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# **Software Requirements Specification**

**for**

## **MedChain**

**Version 1.0 approved**

**Prepared by Varun and Noman**

**Sardar patel institute of technology**

**4th September 2022**

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## Revision History

Name	Date	Reason For Changes	Version
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<b>Med Chain</b>	<b>4 September 2022</b>	First Version	1.0

# **1. Introduction**

## **1.1 Purpose**

The purpose of this document is to present a detailed description of the blockchain-based decentralized software MedChain. It will explain the purpose and features of the software, the interfaces of the software, what the software will do, and the constraints under which it must operate. This document is intended for users of the software and also potential developers.

## **1.2 Document Conventions**

*This document was created based on the IEEE template for the system requirement specification document.*

## **1.3 Intended Audience and Reading Suggestions**

1. Typical Medical professionals who want to store there for viewing and storing the patient's EHRs.
2. Patients who want to have access to their EHRs demanding for a trustworthy platform.
3. Blockchain Developers and Programmers who are interested in working on the project by further developing it or fixing existing bugs.

## **1.4 Product Scope**

1. The user will be able to authenticate him/her using a MetaMask wallet.
2. They will be able to upload their medical records in the form of text data or files along with verification details.
3. Medical practitioners will be able to view insensitive data.

## **1.5 References**

- On the Design of a Blockchain-Based System to Facilitate Healthcare Data Sharing, DOI: [10.1109/TrustCom/BigDataSE.2018.00190](https://doi.org/10.1109/TrustCom/BigDataSE.2018.00190)
- A Permissioned Blockchain-Based Clinical Trial Service Platform to Improve Trial Data Transparency, DOI :[10.1155/2021/5554487](https://doi.org/10.1155/2021/5554487)

## **2. Overall Description**

### **2.1 Product Perspective**

Healthcare data is highly sensitive and there is a need to protect it from unwarranted access. Proposed is a decentralized record management system to handle Electronic Health Records (EHRs), using blockchain technology. The block content represents data ownership and viewership permissions shared by members of a private, peer-to-peer network. Via smart contracts on an Ethereum blockchain, they log patient-provider relationships that associate a medical record with viewing permissions and data retrieval instructions (essentially data pointers) for execution on external databases. The medical records of patients can be stored on IPFS and can be encrypted using the patient's public key.

### **2.2 Product Functions**

1. Uploading of EHRs.
2. Downloading of EHRs
3. Sharing of EHRs
4. Tracking of Patient's Medical history.
5. Validating the Medical Records of a patient.

### **2.3 User Classes and Characteristics**

There will be three user classes

1. Typical Medical professionals who want to store there for viewing and storing the patient's EHRs.
2. Patients who want to have access to their EHRs demanding for a trustworthy platform.
3. Blockchain Developers and Programmers who are interested in working on the project by further developing it or fixing existing bugs.

### **2.4 Operating Environment**

- Windows Vista
- Windows 7
- Windows 8
- Windows 10
- Windows 11
- Mac OS X
- Linux

- Android

And any possible operating system which can operate a browser with a cryptocurrency wallet as a plugin

## 2.5 Design and Implementation Constraints

MedChain has been designed as decentralized Web 3.0 application and hence can be only used on devices that have an active/stable internet connection as well as a browser with a cryptocurrency wallet to perform transactions on the blockchain.

## 2.6 User Documentation

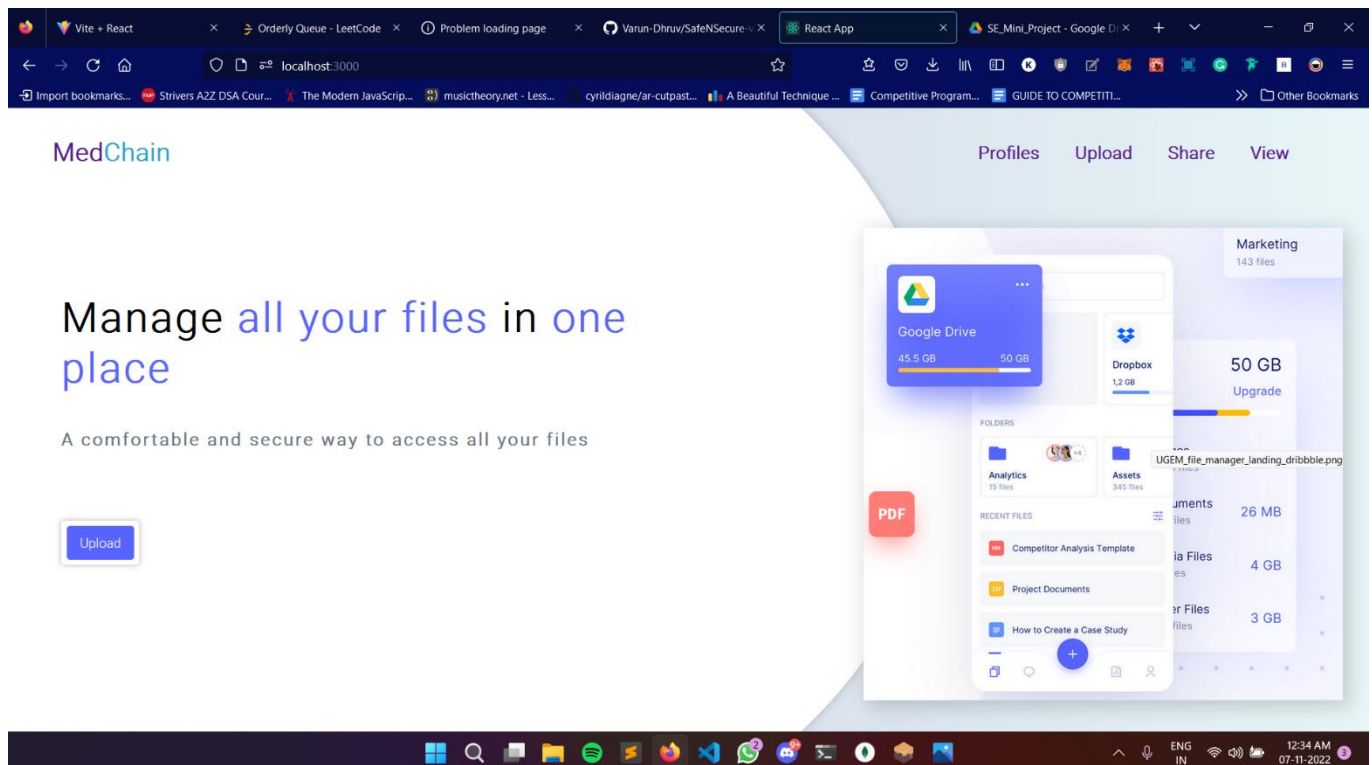
No user documentation yet

## 2.7 Assumptions and Dependencies

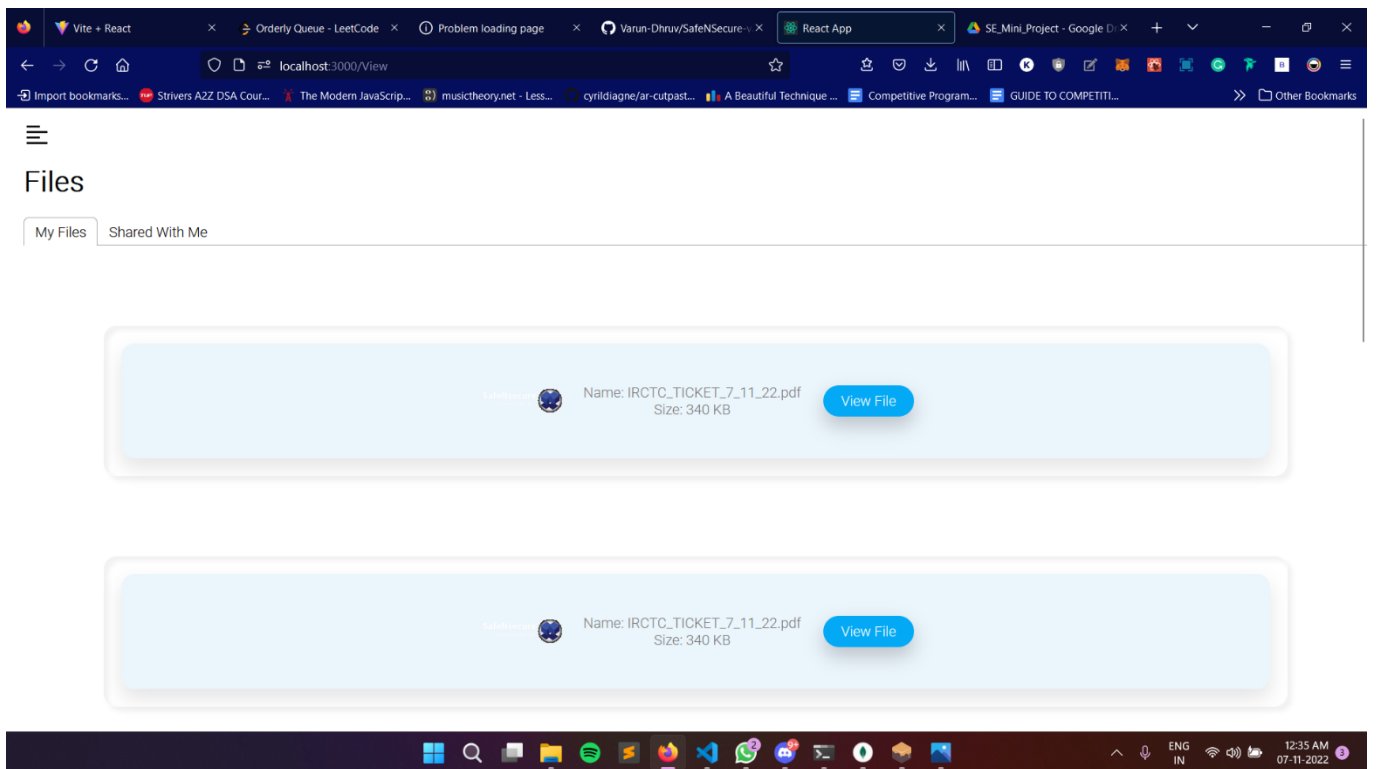
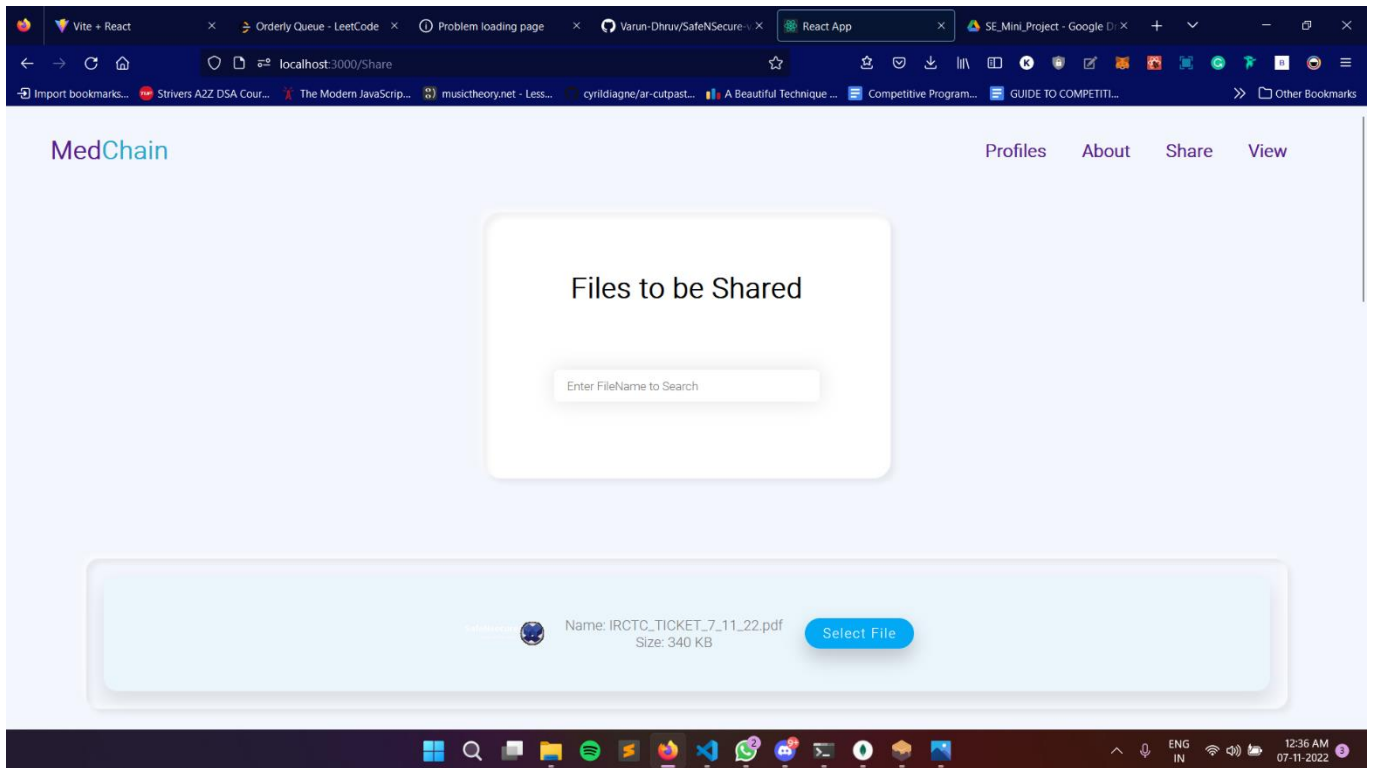
MedChain has been designed as a decentralized Web 3.0 application and hence can be only used on devices that have an active/stable internet connection as well as a browser with a cryptocurrency wallet to perform transactions on the blockchain

# 3. External Interface Requirements

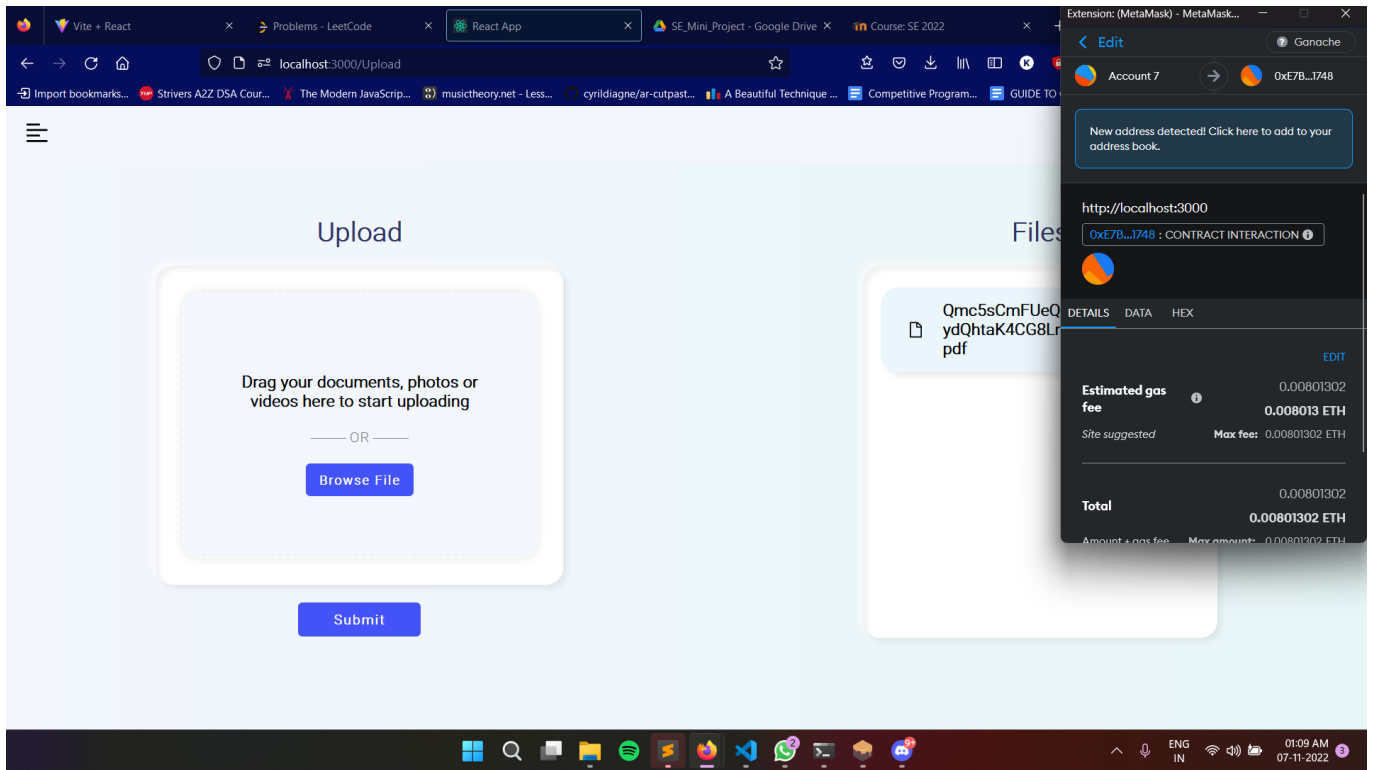
## 3.1 User Interfaces




## Software Requirements Specification for <Project>






## Software Requirements Specification for <Project>











Ganache




Connected


Account 4  
0x224...77DD






99.0864 ETH


Buy

Send

Swap


Assets

Activity



Contract Interaction  
May 17 · localhost:3000

-0 ETH  
-0 ETH



Contract Interaction  
May 17 · localhost:3000

-0 ETH  
-0 ETH

## **3.2 Hardware Interfaces**

The minimum hardware requirements of Gephi are a 500 Megahertz CPU and 128 megabytes of RAM, Ethernet Port, or Wifi Adapter for valid Internet Connection

## **3.3 Software Interfaces**

MedChain requires a web browser with cryptocurrency wallet support to be installed on the system.

## **3.4 Communications Interfaces**

MedCare requires an internet connection, a web browser, and Metamask Plugin.

## **4. System Features**

### **4.1 User Authentication**

#### 4.1.1 Description and Priority

User authentication on the blockchain network will be done through the metamask wallet.

#### 4.1.2 Stimulus/Response Sequences

After visiting the website a user would click the connect to wallet button. A new window will open asking for permission to authorize a metamask wallet.

#### 4.1.3 Functional Requirements

REQ-1: If validation fails then we will show a popup for installing a cryptocurrency wallet, as it's required to have a wallet to access blockchain-based websites.

### **4.2 Uploading EHRs**

#### 4.2.1 Description and Priority

A patient/physician will be able to upload his / her documents on the blockchain for updating his medical record chain.

#### 4.2.2 Stimulus/Response Sequences

A patient/physician will click on the upload button and will be shown the browse file option, to select a file from his / her file explorer.

#### 4.2.3 Functional Requirements

REQ-1: If a user uploads multiple files at the same time we will show him a popup to upload files one at a time as we want a chain-based record.

REQ-2: If the file is too large (e.g 500MB size file) then we will show a popup of the time limit exceeded, try to upload a smaller file.

### **4.3 Validating the EHRs**

#### 4.2.1 Description and Priority

The physician and the patient would have to agree that the uploaded document is genuine.

#### 4.2.2 Stimulus/Response Sequences

A patient/physician will click on the Verify button to verify his / her medical record stored on the blockchain. If both the party agrees that the document is

genuine then two ticks would be shown, one of the physician and the other would be of the patient.

#### 4.2.3 Functional Requirements

REQ-1: A patient/physician will only be able to verify the documents if they are logged in through their Metamask wallet.

REQ-2: Both the user classes. i.e. the patient and the physician will have to verify the document in order for that document to be shown as verified.

### 4.4 Tracking of patient's medical record

#### 4.2.1 Description and Priority

The physician and the patient would be able to view the patient's medical record chain.

#### 4.2.2 Stimulus/Response Sequences

A patient/physician will go to the document page to view the documents (It will be sorted according to the dates). Now a user will be able to share and download the documents by clicking on the respective buttons.

#### 4.2.3 Functional Requirements

REQ-1: A patient/physician will only be able to view, share or download the documents if they are logged in through their Metamask wallet. Only the physician and patient will have the access to view the documents.

## 5. Other Nonfunctional Requirements

### 5.1 Performance Requirements

MedChain requires a system with at least a 500 megahertz CPU and 128 megabytes of RAM. Performance depends on the size of the Mempool and gas fees for each request.

### 5.2 Safety Requirements

The user should not share his/her MetaMask or any other wallet credentials enabling them to access your public and private keys.

### 5.3 Security Requirements

MedChain provides the user with complete security and transparency of their EHRs by employing the benefits of blockchain technology.

## **5.4 Software Quality Attributes**

MedChain provides users with both simple and advanced features. Due to its well-designed and easy-to-use interface, it can be used by both experts and typical users. However, users must already have a basic knowledge of Web 3.0 applications before using them.

## **5.5 Business Rules**

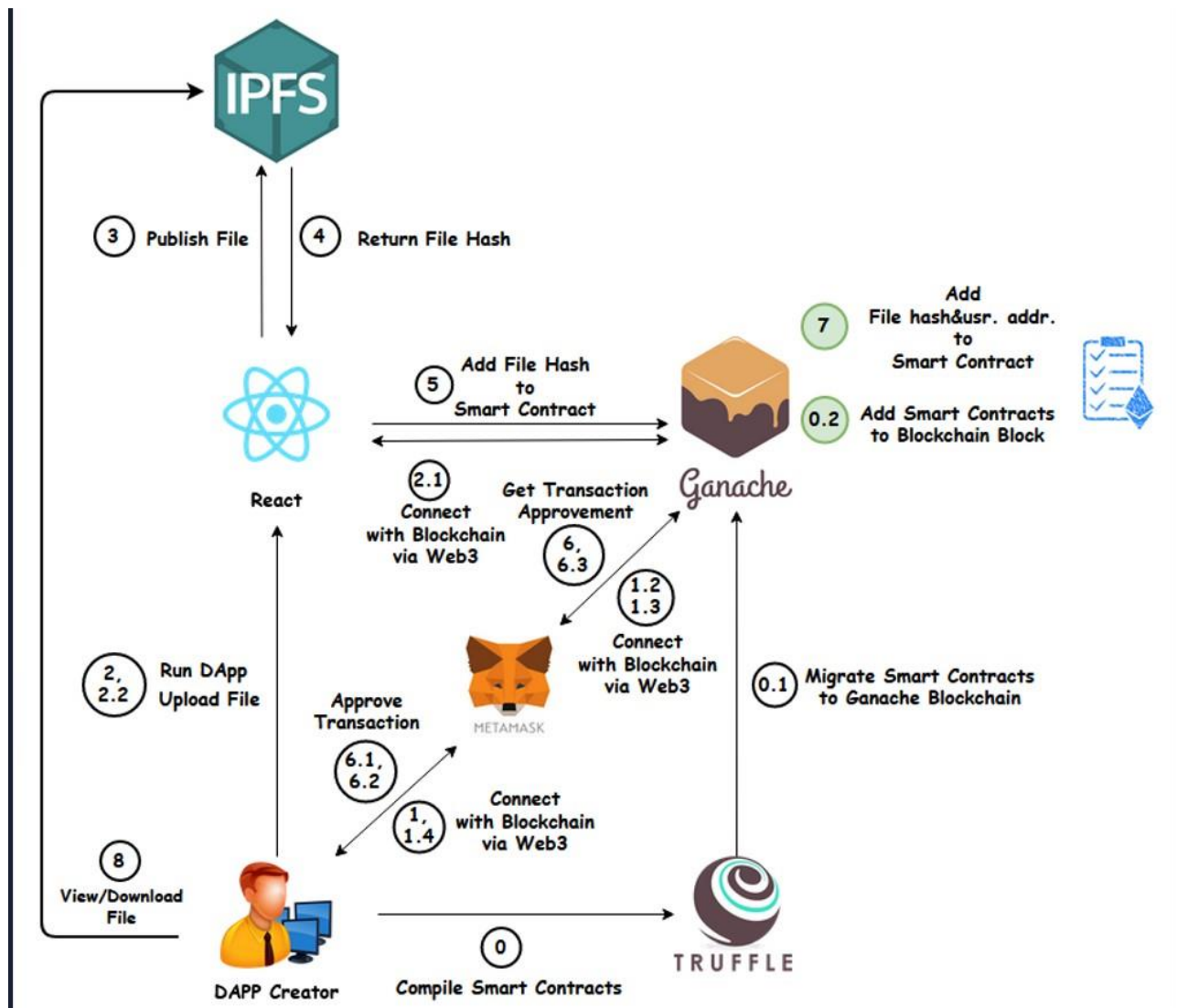
The website will act as a platform for the various user classes mentioned above. We can implement this system in multiple hospitals and medical centers. The verification ticks will give the patient and the doctor a sense of trust. The medical record chain of a patient would help the doctor to get a glance at the medical history of the patient, this will create transparency.

# **6. Other Requirements**

## **Appendix A: Glossary**

- **Cryptocurrency Wallet:** Crypto wallets store your private keys, keeping your crypto safe and accessible. They also allow you to send, receive, and spend cryptocurrencies like Bitcoin and Ethereum.
- **EHRs:** An Electronic Health Record (EHR) is an electronic version of a patient's medical history, that is maintained by the provider over time, and may include all of the key administrative clinical data relevant to that person's care under a particular provider, including demographics, progress notes, problems, medications, etc.
- **JS:** JavaScript, often abbreviated JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. JavaScript is used to program the behavior of web pages
- **React JS:** React is a free and open-source front-end JavaScript library for building user interfaces based on UI components. It is maintained by Meta and a community of individual developers and companies. React can be used as a base in the development of single-page, mobile, or server-rendered applications with other frameworks

## Appendix B: Analysis Model



## Appendix C: To be determined list

1. Letting users upload multiple documents at a single time
2. Encryption of Files using RAC.

### Video Link:

<https://drive.google.com/file/d/1oGkKqjdw7TJ0PQ4CBNgzFDz2d-7rJ0iv/view?usp=sharing>