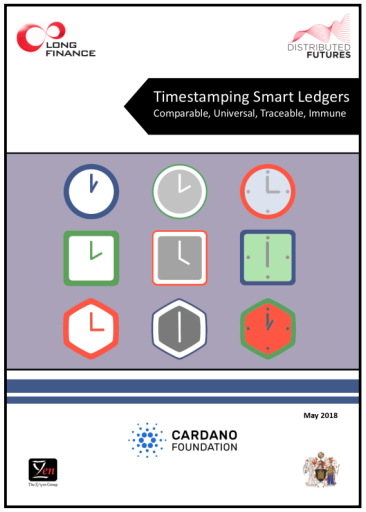
Timestamping Smart Ledgers
Comparable, Universal, Traceable, Immune

“Time is nature's way to keep everything from happening all at once” - John Archibald Wheeler (American Theoretical Physicist). Thanks to the synergy of Timestamping and Smart Ledgers, there is now a way to accurately track and immutably record various incidents across a multitude of industries. This report sheds light on the challenges produced by Timestamping and Smart Ledgers, as well as the many benefits they yield.

Overview



The report outlines current and historic methods for recording the time of an event, as well as the challenges that will be faced in the future. In the world of finance, these challenges include the stringent transaction timestamping requirements laid down by MiFID II Article 25 (or "RTS 25"). In geolocation, the interaction with global positioning systems, themselves subject to relativistic and quantum effects, are equally challenging. For Smart Ledgers, recording the time of transactions is a fundamental feature, yet there are a number of definitions and options that managers choose, often unknowingly, when they instruct their teams.

As the standards for timestamping become more and more stringent, we will need to look to new technologies for help. The use of Smart Ledgers may prove a great boon for all market participants. Regulators will find it easy to enforce technological standards, even in areas as challenging as timestamping.

The report is designed to produce materials that should help senior business people and policy makers understand why timestamping matters.

Report Extracts

A Timestamping Scheme Should Be C.U.T.I

Comparable - Timestamps only become useful when being compared to each other. A timestamping system that records the times of events would not only have to use a universal clock to guarantee *accuracy*, but would also have to provide each timestamp with a specified level of *precision*. Without these guarantees, there is the danger of disputes when attempting to compare two times.

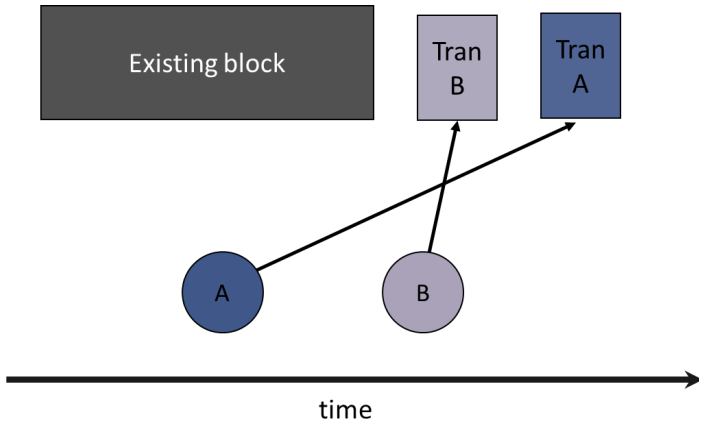
Universal - A timestamp on a document, smart contract, or transaction must be independent of the technology that applied it. Any two interacting systems are going to have to be able to marry up their timestamps with each other, irrespective of the technological mechanisms used by each.

Traceable - To ensure time traceability, every step back to the reference clock must be known and documented. It is easier to guarantee traceability with services such as NPLTime®, which certifies the time signal's traceability to UTC. To ensure traceability with GPS is more difficult. In order to ensure traceability to a central atomic time source, a user would need to have an appreciation of the latencies present in its own internal and external systems.

Immune - A large infrastructure has been set up worldwide, so that any system plugged into it can identify what the time is. It is therefore incumbent upon anyone recording the time of an event to ensure that the timestamp they use is immune from interference by a third party. A timestamp should be impossible to change after it has been applied.

Report Extracts

A Transaction With A Timestamp That Differs From The Posting Time



In the above Figure, transaction A occurs, is timestamped, and submitted to the network before transaction B. However, because the client who submitted transaction A is suffering from high latency, transaction A ends up sitting "after" transaction B in the audit trail.

Any timestamping system will have a specified precision. It is therefore possible that two events submitted by different users are timestamped so that they appear to have taken place at the same time. In such cases, in order to work out precedence, the Smart Ledger will have to fall back on its chronological audit sequence. The audit trail model ensures that the transactions would have to have been added in one order or another.

Conclusions

Throughout the history of timekeeping, two important metrics have been vital to the success of any technology: accuracy and precision. Whenever new timekeeping technologies arrive, their accuracy and precision must be evaluated anew. In a sense, accuracy is a measure of consistency with external standards, and precision a measure of inner consistency.

The time parameters and timestamps of smart contracts and transactions cannot be compared with one another, unless the standards of precision and accuracy are applied to all of them. If a user wishes to post a smart contract to a smart ledger, it is vital that the contract abides by the "time rules" of the ledger. Otherwise, since comparability is impossible, the transactions, contracts, and assets cannot exist in the same universe.

In the world of finance, required standards of accuracy and precision are rigorously set out by regulatory groups such as European Securities and Markets Authority (ESMA) and the Financial Conduct Authority (FCA). This means that if any new technology is to be taken seriously in the financial world, it must be capable of meeting these minimum requirements. Indeed, the sequential nature of Smart Ledgers renders some of the precision standards redundant, since the ledgers have to store transactions in the order received.

However, the distributed nature of the technology does mean that the questions of latency and synchronisation need to be even more carefully considered than a legacy, non-distributed system. This is especially true if the system is to be used in a financial system supervised by MiFID II.

To learn more about this and other Distributed Futures projects

www.distributedfutures.net

www.longfinance.net/Publications.html

You can contact us at hub@zyen.com

CARDANO FOUNDATION

LONG FINANCE

Yen The Z/yen Group