



Analysis on the Impact of GDPR in Healthcare-related Blockchain Solutions and Guidelines for Achieving Compliance

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Scope

- ▶ Blockchain is an emerging technology that offers decentralised data management
- ▶ Radical increase of digitisation in healthcare
- ▶ Concerns regarding the safety of medical data and the transparency of data transactions
- ▶ General Data Protection Regulation
 - ▶ Integral for personal data protection
 - ▶ Opposite to the capabilities of blockchain
- ▶ The scope of this publication is to present blockchain, describe its potential in the healthcare domain, list limitations between blockchain and the GDPR, and finally provide guidelines to reconcile the two

Introduction to Blockchain

Someone requests a data transaction



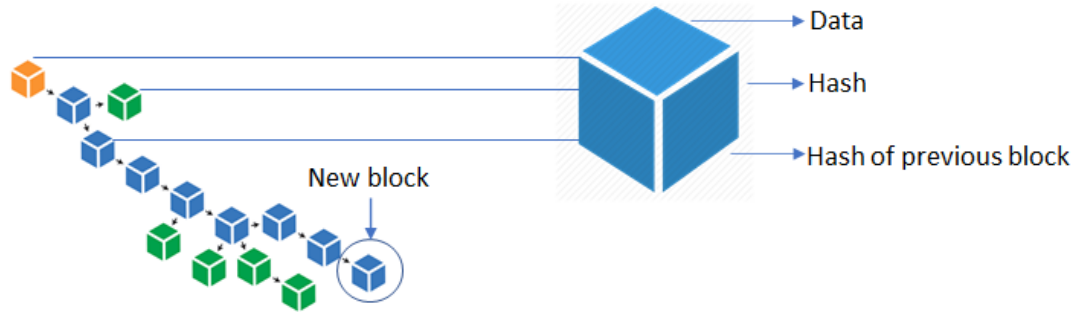
The requested transaction is sent to a P2P network consisting of computer nodes



The nodes validate the transaction. Enough nodes need to validate a transaction to achieve network consensus



A verified transaction can involve cryptocurrencies, contracts, or other pieces of information



The verified transaction is combined with others until enough verified transactions can be collected to generate a new block that is permanent and unalterable



Transaction is complete



Advantages of Blockchain

- ▶ Effective and secure solution in any field involving data transactions
- ▶ Smart contracts can add a degree of automation in the management and validation of transactions in the system
- ▶ Users have ownership of their data
- ▶ Blockchain networks ensure continuous availability, reliability, security, durability, and integrity in a given network or system
- ▶ Blockchain includes various mechanisms through which a transaction is secured
 - ▶ Proof of existence and non-existence
 - ▶ Proof of time
 - ▶ Proof of order
 - ▶ Proof of authorship
 - ▶ Proof of ownership

Blockchain in Healthcare (1/2)

Blockchain can be leveraged by medical digital solutions:

- ▶ As a secure database
 - ▶ Data integrity and maintainability
 - ▶ Digital trail
 - ▶ Reduces the possibility of system malfunction
 - ▶ Users have control of their data
- ▶ Through the use of cryptocurrencies to facilitate economic transactions in the network
- ▶ Combat counterfeit drugs and prescriptions

Blockchain in Healthcare (2/2)

Healthcare Data Infrastructure (e.g., Blockchain-as-a-Service)



Personal Health Record Management (e.g., data-as-a-service)



Healthcare Analytics



Med Device & IoT Security



Identity



Supply Chain (e.g., Pharma)



Digital Medicine & Care Delivery



Advisory, Dev Shop & More



GDPR and Legal Landscape

- ▶ The GDPR sets out rules for the protection of personal and sensitive data
- ▶ Personal data is defined as information that describes an individual, such as identification, physical characteristics, education, employment, financial status, interests, activities, and habits among others
- ▶ Sensitive data of a person refer to his/her racial or ethnic origin, political views, religious or philosophical beliefs, medical records or health status, social welfare, love life, criminal prosecution, convictions as well as participation in associations/organisations related to the above
- ▶ Personal and sensitive data are protected by the GDPR and national legislations
- ▶ GDPR sets out citizen rights to information, access, correction, deletion, objection, notification, automatic decision making and data portability

Basic Provisions of the GDPR

- ▶ Informed consent of users that provide their data to companies/organisations
- ▶ Data minimization when it comes to data processing
- ▶ Informed consent of individuals for the transfer/processing of their data

As such organisations must:

- ▶ Draft and use consent forms to receive users' consent
- ▶ Appoint a Data Protection Officer (DPO)
- ▶ Conduct a Data Protection Impact Assessment (DPIA)

Current Challenges related to the GDPR

- ▶ Blockchain is built entirely on the assurance that transactions will never be forgotten or deleted
- ▶ Right to data deletion is one of the most important articles of the GDPR
- ▶ Organisations and blockchain developers employ various techniques to facilitate data deletion in blockchain:
 - ▶ Encryption techniques combined with private key destruction
 - ▶ Data is saved in central databases and blockchain is used to store the hashes of transactions

Guidelines for GDPR Compliance

- ▶ Informed Consent: Blockchain initiatives must draft informed consent forms that set out the rights of patients and the legal obligations of the data controller and participating organisations
- ▶ DPIA: The DPIA is an excellent opportunity for blockchain initiatives to pinpoint potential risks and explain how such risks will be resolved
- ▶ Appointment of a DPO
- ▶ Privacy by Design: All security measures must be set out from the start, before the system is implemented
 - ▶ Non-blockchain storage
 - ▶ Anonymisation/pseudonymization
 - ▶ Patients' rights

Conclusions and Next Steps

- ▶ The GDPR is not a piece of legislation aiming to create limitations for innovative technologies, but rather to set out the requirements that must be met by technical solutions to ensure privacy and security.
- ▶ The end goals of blockchain and the GDPR seem quite similar, both aiming to empower the data owner and bring forth a new age in data management
- ▶ The guidelines that have been generated to achieve GDPR compliance are not hard to implement and keep track of
- ▶ The technical requirements that must be met follow the lines of effective programming practices instead of imposing hard constraints
- ▶ Researchers, legal experts and developers must work together to set out roadmaps for compliance in various areas and domains

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The overall composition is clean and modern, with the text centered in the white space.

Thank you for your attention!

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