XYO Network in Hospitals

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January 2018

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Abstract

Hospitals are among the most demanding and perilous establishments in the medical field. From medical equipment to identification of both patient and staff, a single misplacement or mistake could mean the difference between life and death. The XYO Network (XY Oracle Network) can provide trustless, verified location reporting that is critical in such a sensitive environment. The feasibility of error reduction and increased efficiency in hospitals is made possible with the XYO Network's unique blockchain technology. The implications could reduce prescription dosage errors, prevent unnecessary procedures, and ultimately, save lives.

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1 Problem

Medical errors are the third leading cause of death in the United States, according to a study released by the Johns Hopkins School of Medicine [1]. Many of these preventable deaths are a result of operational or record-keeping errors, including adverse drug interactions, improper medical records, and even unnecessary surgeries. In a letter to the Centers for Disease Control and Prevention, the study's author, Dr. Martin Makary, stated:

> *"It is time for the country to invest in medical quality and patient safety proportional to the mortality burden it bears. This would [include] research in technology that reduces harmful and unwarranted variation in medical care."* [2]
>
> —Dr. Martin Makary

2 Solution

By tying the XYO Network into the operational frameworks that are already in place in Hospitals, care providers can significantly reduce failures in communication and record keeping that result in patient injury and death. Utilizing the XYO Network and XYO Tokens can provide a trustless, decentralized, and independently verifiable record of all patient interactions with any staff as well as a log of relevant patient data such as the patient's vitals, treatment details, and test results for the duration of their stay.

3 How it Works

The XYO Network is a web of devices that record and archive heuristic data using a blockchain ledger. Whenever a device on the XYO Network interacts with another XYO device device, it logs this interaction. By reviewing this ledger of interactions and the additional data it provides, it's possible to verify with a high degree of certainty that a specific interaction happened at a specific time in a specific location.

For example, imagine a patient, John Doe, who is admitted to the E.R. John is given an identification bracelet that is also an XYO Network Sentinel, which keeps a record of any XYO Network devices John interacts with. The monitor that reads John's vital signs is also a Sentinel. It logs John's vitals as heuristic data, and the communication between the two devices eliminates the potential for human error in record keeping. The monitor also serves as an XYO Network Bridge, reporting and archiving the blockchain ledgers of any Sentinels it interacts with.

When John is treated by a doctor or nurse, these interactions are recorded on John's ledger, the monitor's ledger, and the ledger of a Sentinel embedded in the staff member's hospital ID. The XYO Network could even keep a log of medications John receives, and because a Sentinel could be linked to the medication itself, it could provide confirmation that the correct dosage of the correct medication was administered, confirming the accuracy of John's medical record.

References

[1] Makary, Martin and Michael Daniel. *Study Suggests Medical Errors Now Third Leading Cause of Death in the U.S.* John Hopkins Medicine, May 3, 2016.

[2] Makary, Martin. *Johns Hopkins professor: CDC should list medical errors as 3rd leading cause of death.* Washington Report, Baltimore, MD, May 4, 2016.

Glossary

Bridge A Bridge is a heuristic transcriber. It securely relays heuristic ledgers from Sentinels to Diviners. The most important aspect of a Bridge is that a Diviner can be sure that the heuristic ledgers that are received from a Bridge have not been altered in any way. The second most important aspect of a Bridge is that they add an additional Proof of Origin metadata. 2

certainty A measure of the likelihood that a data point or heuristic is free from corruption or tampering. 2

heuristic A data point about the real world relative to the position of a Sentinel (proximity, temperature, light, motion, etc...). 2

Sentinel A Sentinel is a heuristic witnesses. It observes heuristics and vouches for the certainty and accuracy of them by producing temporal ledgers. The most important aspect of a Sentinel is that it produces ledgers that Diviners can be certain came from the same source by adding Proof of Origin to them. 2

trustless A characteristic where all parties in a system can reach a consensus on what the canonical truth is. Power and trust is distributed (or shared) among the network's stakeholders (e.g. developers, miners, and consumers), rather than concentrated in a single individual or entity (e.g. banks, governments, and financial institutions). This is a common term that can be easily misunderstood. Blockchains don't actually eliminate trust. What they do is minimize the amount of trust required from any single actor in the system. They do this by distributing trust among different actors in the system via an economic game that incentivizes actors to cooperate with the rules defined by the protocol.. 1

XY Oracle Network XYO Network. 1

XYO Network XYO Network stands for "XY Oracle Network." It is comprised of the entire system of XYO enabled components/nodes that include Sentinels, Bridges, Archivists, and Diviners. The primary function of the XYO Network is to act as a portal by which digital smart contracts can be executed through real world geo-location confirmations. 1, 2