

# BlockInsure

Pieces Tech

## Introduction

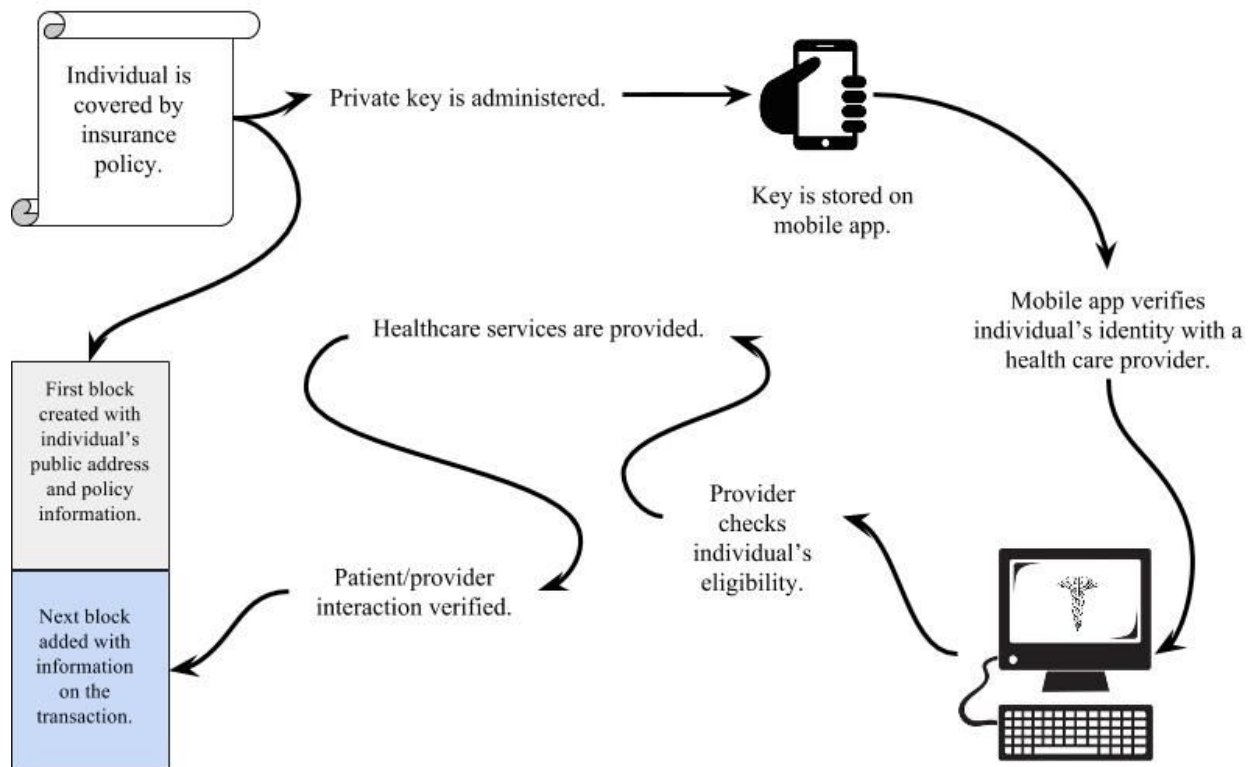
Blockchain was introduced in 2008 and has been utilized mostly as the backing architecture for various crypto-currencies. Despite its historical usage, this technology has a place in Health IT. Although there will be high implementation costs and questions to the security of the system, a properly designed private blockchain will provide a protected way to verify individuals' insurance information, while creating an extra component to defend against fraud.

## Background

Blockchain is a distributed database consisting of a list a valid transactions that are unable to be tampered or revised. Each individual transaction is timestamped and validated by multiple members of the public, and is known as a *block*. It is then linked to a pre-existing block and forms the *chain*. This is the main technology that supports bitcoin and many other cryptocurrencies. Historically, the addition of a block to the chain required an immense amount of computing power, as complex algorithms were involved, so they had to rely on dedicated data centers to add new blocks to the chain. However, in newer implementations, this need has been reduced greatly, allowing for a smaller networks to be made, while still maintaining the decentralized design that blockchain was originally possessed. The immediate advantage of any blockchain is that the dataset is only filled with valid transactions, and this data is readily available to anyone who needs to access it.

## Insurance Coverage Verification

The individual patients and providers would form the various nodes, and the transactions between individual and healthcare providers would then be recorded within the chain. This would create an undisputable account of an individual's proof of insurance. In the public view, the provider and individual would have anonymous addresses, and the individual would hold a private key that they would then utilize to prove their transaction history. After an interaction between a provider and individual, this transaction would then need to be validated by a group of nodes prior to being added to the chain. Once added to the chain, this interaction would be visible to anyone with access to the blockchain and could not be removed, so insurance and healthcare providers would have a readily available list of all past interactions within the system.



## Efficiency

Upon beginning a new coverage plan, an individual would be given a randomly generated personal key that could either be stored on a smartphone app, or if this is not available, then a smart card could be used instead. In either case, an individual could then show a healthcare provider that their identity is linked to their public address without revealing their private key; this would all be done by the phone or card. This would mean that a healthcare provider would instantly be able to verify an individual's insurance coverage with minimal effort and time expended.

## Insurance Fraud Protection

Blockchains historically have been used in monetary transactions and have guarded against fraudulent transactions; for an interaction to be added to the chain, both parties must prove who they are with their private key, and then it must be validated by a group of nodes prior to being appended to the list. This same concept can be applied to the insurance chain; in order for an item to be added to the chain, an individual and provider would have to use their private key, and then the interaction would be placed on the chain with a timestamp permanently. Having this historic list of transactions would increase the traceability, which, in turn, could result in a decrease in insurance fraud. Insurance providers could track various variables conveniently in order to identify fraud automatically, and due to the validation process, it would be difficult to refute whether the fraud has taken place. On top of this, individual healthcare providers could easily and quickly monitor the interactions to ensure that all of the transactions are correct.

# Blockchain Design

The ideal design for the blockchain would be a private network in which insurance and healthcare providers are the only groups that are given access to the data on the chain; this data would contain no explicit information about the interactions, utilizing anonymous public addresses that could be linked with an individual or organizations with a private key. Under this design, there wouldn't be a risk of a breach in PHI security, as only individuals who traditionally had access to this information could access it, with the added benefit of the information on the chain being completely anonymous. Private blockchains are far smaller than public ones, and therefore, the amount of computing power required to add a new block is minimal; this process would be able to be done on a personal computer, rather than needing dedicated data centers. Users would need a computer to prove who they are, but for many, this could be done in the form of an app on a smartphone. In cases in which an individual does not have access to a smartphone, smart cards --- credit card sized devices with a micro computer inside --- could be used instead. Either option would create a secure and user friendly way to manage an individual's private key and be inexpensive to rollout to users.

# User Experience

The experience for participants will be fairly similar, but far more efficient, to the traditional process of insurance verification. An individual would still bring their identification to their healthcare provider, only instead of a card, this will either be on a smartphone app or smart card. The healthcare provider would then verify that the individual was eligible for treatment, but this process would be automated and instantaneous.

# Conclusion

Utilization of blockchain technology will not only make the process of insurance verification easier and quicker, but it will also create an extra barrier to protect against insurance fraud. Implementation of this system will not only save time for healthcare providers and individuals, but will also save insurance providers money.