

Decentralized Health with Free Software

Zahra Bakhshandeh

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Overview

01

Introduction

02

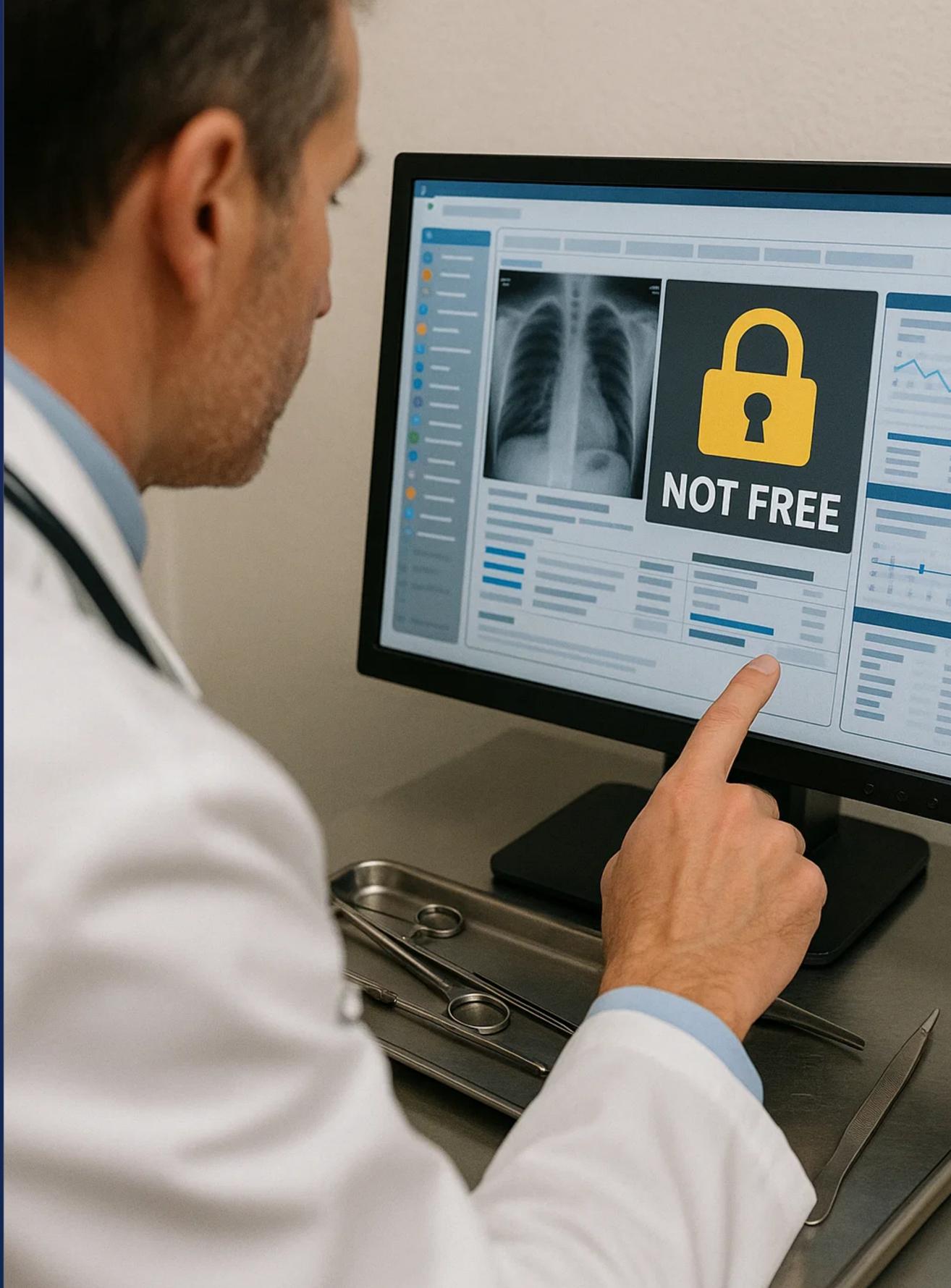
Free Software in Healthcare

03

Decentralized Healthcare

04

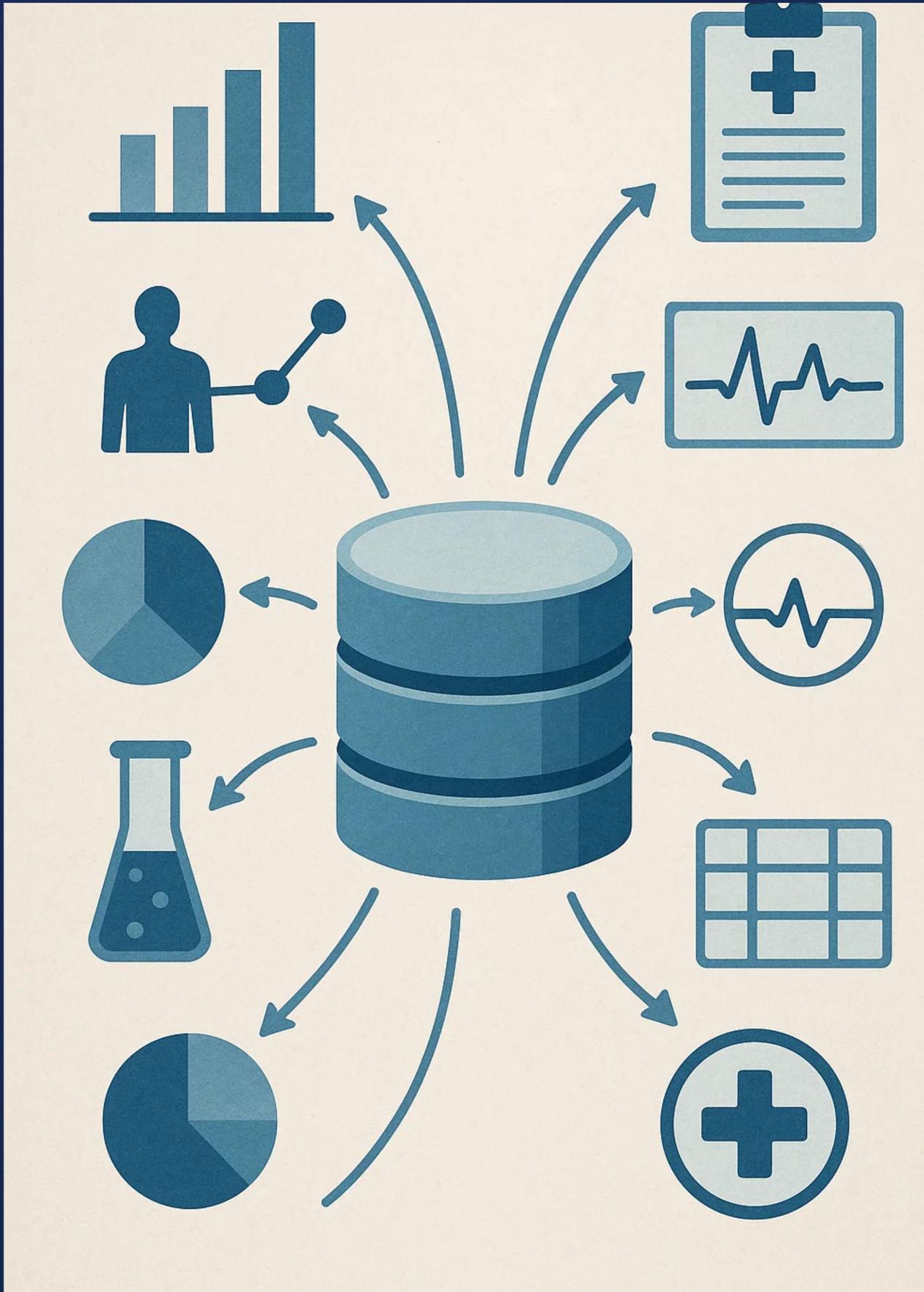
Future of Open-Source and Decentralized Healthcare



Intoduction

Non-Free Software

- Tools are closed-source
- No transparency in decisions
- Security risks can't be reviewed
- Hard to switch. vendor lock-in



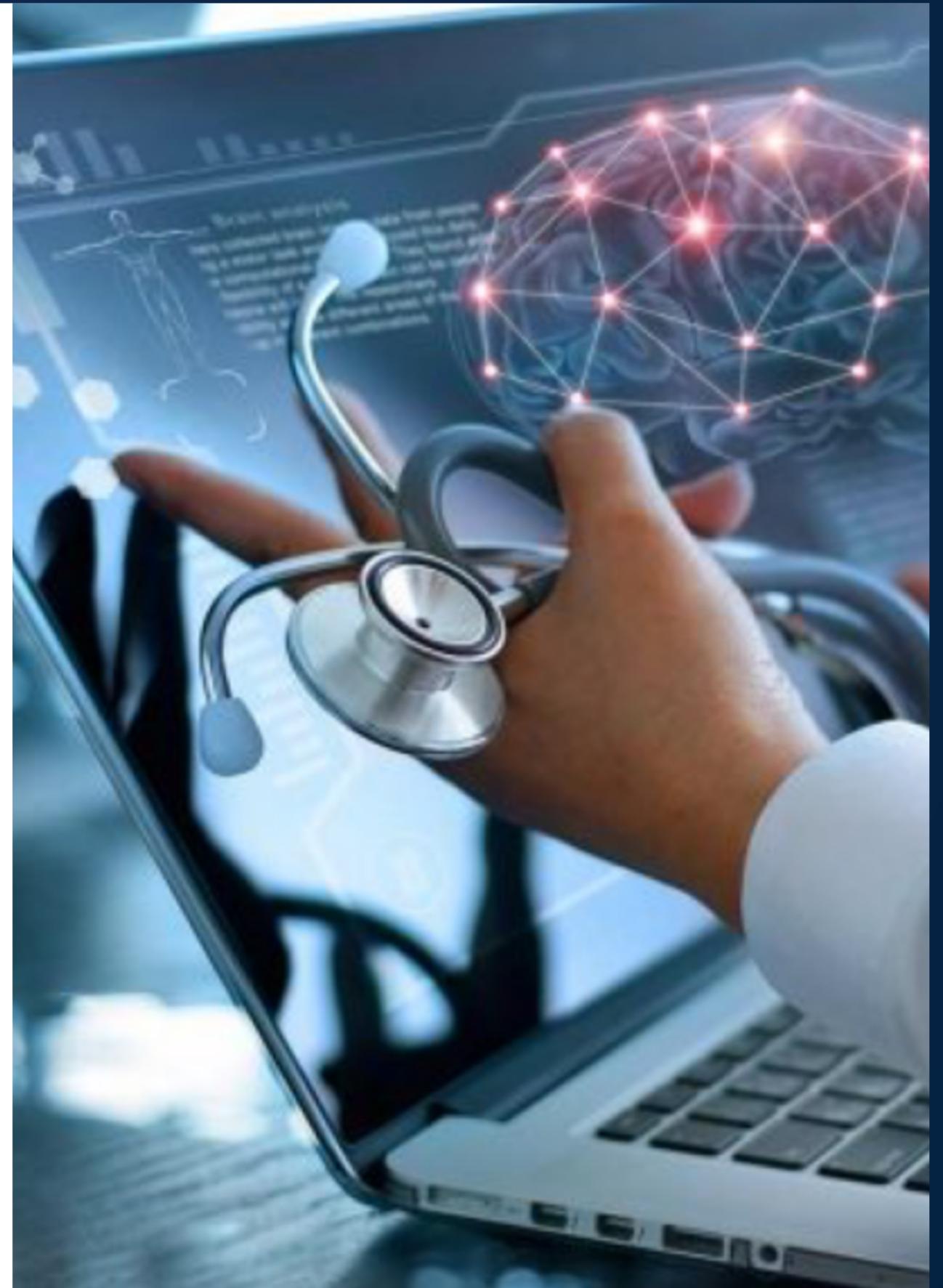
Intoduction

Centralized Data Systems

- Centralized Data Systems
- Data stuck in separate systems
- Hard to share between doctors
- Patients have no control
- Weak security

Free Software in Healthcare

- **Open code:** trust and transparency
- **No vendor lock-in:** freedom to customize and share
- Enables collaboration across borders
- Empowers patients and providers alike



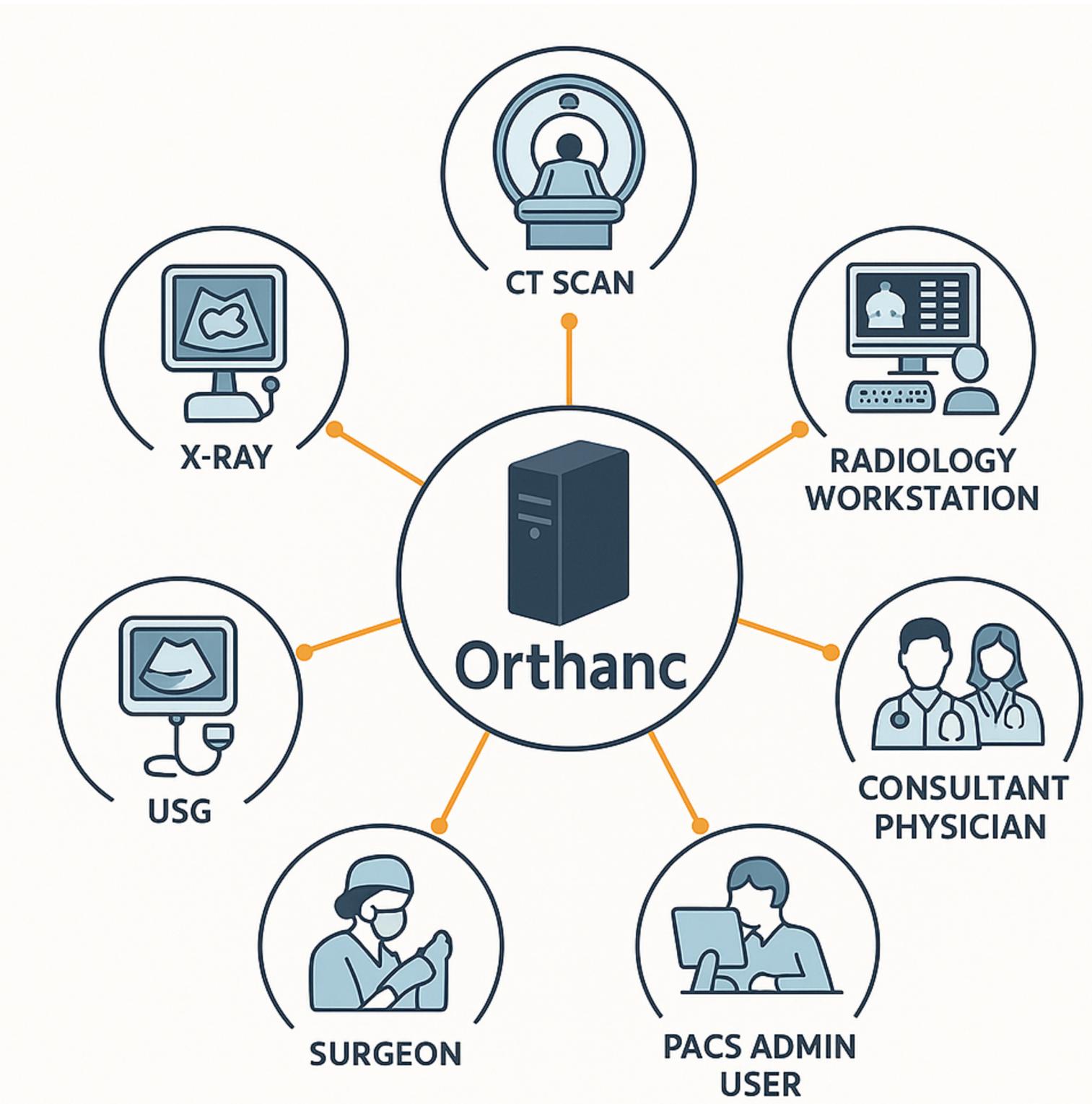
GNU Health

- **Free software for personal and public healthcare**
- **2010**
- **Focus:** Public health, clinical records, social medicine
- **Features:**
 - Complete electronic medical records (EMR)
 - Epidemiological tracking (e.g., outbreaks, demographics)
 - Health information exchange
 - Social determinants of health



Orthanc

- Lightweight, open-source DICOM server for medical imaging
- 2011
- Focus: Medical imaging (X-rays, CT scans, MRIs)
- Features:
 - Full DICOM storage and retrieval
 - Easy integration with existing systems
 - REST API for automation and research
 - Cross-platform and lightweight (runs on Raspberry Pi!)

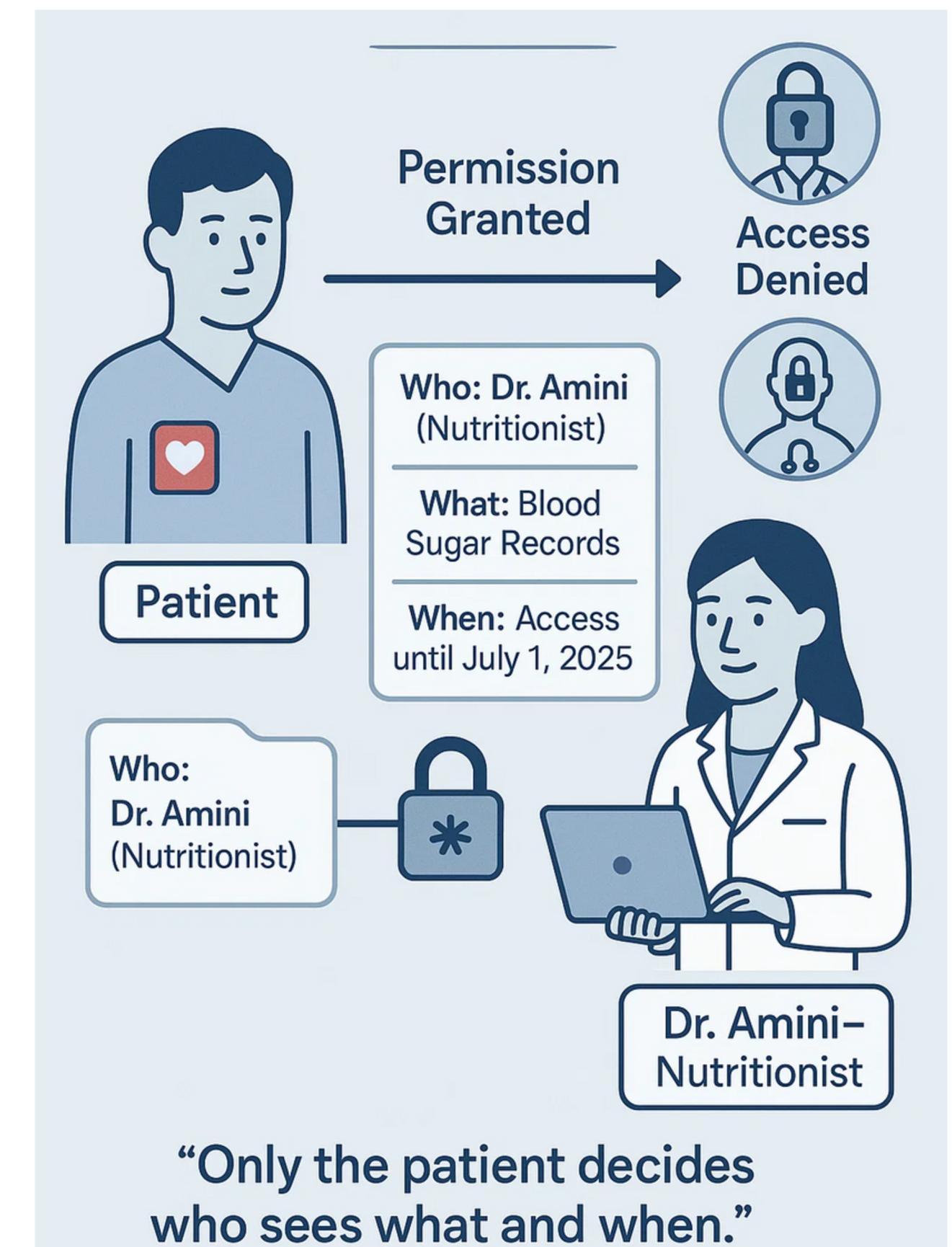




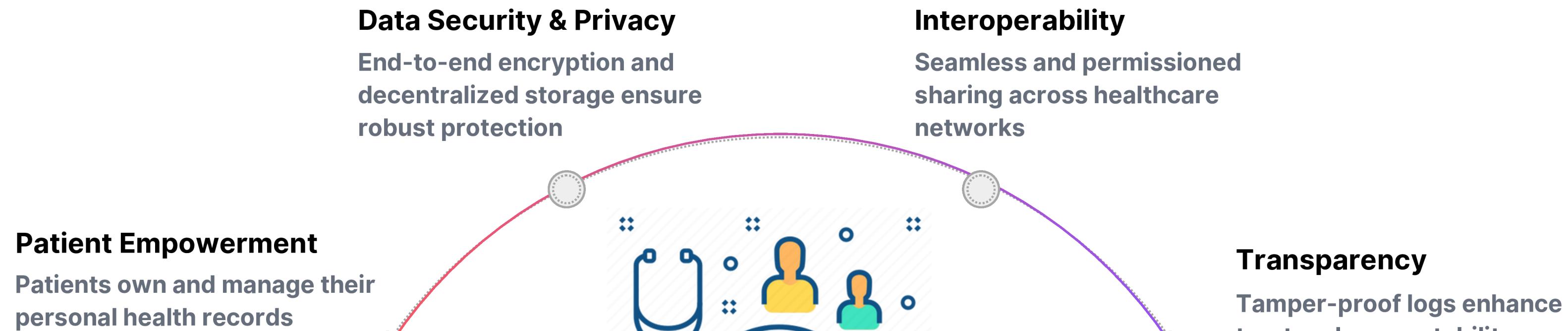
Decentralized Healthcare

- All health data is stored on a secure, distributed ledger
- Each user owns and controls their medical records
- Data is encrypted and access-controlled by the patient
- No central authority. just verified, transparent sharing

Example

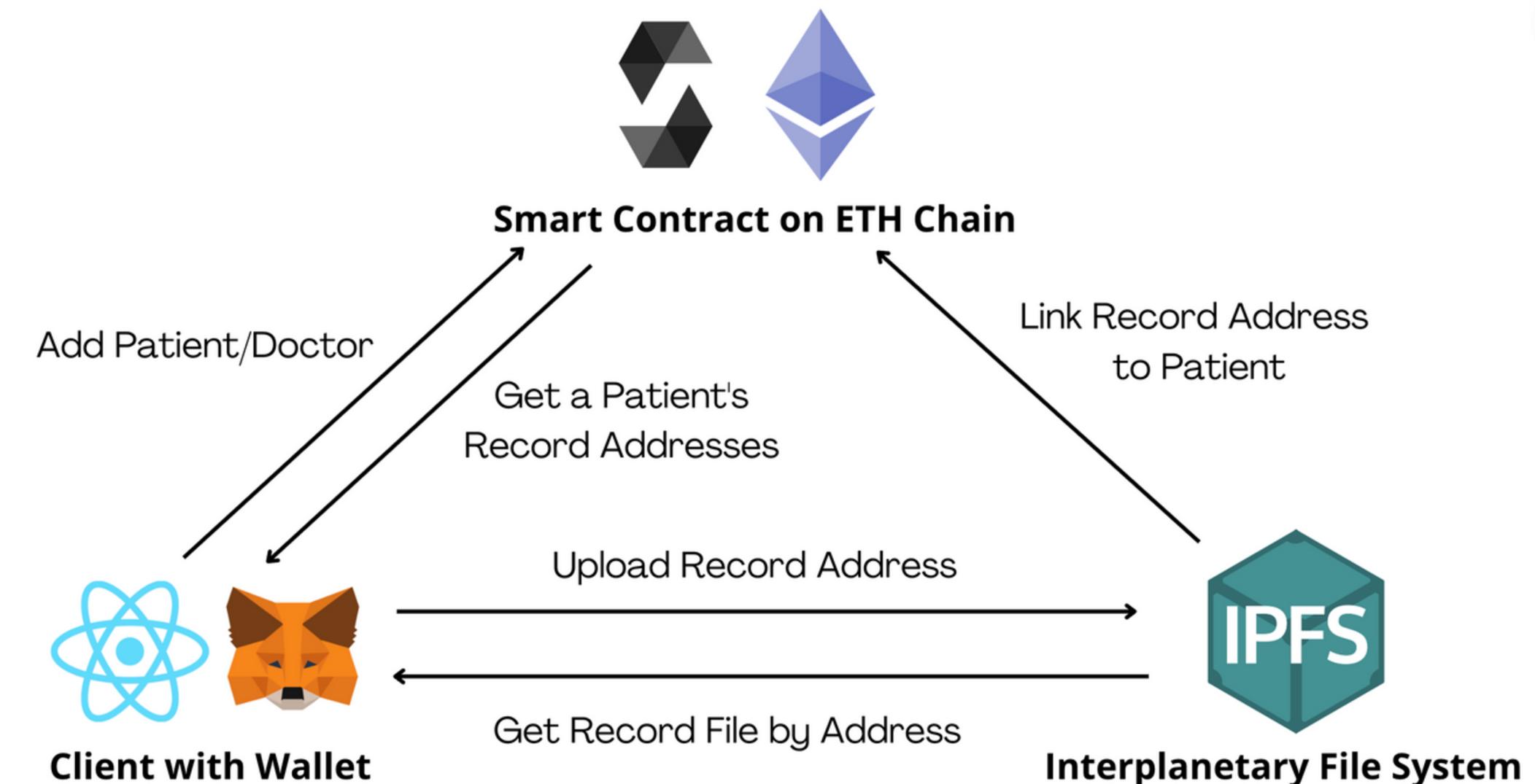


Benefits of Decentralized Health Systems



MedChain

- An open-source platform to store and share electronic medical records (EMRs) using blockchain and decentralized storage.
- 2022
- **How It Works:**
 - Provider signs in with crypto wallet
 - Registers patient via wallet address
 - Uploads record to IPFS
 - Links record on Ethereum
 - Patient views data through their wallet
- **Tech Stack:**
 - React (frontend), Solidity (contracts)
 - Ethereum (auth), IPFS (storage)



HIE of One

- Open-source access control for health data, built on decentralized identity and open standards (without blockchain).
- 2017
- **How It Works:**
 - Patient manages identity via self-sovereign ID
 - Access is controlled using OAuth2 and OpenID Connect
 - No central authority stores or controls the data
 - Patient decides who can access what data, for how long
- **Tech Stack:**
 - OAuth2 / OpenID (identity & access control)
 - FHIR (health data standard)
 - JSON Web Tokens (permissions)

Future of Open-Source and Decentralized Healthcare

- Patients control their data
- Privacy-first by design
- Interoperable via open standards (FHIR, DIDs)
- Trustworthy AI from open, auditable data
- Innovation by the community, not corporations



References

- **GNU Health**
 - Website: www.gnuhealth.org
 - Project page: savannah.gnu.org/projects/health
- **Orthanc**
 - Website: <https://www.orthanc-server.com>
 - GitHub: <https://github.com/jodogne/Orthanc>
- **HIE of One**
 - Website: <https://hieofone.com/>
 - GitHub: <https://github.com/HIEofOne>
- **MedChain**
 - GitHub: <https://github.com/JeffreytheCoder/med-chain>



Thank You

Freedom in code, and freedom in care



<https://www.linkedin.com/in/zahrabakhshandeh>