SECURE ONLINE EHR MANAGEMENT SYSTEM

(BLOCKCHIAN APPROACH)

PROBLEM STATEMENT NUMBER: SS45

ORGANIZATION: MINISTRY OF HEALTH AND FAMILY WELFARE

TEAM: PRIVACY_WARRIORS

OUR MENTOR


MENTOR
K.SOMESH
ASSISTANT PROFESSOR
GMR INSTITUTE OF
TECHNOLOGY, RAJAM
GARIT

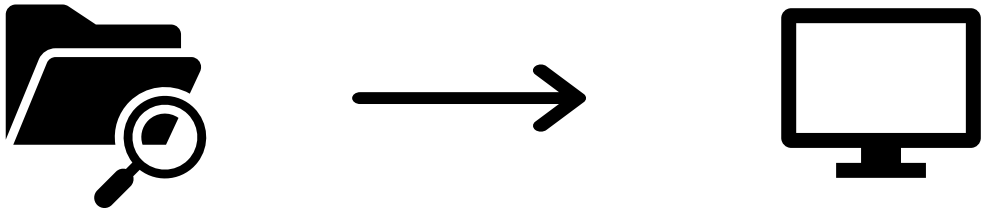

GARIT
Training Tomorrow's
Engineers Today

PROBLEM STATEMENT SS45

EHR generally contains highly-sensitive and critical data related to patients, which is frequently shared among clinicians, radiologists, healthcare providers, pharmacists, and researchers, for effective diagnosis and treatment. Hence, may use **blockchain** technology for accessing and managing the **privacy** and **security** of patient data and history in clinical practices.

PATIENT VISITS THE HOSPITAL

WHY EHR (ELECTRONIC HEALTH RECORDS)



Save space while storing
the documents in computer

Electronic Health Records cleaner and better organized workspace, promoting better staff morale.

All the Clinicians, doctors and patients can easily access the health records from anywhere because data is stored in private and secure Blockchain Network.

EHR (ELECTRONIC HEALTH RECORDS) INCLUDES

Administrative and billing data

Patient demographics

Progress notes

Medical histories

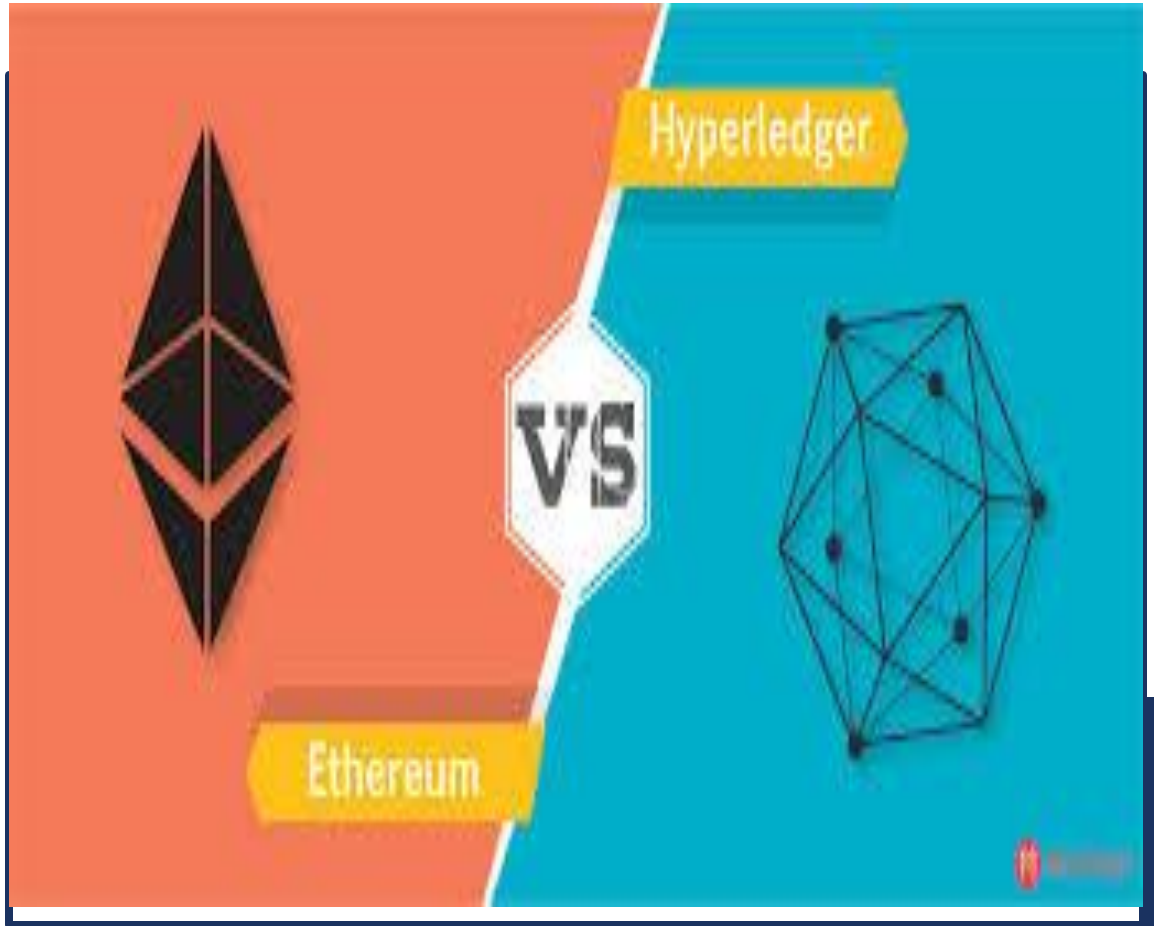
Diagnoses

Medications

Radiology images

Lab and test results

ETHEREUM VS HYPERLEDGER FABRIC

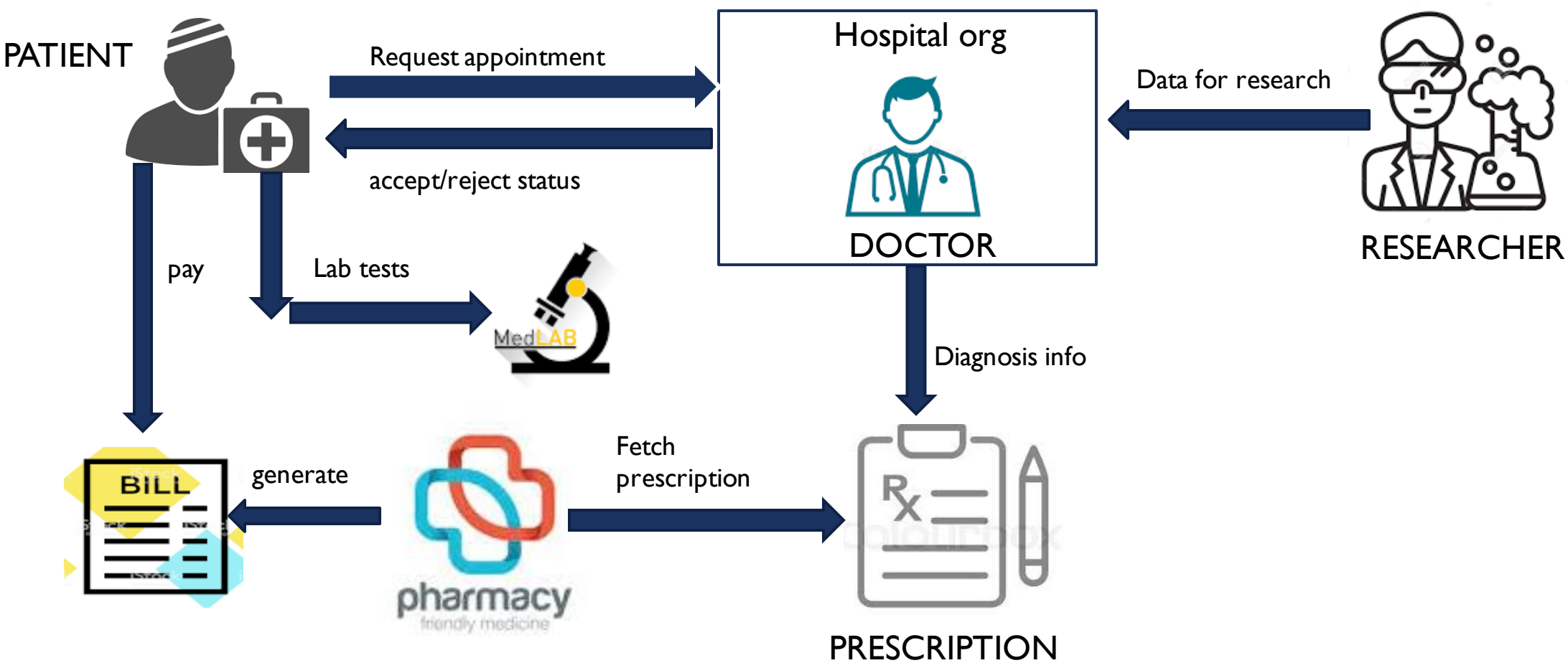


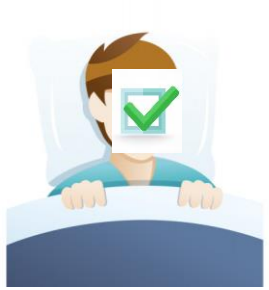
- Transactions
  - Transparent(Ethereum)
  - Confidential(Hyperledger)
- Mode of peer transaction
- Scalability
- Flexibility

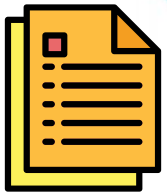
MAJOR ASPECTS

- Privacy
- Security
- Confidentiality

WORKFLOW


PATIENT
Request appointment
accept/reject status
Hospital org
DOCTOR
Data for research
RESEARCHER
pay
Lab tests
MedLAB
Diagnosis info
BILL
generate
pharmacy
friendly medicine
Fetch
prescription
PRESCRIPTION





LAB

ACCESS CONTROLS

- Patient: 1. Can view their EHR data
- 2. Grant access and revoke to others to view their EHR data
- Doctor: 1.Can view authorised patient’ s EHR data
- 2. Can update diagnosis and treatment info
- Lab technician:1. Can view authorised patient’ s EHR data
- 2. Can upload lab reports
- Pharmacy : 1.Can view prescription of authorised patient’ s EHR data

TECHNOLOGY STACK

- IBM’s Hyperledger Framework for Blockchain
- Run time Environment as Node js
- Angular framework for user interface(front-end)
- REST API for connecting client application with smart contract

OUR APPLICATION SPECIFICATIONS

- 1. Recaptcha and loading page
- 2. Dashboards for every participant involved
- 3. Maintaining security towards data
- 4. Avoiding multiple registrations of a person by keeping Aadhar no as id

DOMAIN ANALYSIS

By visiting some websites we find the work of Government on EHR till now.

- DATA STANDARDS FOR IMAGE, MULTIMEDIA, WAVEFORM, DOCUMENT.
- Image: JPEG lossy (or lossless) with size and resolution not less than 1024px x 768px at 300dpi
- Scanned or Captured Records
- Scanned Documents: ISO 19005-2 Document Management
- ISO 13606-5:2010 Health informatics - Electronic Health Record Communication
- ISO TC 215 set of standards for health information storage.

GOALS

- Promote interoperability and where necessary be specific about certain content exchange and vocabulary standards to establish a path forward toward semantic interoperability
- Support the evolution and timely maintenance of adopted standards
- Promote technical innovation using adopted standards
- Encourage participation and adoption by all vendors and stakeholders
- Keep implementation costs as low as reasonably possible
- Consider best practices, experiences, policies and frameworks
- To the extent possible, adopt standards that are modular and not interdependent.

THE ETHICAL, LEGAL, SOCIAL ISSUES (ELSI) GUIDELINES FOR ELECTRONIC HEALTH RECORD (EHR)

- **Privacy** would refer to authorization by the owner of the data (the patient)
- **Security** would have as components both public and private key encryption; the encryptions used in transit and at rest need to be through a different methodology.
- **Trust** would be accepted whenever a trusted third party confirms identify

PATIENT IDENTIFICATION TRAITS

1. Name
2. Address (all geographic subdivisions smaller than street address, , and PIN code)
3. All elements (except years) of dates related to an individual (including birth date, date of death,
4. Telephone and/or Fax numbers
5. Email address
6. Medical record number
7. Health plan beneficiary number
8. Bank Account and/or Credit Card Number
9. Certificate/license number

PATIENT IDENTIFICATION TRAITS

10. Any vehicle or other any other device identifier or serial numbers

11. PAN number

12. Passport number

13. ADHAAR number

14. Voter ID card

15. Fingerprints/Biometrics

16. Voice recordings that are non-clinical in nature

17. Photographic images and that possibly can individually identify the person 18. Any other unique identifying number, characteristic, or code

DATA CENTERS (STORAGE PURPOSE)

- Electronic Health records can be either stored in Cloud (can use AWS/Azure/IBM) or separate data centres.
- We have used IBM cloud to store the data as well as blockchain configutations.
- To scale it up to the entire country, its always better to have dedicated Data centers for effective medication to patient by Government.
- Data centers are central repositories of integrated data.
- Data Centers are important to maintain the huge data.
- Every organizations who deals with large amount of data owns their Data center.
- Data centers are mainly used to protect the performance and integrity of the core data.

APPLICATION FEATURES

- Separate Dashboards for Everyone (Patients, Doctor, Clinicians, Researchers, pharmacists, radiologists …..)

- Voice based Assistance

- Conversational Chatbot

- Loading page

- Patient Privacy Permission.

- Selective based Categorization of Hospitals.

MAIN THEME OF OUR PROJECT

- Help Government to achieve Secure Electronic Health Record Management system.
- To achieve private network for hospitals under government.
- To provide Privacy to patient data.
- To get Lifelong storage which helps us to predict Future of health.
- Integrating other technologies to get more efficient system.
- To develop a model which is used to detect their family health information for analysis.

QUESTIONS & ANSWERS

- More than 75% of outpatients and more than 60% of inpatients in India being treated in private healthcare facilities, why ??
- Because they feel that there is no security for their records in Government. Now, our project helps to achieve patient security as well as safety.
- Why hackers stole the health care information easily?
- Because there is no security for data, our project helps government to achieve using blockchain.
- Why should we integrate other technologies for health care data?
- For best Analysis of patient symptoms to predict the future diseases.

THANK YOU

PRIVACY_WARRIORS