



# SECURE ENTERPRISE TIME SYNC WHITEPAPER SERIES

## TimeKeeper Compliance Deployment (2017)

### Introduction

### About FSMLabs:

#### Who We Are

- Independent, self-financed, specialist system and operating system software development, integration and support firm
- Focused on adapting “off the shelf” technology to high-performance and critical response-time applications
- 16-year record of success in building mission critical real-time acceleration for standard software
- Clients on every continent except Antarctica

#### Who We Serve

- Exchanges
- Banks
- Brokerage Firms
- Proprietary Trading Firms



**VIRTU FINANCIAL**



**KCG**



TimeKeeper compliance eases FINRA, MiFID, etc. time sync monitoring & reporting burden

### Key features:

- Monitors/records every time sync transaction and measurement
- Tracks track primary time source (normally local GPS) and cross-check NIST (as per FINRA)
- Able to alert immediately when any system is out of certain bounds
- GUI for high level view of compliance/non-compliance
- Produces PDFs for long-term storage of monitoring/reporting
- Consolidates logs over standard PTP/NTP protocols between hosts
  - Even between datacenters



### GUI reporting

Compliance comes with a user-friendly GUI dashboard:

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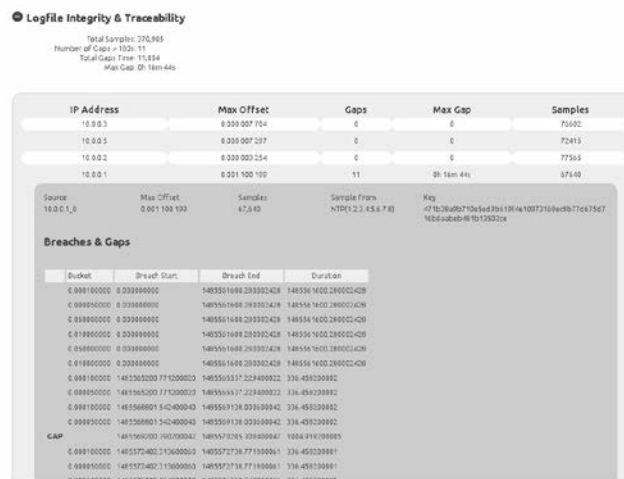
Daily, weekly, monthly, yearly reports are available

As much detail or as little as needed. Designed to be simple and provide only necessary data for reporting

Quickly see how many hosts exceeded certain time offset thresholds, for how long and how many times

## Reporting via PDF files

Integrated PDF tool:



Similar to GUI reports but in PDF form – with all selections expanded

Ease to archive for long-term record keeping

Simple to include in other reports

## How TimeKeeper Compliance works

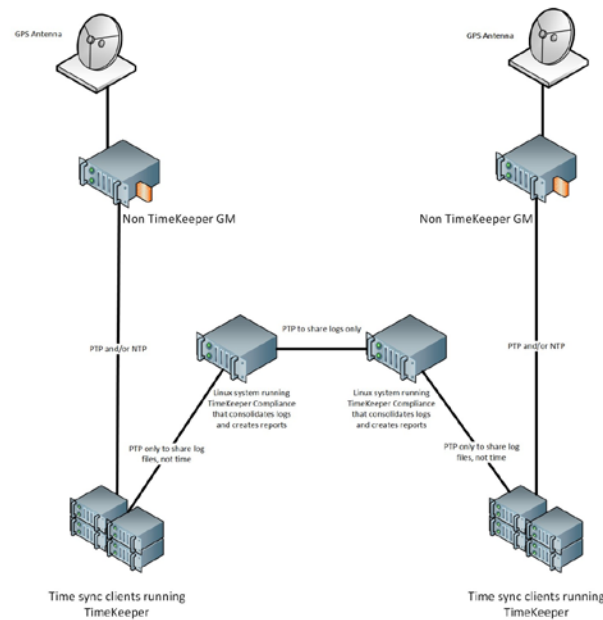
Key functionality:

- TimeKeeper setup to serve/receive time sync
- TimeKeeper clients start recording data
- Every 15 seconds (configurable) TimeKeeper shares sync data with servers/clients/other network2 nodes
- Data is stored in /var/log/timekeeperclients/
- User configures a given TimeKeeper instance to generate Compliance reports with stored data

## Deployment: software-only architecture

TimeKeeper Compliance deployment architecture:

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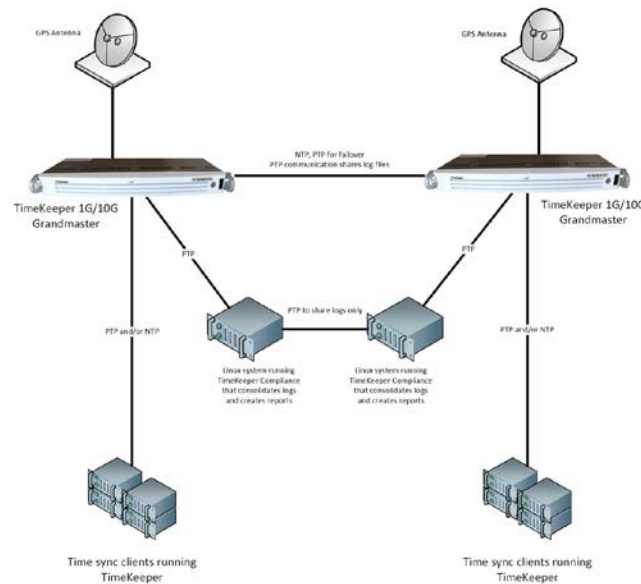
TimeKeeper Clients get time via PTP or NTP from non TimeKeeper grandmasters

TimeKeeper Compliance runs on your own hardware to collect client logs and generate reports, gets data directly from clients

Compliance instances communicate to share data between data centers and/or duplicate records for disaster recovery

## Deployment: TimeKeeper-based time appliance

TimeKeeper Grandmaster, Compliance & Active Client deployment architecture:



TimeKeeper Clients get time via PTP or NTP from TimeKeeper grandmasters

TimeKeeper Compliance runs on your own hardware to collect client logs and generate reports, gets data from grandmasters

Compliance instances communicate to share data between data centers and/or duplicate records for disaster recovery

## Easy installation & setup

Typical steps:

- Install TimeKeeper 7.2.0 or newer
- Use a "compliance enabled" license
- Turn on Compliance
- Add ENABLE\_COMPLIANCE=1 to /etc/timekeeper.conf, refer to TimeKeeper documentation for all options
- Confirm clients are providing data
- /var/log/timekeeperclients should be populating
- GUI will show 'clients' in timing quality tab
- Wait ~24 hours for first day of reports to appear

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<b>Data retention requirements (disk space)</b>	Disk space factors: <ul style="list-style-type: none"><li>• Varies by protocol, sync rate, etc.</li><li>• Typical/default values would be 1 update/second, NTP/PTP and thus ~2.7MB per client/source/day</li><li>• This would be ~985MB/year</li><li>• For 20k clients: ~20TB/year</li></ul>
<b>Compliance performance</b>	Performance factors: <ul style="list-style-type: none"><li>• Compliance reports are generated every 24 hours</li><li>• Processing all client data can be slow and require up to 24 hours to generate</li><li>• Disk speed is the limiting factor</li><li>• SSDs speed up the process tremendously</li><li>• Running on virtual hardware can be very slow</li><li>• Generally recommended to not run</li><li>• Compliance on systems also serving time</li></ul>
<b>Have questions? Simply contact us</b>	TimeKeeper Platform Solution, TimeKeeper Grandmaster II Appliance, TimeKeeper Server or Boundary Clock Software, and TimeKeeper Active Client Software are available from <a href="http://www.FSMTime.com">www.FSMTime.com</a> and FSMTime' resellers. If you have any questions or would like a live demo of TimeKeeper products, simply contact us at <a href="mailto:sales@fsmtime.com">sales@fsmtime.com</a> .