



Voice Biometrics and Blockchain: Secure Interoperable Data Exchange for Healthcare

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PURPOSE

The healthcare system in the United States is unique. From payor to provider, patients have many choices but they lack in the ability to manage or share their health information. This complicated care paradigm places patients at a distinct disadvantage. Legislation clearly defines government expectations of data availability but not how to achieve exchange. Because methods of sharing are left to the discretion of care providers and software vendors, non-interoperability is the standard.

METHODS

The OpenPharma Blockchain on Fast Healthcare Interoperability Resources (FHIR) (OBF) solution is interoperable by design. OBF empowers patients with data access through biometric identity authentication, blockchain, and machine-to-machine secure data access. OBF provides authenticated users read-only, real-time access to patient records using the healthcare interoperability standard HL7 FHIR.

OBF is built around a modern, browser-based user interface, blockchain technologies (leveraging either Ethereum or the Hedera protocols) and modular, modern software exposed as Application Programming Interfaces (APIs). This allows OBF to meet the Office of National Coordinator for Health Information (ONC) metrics, which include sending, receiving, and finding information from outside sources and using that information to make informed clinical decisions without additional burden on clinicians or patients.

RESULTS

Building on the HL7 FHIR application community practices, OBF is a SMART-on-FHIR plug-in for Electronic Medical Record (EMR) systems. Using OBF, patients can identify themselves and gain access to their medical records using their voice. This unique feature is accomplished through the Saavha voice print biometrics technology. Saavha returns a unique member ID that is passed directly to the OBF

blockchain smart contract for storage and interoperable patient record access (the ID does not contain public health information [PHI]).

To ensure complete privacy, all information is passed through multiple layers of encryption where no keys are stored locally. Additionally, no PHI is shared to the blockchain. To ensure privacy, OBF creates a new encrypted address for the FHIR patient record object, using the Saavha generated member ID as the unique identifier. This encrypted address is then published on chain, making it available to participating providers. Providers must register their relationships to patients before OBF will permit online viewing of patient records. Patient record access is accomplished through voice verification and real-time surfacing of encrypted patient data through the OBF FHIR Viewer.

CONCLUSIONS

OBF is a lightweight, flexible, secure, and stable interoperable solution that places data stewardship with patients. Using industry-wide data standards, biometrics, Smart contracts, Ethereum, and OpenPharma's data viewer for the first-time patients can authorize read-only record exchange using their voice.

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