

# Blockchain based platform for Healthcare Information Exchange

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**Abstract** - This document shows the required format and appearance of a manuscript prepared for SPIE e-journals. The abstract should consist of a single paragraph containing no more than 200 words. It should be a summary of the paper and not an introduction. Because the abstract may be used in abstracting and indexing databases, it should be self-contained (i.e., no numerical references) and substantive in nature, presenting concisely the objectives, methodology used, results obtained, and their significance. A list of up to six keywords should immediately follow, with the keywords separated by commas and ending with a period.

**Key Words:** *e-Health system, reliability, security, blockchain architecture, smart and connected, Heterogeneous data*

## 1. INTRODUCTION

Blockchain consists of a continuously growing list of records called blocks. Each block represents a set of transactions and is cryptographically linked to its previous block thus forming a chain. A Blockchain is managed by a peer-to-peer network of nodes that validate new blocks using a consensus algorithm. The consensus algorithm ensures that the next block in a blockchain is the one and only version of the truth, thus preventing powerful adversaries from successfully forking the chain. As a result, all nodes of the network contain the same replica of data, eliminating the need of a central trusted authority to manage data.

## 2. OBJECTIVES

Following are the objectives.

- Data can only be accessed by the patient's private key, even if the database is hacked, the data will be unreadable.
- Healthcare data is highly sensitive so there is a need to protect it from unwarranted access.
- A patient will have full control over accessing their healthcare data. The patient will control who sees their data and what they see.

**Problem Definition** Health information exchange is probably that one thing that keeps hindering healthcare IT. The challenges are in data security and privacy, as well as in multiple operational inefficiencies, which inevitably concern those partaking in sensitive interactions. There are multiple reasons why privacy remains challenging, but the major one is that there are no uniform architectures and standards to ensure trusted access and safe data exchange between all stakeholders, including patients. So, facing all this problem, I am presenting a Blockchain-based approach for exchanging patient data securely. A blockchain network with Health information Exchange can help providers to gain patients' trust since

individuals will be able to track everything that happens with them.

**Research Hypothesis** It is a decentralized platform that apply blockchain technology to solve the problem of health data exchange. It aims to create platform where different healthcare agents such as doctors, hospitals, laboratories, pharmacists and insurers to request permission to access and interact with medical records. Each interaction is auditable, transparent, and secure, and will be recorded as a transaction on distributed ledger. The project will guarantee privacy issues as it is built on the permission based Hyperledger Fabric architecture providing for varying access levels. Therefore, patients will be able to control who can view their records, how much they see and for what length of time.

## 2.1 METHODOLOGY

- 1) **Blockchain:** Blockchain is a Peer-to-Peer decentralized technology. The important thing to know about blockchain is its main characteristic: Transparency, no need for third parties and instant access to data since it is replicated on all nodes. It is a series of linked blocks of transferred data between different connected nodes that form the network of the blockchain. There exist many types of blockchain, either private or public, and the most popular are Bitcoin and Ethereum. The first one is the infrastructure for the well-known cryptocurrency Bitcoin. The other, Ethereum, is very similar to Bitcoin but differs however in several aspects. For instance, it has a very flexible programming language for Smart Contracts, which we will define later, and there is a difference in what the blocks contain, and how each block is validated [5].
- 2) **IPFS:** The Inter Planetary File System, is a peer-to-peer distributed file system that is based on different older technologies, especially BitTorrent. It is "similar to a single BitTorrent swarm exchanging git objects". IPFS is very similar to Blockchain in terms of the way it functions, however IPFS is seen as the storage system since one of the most drawbacks of Blockchain is its inability to maintain a huge amount of data on it [6]. We believe that IPFS is the best candidate for Off-Chain database in a fully distributed system
- 3) **Mining:** It is the process of validating a block in the blockchain, it varies between different types of blockchain. What's important is the fact that a lot of computational power is needed for becoming a "Miner" in the blockchain. Miners are usually rewarded, for example in bitcoin, they are rewarded with actual crypto-currency. Mining might affect the whole performance of the system, it is a critical concept that needs to be taken into consideration.

## 2.2 SYSTEM REQUIREMENT

### Software Requirement

1. NodeJs
2. Angular Js
3. Python
4. PHP

### Hardware Requirements

- 1.Processor : Intel Core i8
- 2.GPU
3. RAM : 8GB
4. Hard drive : 1TB
5. Windows/Linux or an Apple Mac : 64Bit

Most of the tools used in Blockchain based application development are supported on Windows, Linux and Mac.

**Table -1:** Project Plan (Work Schedule Chart)

Sr. No.	Description	Tentative work to be accomplished	Proposed Duration
1	Literature Survey	To study maximum 20 papers.	8 weeks
2	Study of Base Paper	To do a thorough study of the base paper	4 weeks
3	Implementation of Base Paper	To implement modules	12 weeks
4	Extensions to Base Paper	Enhancing base paper	8 weeks
5	Test and implement	Performing testing and quality assurance	4 weeks
6	Conclusion and Report Writing	Completion of documentation.	4 weeks

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