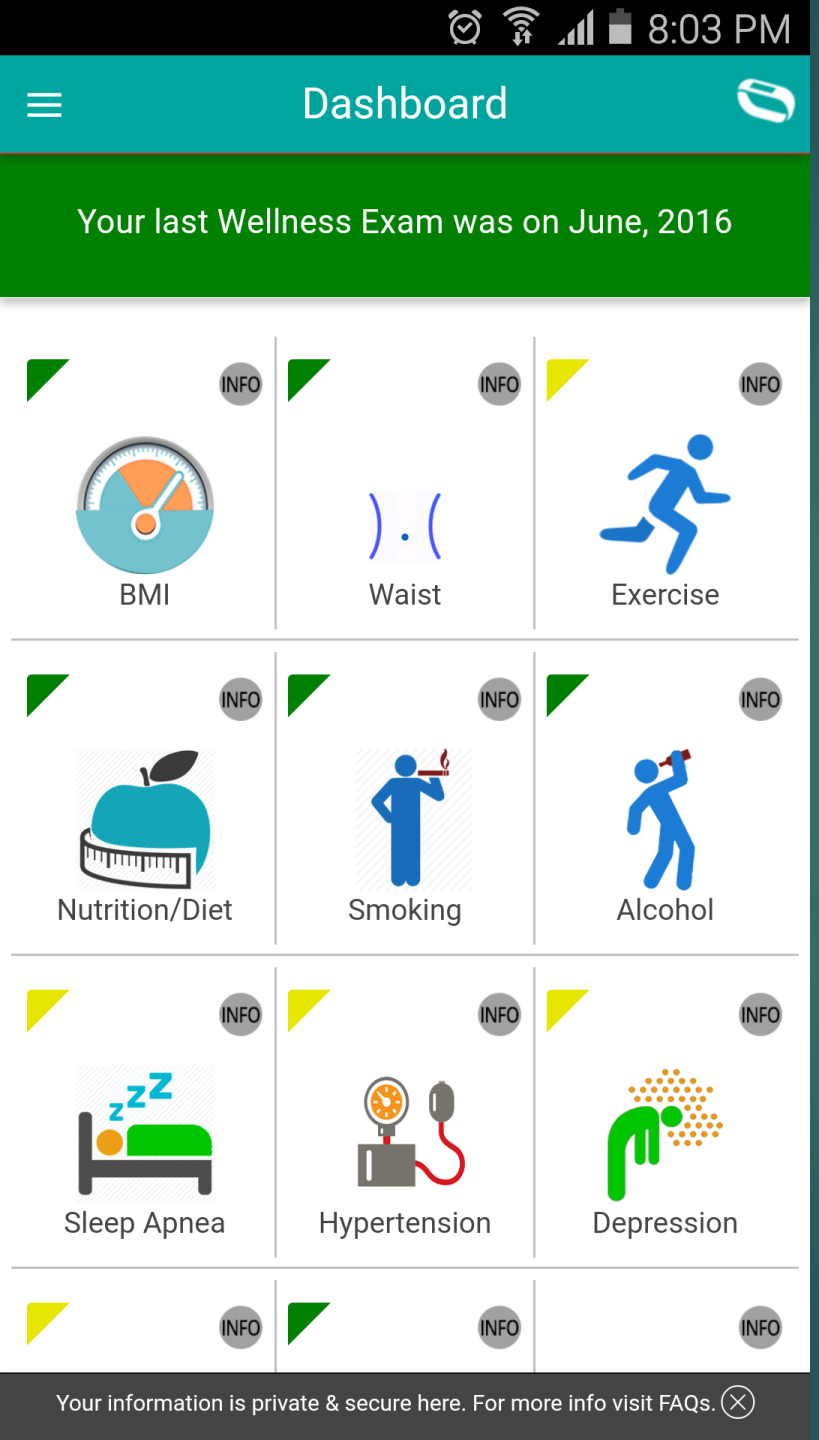
APPLICATION OF BLOCKCHAIN IN HEALTHCARE

The big problem in healthcare IT

- 62% of insured adults rely on their doctors to manage their health records
- 29% keep them in a file drawer or even a shoebox
- Over 300 different EHR systems in use today,
  - 3 different IT systems of record for every encounter
  - On average we see 18.7 different doctors in our lifetime
  - Little to no communication among systems
  - Our medical records are scattered across many different types of systems controlled by many different IT departments and behind many different firewalls (no one has a holistic view of your health)



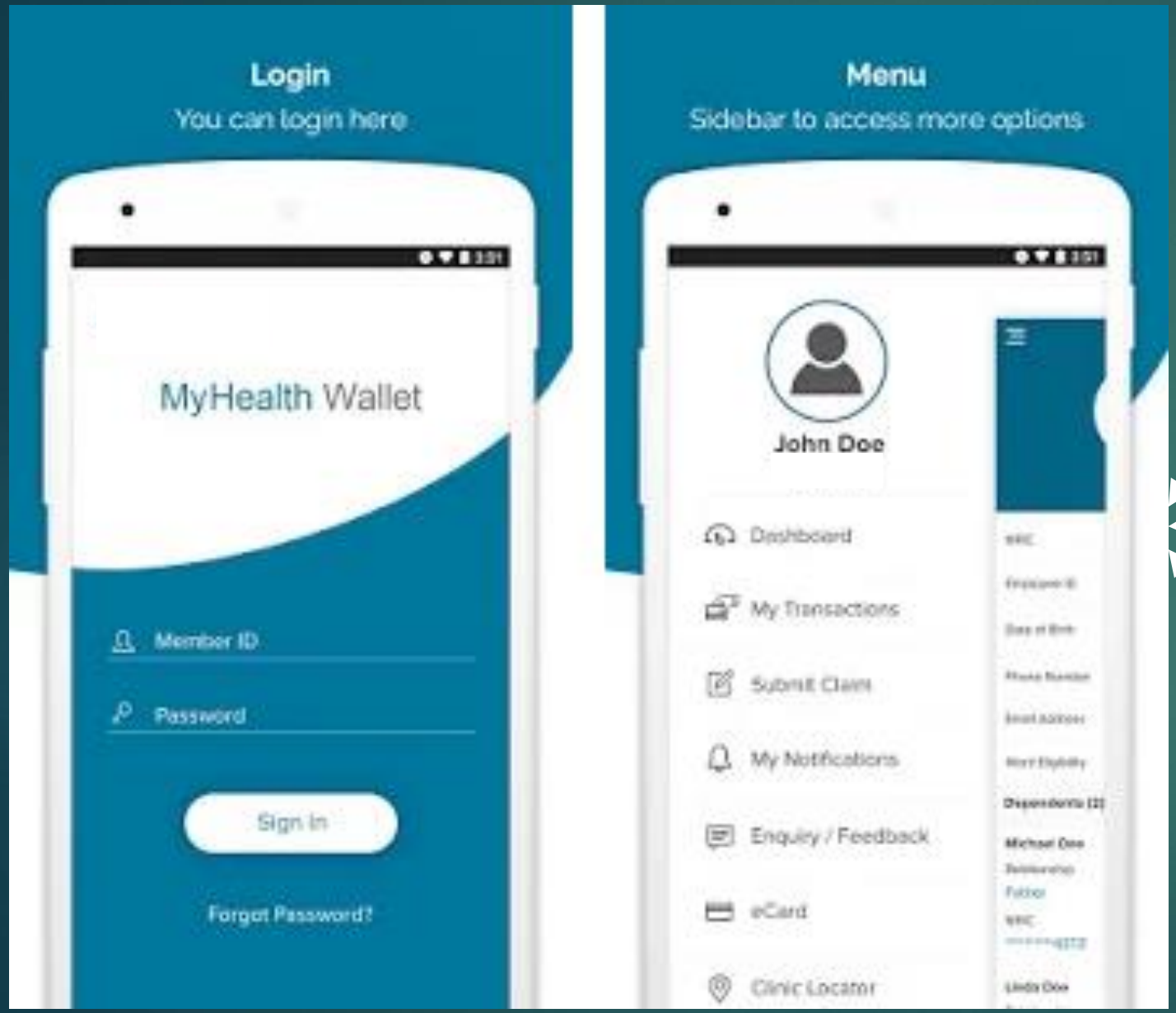
Health Wizz

Solution
Step 1: Create a personal health wallet on individual's phone

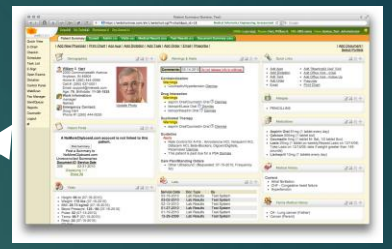
Health Wallet

Storj.io

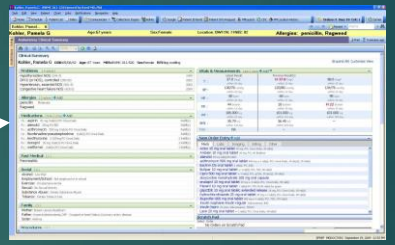
Health Wallet Sources of medical data: Hospital and doctor's EHRs



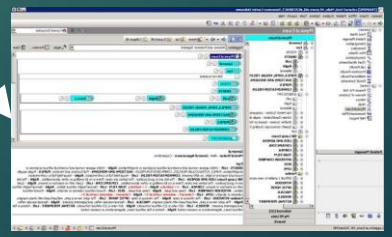
SMART FHIR



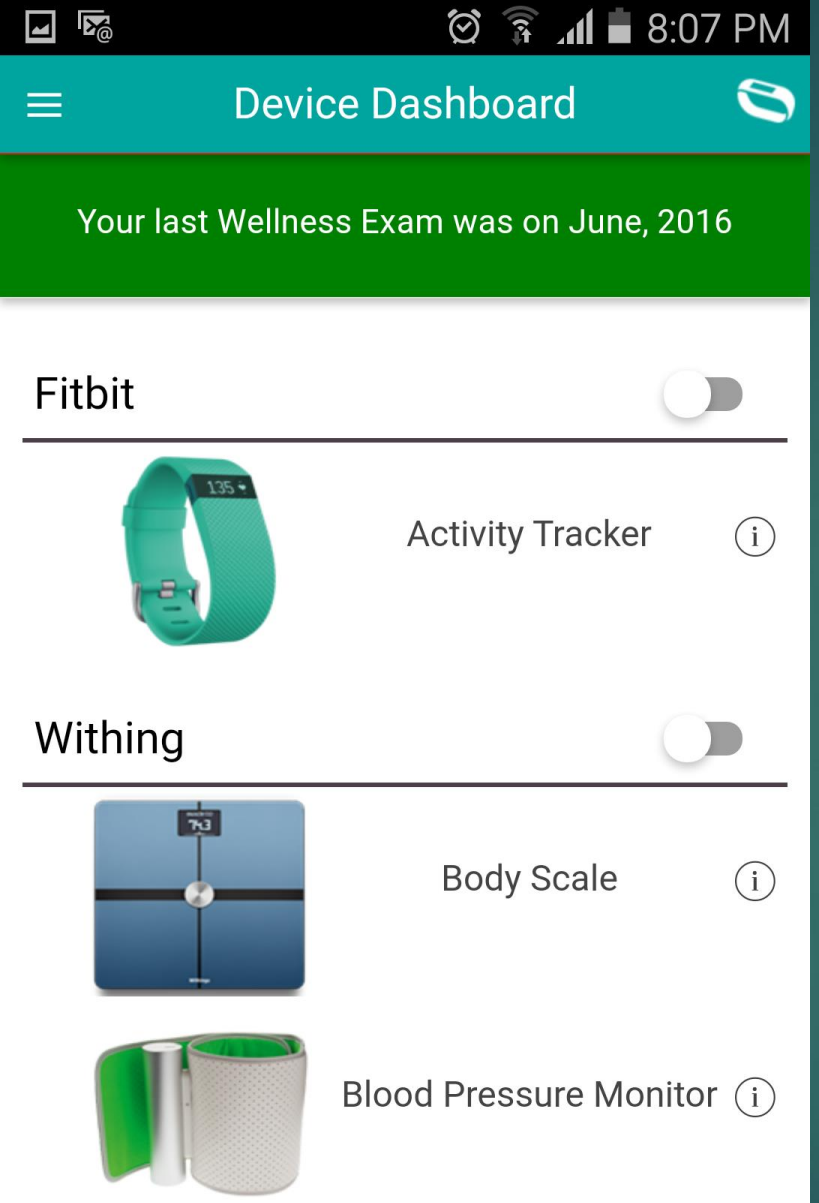
Epic



Cerner



Allscripts



Sources of medical data: Wearables and Remote Monitoring Devices

- Collect and deposit data from Wearables and Remote Patient Monitoring devices
- Today Health Wizz consumes this data for clinical management from health wallet

Approach

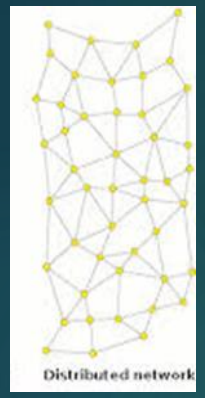
- Empower individuals to collect and organize data from various EHR systems (Epic, Cerner, Allscripts) on their smartphones and extended cloud
  - Individuals not only own their wellness data, but also all their medical records
- Put pointers to individual's healthcare data on a blockchain to create a distributed database that is private and secure
- Reward individuals with health coin for taking charge of their healthcare records

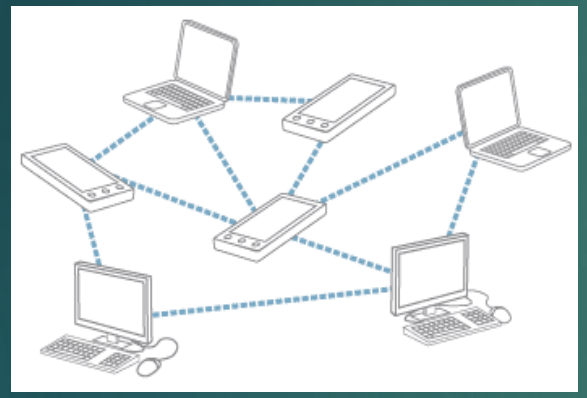
Work to be performed on blockchain

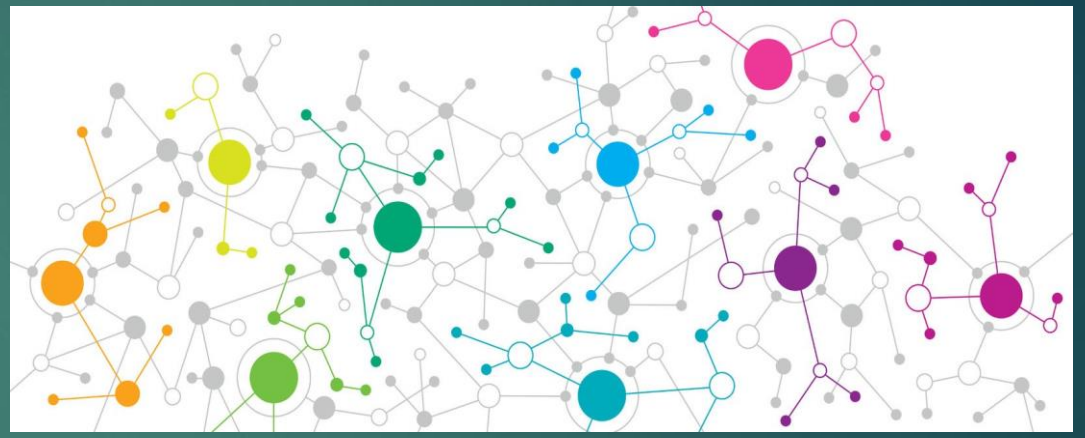
- Interoperability among EHR systems (contextual and semantic) when a user asks to transfer her data to an EHR system of a doctor or hospital
  - Current thinking: To perform this operation on a public blockchain would be very expensive (homomorphic encryption)

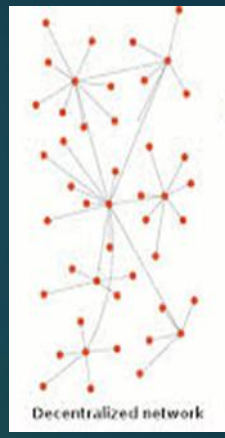
- Record medical data transfers as transactions from and to EHR systems (and other entities such as insurance companies and research organizations) and the patient's phone/storage
  - Current thinking: This could be performed on a public blockchain but there are concerns about privacy

Private distributed computing combined with a public blockchain









- Private distributed computing (blockchain?) for storage and translation of healthcare records from one format to another
- Individuals own their own PHR
- HIE of 1

- Public blockchain for healthcare transactions (Hyperledger?)
- Share PHR with EHRs, Pharmaceutical Companies, Research organizations, Exchanges

Costs and rewards

- Who bears the cost of performing interoperability transactions on a private blockchain?
  - Can the cost be recovered from medical data brokers and insurance companies – will they be willing to reward users with health coins?
- Do miners get paid for recording transactions on a public blockchain?
  - Can the cost be recovered from medical data brokers and insurance companies – will they be willing to reward miners with health coins?

Identity Management

Benefits to individuals

- Individuals get total control of their personal health records
- Individuals direct who they share their health records with on a secure and private platform
- Wearables data and Remote Patient Monitoring (RPM) data for wellness and chronic disease management
- Interoperability between mHealth and EHR systems

Market place for healthcare data

- Today, individuals who are owners of their health data do not get any rewards or remuneration when their data is sold
- In contrast, a blockchain would give individuals complete control over who their data is shared with
- If access to permissioned healthcare data is available on a blockchain there is potential to create a market place where normal supply and demand forces would operate