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COVID-19 Vaccine Distribution Puts Spotlight on Blockchain Benefits

There is great anticipation and hope that the development of the Covid-19 vaccines will allow our lives to begin to return to normal. But the effectiveness of the vaccines depends on many factors including successful distribution. This is a place where software-enabled technologies — including emerging advances like blockchain — can play a role. While the potential benefits of blockchain technology remain underappreciated, its role in the distribution and security of the vaccine for Covid-19 presents an opportunity to help better understand how blockchain works, and how it benefits sectors across the economy.

Blockchain is a digital ledger used to record transactions permanently and safely. Third-party management is not required as the records are updated by the blockchain participants themselves, increasing transaction efficiency and security. Only authorized parties can add information to the blockchain and/or access previously recorded information. To leverage this technology, users are not required to have blockchain expertise, all they need is to know is how to upload data to the blockchain application and/or access it.

For additional information about Blockchain, please see Software.org: The BSA Foundation's Blockchain Primer

Participants in a blockchain submit their records/transactions (blocks) to the ledger and these blocks are "chained" to additional blocks submitted by other participants. These ledgers are structured to allow anyone with access to the database to view the complete history of the transactions it contains. To ensure that the transactions are legitimate, updates to the blocks or records are authenticated and verified through digital signatures and encryption. Access to blockchain information is also only available to authorized individuals, which addresses privacy concerns.

Blockchain technology can be used in a variety of ways to support immunization efforts:

STORAGE AND TRANSPORTATION

VACCINE INTEGRITY

PRODUCT RECALL

IMMUNIZATION RECORDS

STORAGE AND TRANSPORTATION

Vaccine supply chains are very intricate as they involve many stakeholders and steps that need to be taken quickly and safely.

Each supply-chain step can be recorded using blockchain, which can help ensure vaccines are stored and transported from manufacturing facilities to patients observing the necessary protocols, including vaccine temperature conditions.

VACCINE INTEGRITY

Unfortunately, highly desirable products are often counterfeiting targets. Counterfeit vaccines would pose a grave risk to human life, as they would not only be ineffective but could also further harm patients' health. Blockchain can be used to ensure that the vaccine that reaches patients was produced by authorized manufacturers.

Ensuring each step of the supply chain is accounted for and safely recorded using blockchain can help ensure the integrity of the product that will be administered to patients.

PRODUCT RECALL

In the event shipment storage or transportation protocols are breached, a recall may be necessary if such breaches raise concerns about the quality of the vaccines. When blockchain is used, products can be traced very efficiently, and recalls can occur quickly and in a very targeted manner. This would prevent major disruptions in delivery.

IMMUNIZATION RECORDS

Patients, doctors, employers, school administrators, and other stakeholders will need quick access to patient immunization records. And all this needs to be done quickly, safely, and in a way that ensures patient privacy.

Paper-based records can be misplaced and could theoretically be forged. Blockchain can be used to securely record the vaccination dosage received by each person on certain dates. These records can be made available digitally, almost in real time, minimizing errors and increasing efficiency.

Blockchain records can be used to help doctors and patients keep track when new immunization is required. People can keep their vaccination records in a secure "digital wallet," and they can choose to share this information for any purposes they wish, including international travel.

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