KIZUNA V1

Foreword

Our current healthcare system faces many challenges, including the security and privacy of users' health data. Sharing health data between primary and specialist care providers can be problematic due to the risks of privacy breaches and data loss. In addition, regulatory restrictions and security policies often prevent efficace data sharing.

For years, healthcare facilities, doctors and patients around the world have been given centralized systems that, although (in most cases) easy to use, are increasingly weak from the point of view of data security.

Goal

I have always believed that technology, and in particular information technology, which today is going through a rosy period full of innovations, should be based solely on the improvement of the living conditions of humanity, facilitating work and creating a better world.

For this reason, the question I asked myself was as follows: **can the world health system, which today is based for the vast majority on centralized systems be improved using the technologies that we have in our era?**

My goal was therefore to create a decentralized platform that allows the safe sharing of users' health data and that is designed to be highly secure, private and compliant with data protection regulations.

How to do? Through the use of a **Blockchain.**

Blockchain

Blockchain is a **shared,** unchangeable digital register **that records** transactions transparently and securely. It works like a big ledger, distributed over a network of computers called nodes, without a single central authority controlling it. Each transaction is recorded in cryptographically linked data blocks, creating a chain of information that can be verified by all participants. The blockchain offre **transparency, security and** decentralization, eliminating the need for intermediaries and opening new possibilities for innovation and collaboration.

Why decentralization?

The decentralization of blockchain offers numerous advantages over a traditional centralized database. One of the main advantages is improved security. In a traditional database, data is generally stored in one place, making them vulnerable to cyber attacks and fraud. Instead, a decentralized blockchain distributes data over a network of nodes, making it extremely difficult for hackers to alter or compromise information. Moreover, thanks to the use of advanced cryptographic algorithms and distributed consent, transactions within a blockchain are safe and unchangeable.

Another advantage of blockchain decentralization is transparency. In traditional databases, it is often unclear how data is managed and modified over time. With a blockchain, all transactions are recorded permanently and verifiably on the block chain. This means that each participant in the network can access a shared transaction log, promoting transparency and accountability.

Decentralization of blockchain or also greater resistance to failure. In centralized databases, if the central system fails or is compromised, the whole system may collapse. Instead, a decentralized blockchain distributes information over many nodes, ensuring that the system remains operational even if some nodes fail or are attacked. This resilience helps keep blockchain-based services reliable and available.

In addition, the decentralization of blockchains eliminates the need for a third-party trust. In traditional databases, trust in a centralized entity is often required to verify and validate transactions. With a blockchain, distributed consent allows users to independently confirm transactions without affigiving themselves to intermediaries. This reduces the costs and administrative burdens associated with managing a third-party trust.

Finally, the decentralization of blockchains promotes interoperability **and fair access**. Because blockchains are based on open standards and shared protocols, several blockchain systems can interact with each other without restrictions. This creates an environment where information and services can flow freely between different applications, allowing for greater collaboration and innovation.

Overall, the decentralization of blockchains has significant advantages over a traditional centralized database, including increased security, transparency, failure resistance, third-party deletion, and increased interoperability. These benefits have made blockchains a promising technology for a wide range of industries and applications, opening up new possibilities for efficiency, reliability and democratization of digital services.

Which Blockchain to choose

After months of study my choice fell on Ethereum**.**

Why?

First, Ethereum is known for its support for smart contracts. Smart contracts are autonomous programs that run on the blockchain and allow you to establish rules and agreements independently, without the need for intermediaries. This functionality of Ethereum offre a huge flexibility for the creation of **DApp**(*decentralized* applications) that require the automatic management of transactions and the validation of the rules of the game.

In addition, it has a large community of active developers and users, which means that there are many tools, resources and libraries available to simplify the development of decentralized applications.

Another reason to choose Ethereum is its interoperability. The support of numerous standards for the creation of smart contracts, which allow App to interact both with each other and with other services based on Ethereum, opens the door to the creation of interconnected ecosystems, where applications can exchange tokens and data in an efficient way.

In addition, Ethereum has a consensus mechanism called Proof of Stake (Pos) that is designed to improve energy efficiency and reduce transaction costs compared to traditional Proof of Work (Pow). This means that applications on Ethereum can benefit from faster confirmation times and lower transaction costs.

Finally, Ethereum has proven to be a reliable and stable platform over time. It has been in operation since 2015 and has handled a wide range of App and transactions on a global scale.

How it works

Data recording

Users will be able to upload their health data to the platform, where it will be stored safely and privately. From now on, the user will be the sole owner of the data.

Authorized primary and specialist care providers will only have access to this data if authorized by users themselves by creating a smart contract on the blockchain. This means that users will have complete control over their data and can revoke access at any time.

Event recording

The platform will be able to manage different types of events:

- User-generated events, such as a request for advice from a primary and/or specialist care provider, the sending of data upon request by one of the authorized doctors, or the booking of a visit of any type.
- Events generated by care providers, such as confirming a reservation, sending a report about a visit or surgery, requesting data for analysis, sending a prescription, etc.

The data managed during the events will obviously be treated as personal data of the patient and therefore will be accessible only to medical personnel previously authorized.

Data sharing

Subject to your consent, the platform may allow the sharing of your data between different types of care providers. This is obviously not a mandatory feature, but it could simplify the diagnosis in many cases.

Take for example the diagnosis of an uncommon disease. In these situations, several doctors from all over the world can contribute to the cure and provide their experience directly from their device, collaborating in real time with trusted care providers of the user.

Data analysis

In case of authorization by the user, the platform may also allow the collection of data in order to analyze them and check the general trend of certain catchment areas. It should be remembered that the data will always and only be analyzed by authorized personnel and processed in a completely safe form. This will help care providers to better study the development of the pathologies of the users to whom they are linked or of specific geographical areas.

Transactions

The platform will use end-to-end encryption to ensure data security during transfer and storage. In addition, all transactions will be recorded on the blockchain, creating complete traceability and ensuring that all parties involved are aware of the origin and history of all data.

Perks

In summary, the main advantages of using this platform will be:

- Increased security and privacy for users' health data
- A platform highly compliant with data protection regulations
- Immediate access to health data by authorized primary and specialist care providers
- Full control of users on their data, with the possibility to revoke access at any time
- Full traceability and high security thanks to blockchain technology

Requirements and costs

Accounts on blockchains work slightly differently than the "traditional" systems we are used to. In order to create an account you need a **wallet**, which will automatically generate a hash address that will match our person.

This is an example: **0d680149400a9ed662d3b2d49e878664efd1b853.**

Creating this hash is completely free and the procedures vary depending on the provider you choose, but they are all very simple. Some examples of wallet providers are MetaMask or Coinbase.

Why use a digital wallet?

Blockchain transactions have a cost, which is normally based on several factors:
- The computational power used to execute a user request
- The current amount of requests to be executed in the same time frame
- The current value of an *Ether,* the main currency on which Ethereum is based and which will be the currency through which transactions will be paid.

It’s easy to understand how the cost for every single transaction depends from the day of the week or even from the moment of the day in which it is executed.
However, after several calculations done during some simulations, I can confirm that in the case of the platform described above the cost of transactions will not be more than a few cents, with a maximum attainable of 1-2$.

It is also important to specify that you will have to pay only for **writing** transactions. In In other words, recovering data from the blockchain will always be free and the only actions that will have a cost will be the insertion and/or upload of data.

This translates into completely sustainable costs and in many cases even lower than those normally faced for a specialist visit or a routine check-up.

Conclusion

This decentralized platform for the secure sharing of health data is a big step forward for the healthcare sector. It offers a highly secure and private solution for sharing users' health data, creating an environment where users have complete control over their data, and authorized primary and specialist care providers can access critical information quickly and securely.

So **Kizuna** is born**.**

Sources

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