Enabling Blockchain Architecture for Health Information Exchange (HIE)

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Abstract:

Electronic health records (EHRs) have become such an important aspect of the healthcare system, making security a crucial component in this framework. Health Information Exchanges (HIEs) are a centralized system that enables health care providers to securely access and share these patient EHRs over the internet. However, privacy concerns, security threats, limited transparency of the system, and a lack of patient control are all major challenges faced by the present HIE systems.

HIE systems are designed to lower healthcare costs, minimize medical errors, and increase inter-organizational coordination of patient data among health care institutions. Blockchain technology has the potential to revolutionize health care by putting the patient at the center of the system. Every transaction has an immutable audit trail owing to the shared ledger structure. Without the requirement for a central authority, healthcare institutions can create authorized entries. A blockchain-based HIE architecture can increase the security, privacy, and interoperability of healthcare records while also maintaining data integrity through its smart-contract standard. At the same time, it permits only authorized individuals to access confidential information and patient identities. As a result, blockchain-based HIE architectures are viable solutions that can help healthcare companies achieve their goals.

Tentative Table of Contents:

Section 1: Introduction
(Introduces key blockchain concepts)
A. Taxonomy of Blockchain Systems
(Public, Private, Consortium, Hybrid Blockchain)
B. Use Cases of blockchain in healthcare
(Applications like supply chain transparency, insurance settlements, etc. Focusses on HIE and its meaning)

Section 2: Pitfalls in the Traditional HIE systems
(Discusses the following pain points of the current HIE system and how blockchain architecture would help overcome them)
A. Varying data standards
B. High cost per transaction

    C. Inconsistent rules and permission
    D. non-secure network infrastructure
    E. Unsyncronized records and multiple patient identifiers

Section 3: HIE architecture using Blockchain
    (How medical data is created and and accessed in a blockchain based architecture takes place)
    A. Data Creating & Updating
    B. Transaction Processing & Storage
    C. Data Query
    D. Patient's Data Sharing

Section 4: Advantages of Bockchain based HIE systems over traditional systems
    A. Security enhancing
    B. Interoperability enabling
    C. Trust
    D. Opt-in Intention
    E. Tracability and transparency
    F. Business Value
      i.) Patient Perspective
      ii.) Provider and organization perspective

Section 5: Implementation challenges and considerations
    (Explores the obstacles while building blockchain solutions for HIE)
      A. Time consuming transaction verification
      B. Compliance with Federal and Local Laws
      C. Inadequate Technical infrastructure and social support

Section 6: Conclusion