



## Sensitive Information Audit Timestamping

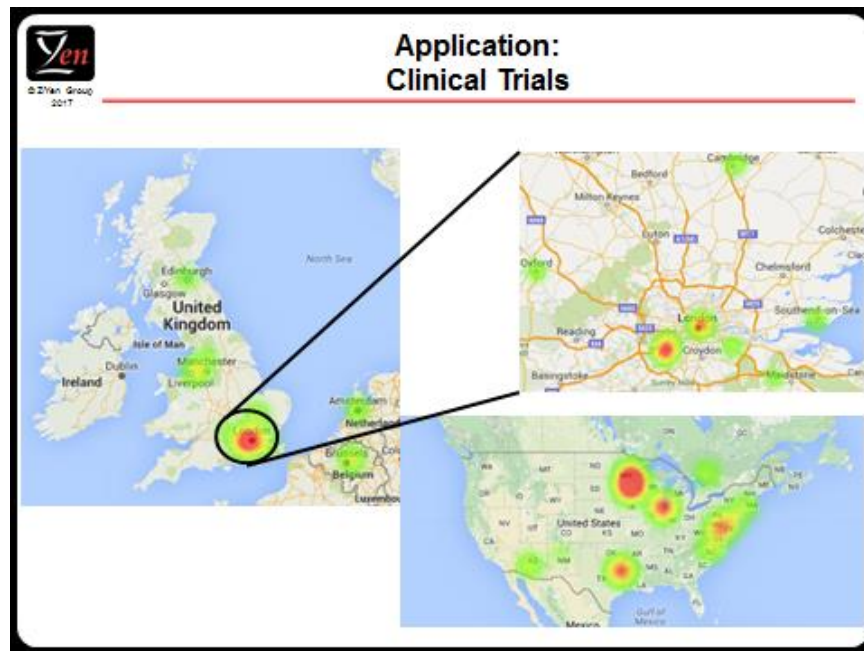
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### Background

As 'Big Data' use of sensitive data increases, the need for confidence by the general public in the responsible use of health and other information increases in importance.

Mutual distributed ledger (MDL, aka blockchain) technology already provides timestamping services in health. For example, Computerised Life Event Assessment Record (CLEAR) is a three year ESRC funded collaboration between researchers from Middlesex University, Kings College London, and Goldsmiths University. Since March 2016 CLEAR has recorded information relevant to clinical trials on the MetroGnomo MDL provide by Z/Yen. The CLEAR project – led by Professor Antonia Bifulco – is developing an interactive online method for measuring stress based on life changes, events and ongoing difficulties. MetroGnomo provides an unchangeable authoritative record of trials data. Proof that a given piece of information exists is logged by a network of receivers to guarantee persistence and incorruptibility without revealing the information itself. Channel Island government, the States of Alderney, have agreed to operate a receiver until 2021 and to oversee MetroGnomo's integrity.

There are several other projects using MetroGnomo confidentially for clinical research recording. In its first year, MetroGnomo recorded 8.2 million events clinical assessments. See some of the US-originated trials live here <https://metrognomo.com/heatmap/assessments/> (give it a second to load). The heatmap below shows a typical day.



### Outline Proposal



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For most applications, it is sufficient for an authoritative external audit to see that data written to a log is accurate and matches the hashes written to an external MDL. In technical terms, this is immutable. However, public confidence requires trust in the technology and trust in the process. The technology should have low reputation risk as well, a feature not associated with cryptocurrency blockchains.

We propose a service for physical publication of state information, available commercially for use by responsible Big Data users in high sensitivity applications such as health and AI. For publication, customers assert the state of any internal data structures they wish to be held accountable for. Those states can cover audit logs, or algorithmic evolution states, whatever the client wishes to be held accountable for.

Publication is designed to be irrevocable, and physical. The physical part is achieved by publishing, in addition to online publication, the latest hashes received in a reputable daily journal of record, e.g. the Times of London or London Gazette, such as the following:

*At 07:00:00 on 15 July 2017: \$company log state:*  
*3b3a84bb25c025ec19c20cc60a179e7ea240626cd572f1c70c019d62d2131d8d.*  
*MetroGnomo log state:*  
*a450c44298fc1c149afb4c8996fb92427ae41e4649b934ca495991b7852b855*

Once published in a newspaper, the information will be archived around the world, accessible on demand, and also allow any individual who wishes to maintain their own copy to do so, in a manner which can not be modified by technical means.

While not essential, this physical ‘belts and braces’ approach is designed to add a more public face to the immutability of the technical ledgers and enhance confidence.

### Next Steps

We welcome a discussion on interest in this outline proposal, and how this outline proposal could be taken forward. For an example of this already working technically, do check out [www.metrognomo.com](http://www.metrognomo.com). Please feel free to contact Michael Mainelli at [michael\\_mainelli@zyen.com](mailto:michael_mainelli@zyen.com).