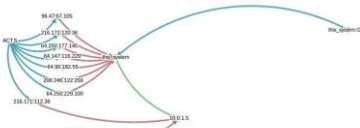
✓ Monitoring

TimeKeeper monitors the sources it uses for time and reports their accuracy. It also optionally alerts via SNMP, email, syslog and other methods when there is a problem. Other solutions silently let time drift. All TimeKeeper data is logged to human readable and documented files for later auditing. When something happens on your network or you're required to prove accuracy of your time sync – it's all stored and available for you.

TimeKeeper can also monitor clients that receive time downstream – so that you can alert on threshold violations in client systems without needing to access them directly meaning that you can see problems before anyone else does.

Network Mapping

Automatically map your network and see where time is coming from, where it's going and see what is happening



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✓ Security

TimeKeeper has built-in failover when a source has problems or shows incorrect behavior. Failover sources can be mixed and matched between PTP (multiple profiles), NTP and nearly any other time format. This allows for detecting and reporting of failed equipment, misconfiguration and even malicious attack.

TimeKeeper alternatives

✓ RedHat PTP support using open-source tools

RedHat has made some changes to make PTP (and only PTP) support part of their distribution. The first attempt packaged the open-source program "ptpd2". Later RedHat versions tried another open-source program "ptp4l" and made some required driver and kernel changes required by that program. Each program requires different setup, different configuration arguments and supports different sets of hardware with different capabilities. You, as a user, end up testing those tools and keeping track of which version requires which configuration file and what capabilities each has on your network. Part of these RedHat enhancements include back-porting experimental changes from more recent kernels that include the message:

```
TECH PREVIEW: IEEE 1588 (PTP) may not be fully supported.  
Please review provided documentation for limitations.
```

TimeKeeper has supported PTP, NTP, GPS, TIME, PPS (along with others) and taken advantage of hardware assist and been in production for years and continues to support all RedHat versions past, current and future (and other distributions) with a single uniform configuration.

Our own testing has shown that open-source packages respond erratically to periodic errors on the network and can even cause time to jump backwards sometimes (See FSMLabs' "Time Should Not Go Backwards" Case Report). There are even documented cases of time jumps of 34 seconds in production systems. This is something that TimeKeeper never allows.

RedHat has a great deal of experience producing a Linux distribution but has no timing expertise and you'll likely end up on a mailing list looking for solutions to problems or advice on setup. Note the 2 year effort that was required to install and setup an open-source system at IMC in "[Challenges deploying PTPv2 in a Global Financial Company](#)" that ultimately had significant limitations and vulnerabilities.

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✓ SFPTPD (from Solarflare)

Solarflare provides an excellent set of network cards that have great time synchronization assist. They also provide a program for tracking PTP when used with their NICs that is a modified copy of an open-source program. The program is indeed able to track a single PTP source when used with Solarflare NICs but is limited by the same problems that its open-source roots have with added vendor lock-in. TimeKeeper is able to take advantage of all the features of the Solarflare NIC, expanding far beyond sftptd's capabilities but does not have the sftptd limitations:

- Single time source (no failover)
- No monitoring or visibility into what is happening
- PTP only (no NTP support)
- Based on an open-source project that RedHat has abandoned
- Solarflare only – no support for other network hardware

How to Purchase TimeKeeper

TimeKeeper, TimeKeeper Server Software, and TimeKeeper Client Software are all available from FSMLabs and FSMLabs' resellers. For purchase information or for a live demonstration of TimeKeeper please contact FSMLabs at sales@fsmlabs.com.

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