HOPTROFF TIME™

Traceable Time as a Service (TaaS)

Monitoring Automation with Timestamps

As machine processing gets quicker and more activities are performed by autonomous algorithms, there is an urgent need for technology that can accurately monitor automated activity, so that machines, and by implication their owners, can be held fully accountable for their actions.

Microsecond timestamping is a reliable method of sequencing and verifying the data records of autonomous algorithms, but unless the clock on the server being monitored is continuously checked and corrected, accuracy will drift. Additionally, unless the timing process is monitored at each stage, from the primary time-source all the way to the logged timestamp, there will be no way to prove which timestamp is correct when two separate timekeeping systems disagree.

Achieving Traceable Time

To solve these problems, a timestamp needs to be able to show that it is accurate through an unbroken chain of comparisons from the timestamp back to the primary time source ("Traceability") so when a dispute arises, there will be a way to objectively compare timestamps, find out who is right, and resolve the dispute. To achieve Traceability requires the following steps:

- Connect three grandmaster clocks to three different primary sources of UTC (GPS, NPL, Glonass and Galileo are examples)
- Continuously compare the three different primary time sources to ensure accurate time is being maintained.
- A small application running on the servers to be synchronized that keeps the local server clock synchronized.
- Measure and record the internal latency within the server between the synchronized clock and applications so that any significant variation can be recorded in the timestamp log. At times of high loading this latency can be many milliseconds. This measurement is referred to as granularity.
- Log all the timestamps in a database so they can be used to monitor time keeping and aid in reconstructing events if required.

Time as a Service (TaaS)

When so many companies use co-located or hosted services to manage their servers, it is inefficient for each company to install a triad of GMC within each data centre. The efficient solution is to deliver Time as a Service (TaaS) over a network as a shared integrated service comprising three elements:

- A time feed, derived from three grandmaster clocks connected to three different sources of UTC, which is delivered over a direct ethernet connection, with consistent asymmetry, to the data centre. An accuracy of 10µs has already been achieved in testing over existing networks between London, Frankfurt and Paris (each network provider needs to be tested to verify performance).
- Downloadable software which synchronizes with the time feed and measures granularity.
- A timestamp database that stores the logs and makes them available in a browser based UI.

Benefits of TaaS

Traceable TaaS implementation saves customers time and money because it:

- Provides fully traceable time much more quickly and at much lower cost than customers building and maintaining a complete system of their own.
- Ensures clocks all servers within a server estate are agree with each other to provide synchronous computing.
- Means traceable time evidence can be used to resolve disputes between the timestamps from two different timing installations, which both believe they are accurate, when they disagree.

Hoptroff London believes any industry which deploys, or intends to deploy, autonomous algorithms to manage business activities, can benefit from the introduction of TaaS and microsecond timestamping.

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