

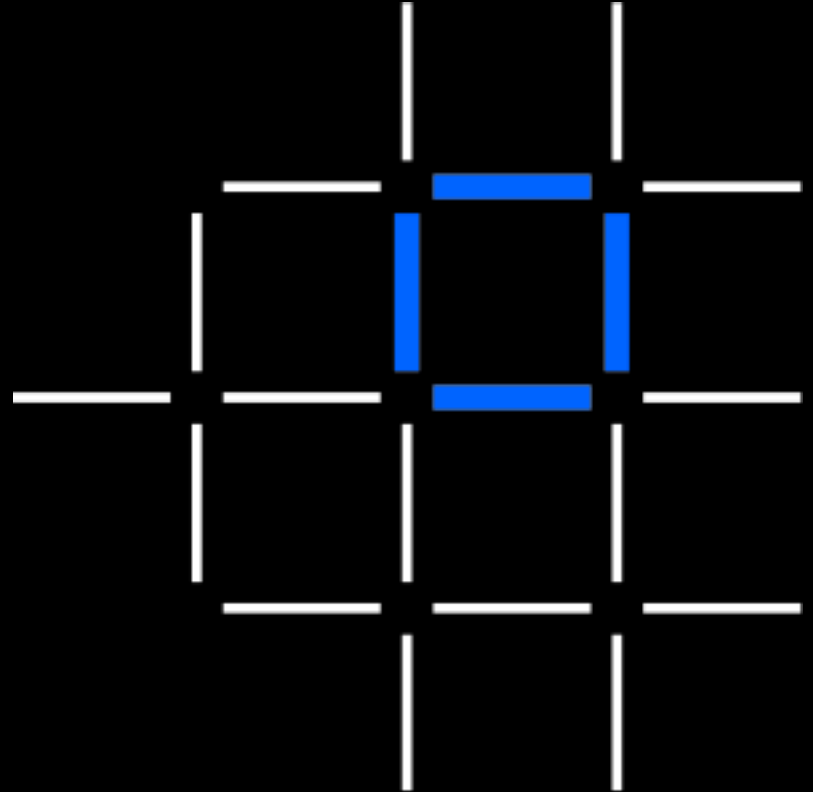
Blockchain In Healthcare

- Early Adopters & Emerging Use Cases



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Imagine if ...



**You could see all places that your food had traveled ...
From the farm to your table**

**Before you left the auto dealer your
title and registration were texted to your phone**



You were 100% certain your vote was counted



**Your digital identity was not longer represented by
A user id and password**



Executive Summary



- Blockchain is the technology that powers cryptocurrencies (like Bitcoin), but it is *NOT* a cryptocurrency.
- Blockchain is a distributed, single source of truth that cannot be altered, and has controls over what participants can see and do.
- There is no super user in a Blockchain network—*no single party has access to everything*.
- Using Blockchain can reduce cost, increase efficiency, improve security and trust in business processes.
- Blockchain is being used today in financial services, food traceability and trade finance.

What is Blockchain?



A **distributed**,
single source of truth
that cannot be altered and
has **controls** over what
parties can see and do.

= *A great way to keep track of stuff*

What is Blockchain?



Journey of Digital Transformation

Blockchain can solve :

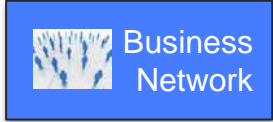
The Challenges of bringing trusted transactions into reality,

The challenges of access to reliable trusted data,

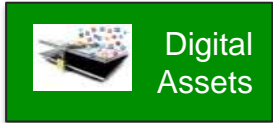
Transactions that involve the 3 P's: People, Process, Paper

...at future speed

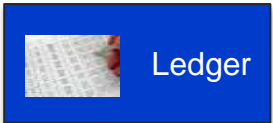
Blockchain Explained



Customers, suppliers, banks, partners, government institutions, cross geography and regulatory boundary
Wealth is generated why the flow of goods and services across business network
creating markets: public (fruit market, car auction) or private (supply chain financing, bonds)



Anything that is capable of being owned or controlled to produce value
Tangible, e.g. a diamond, car, house
Intangible, bond [financial], patent [intellectual], music [digital]



Ledger is the system of record for an institution
Transaction – an asset transfer on to or off the ledger
Contract– conditions for transaction to occur



A shared ledger technology allowing any participant in a business network to securely transact directly, with accountability and with higher resistance to malicious tampering.

Blockchain is made up of a Ledger and Smart Contracts

Ledger



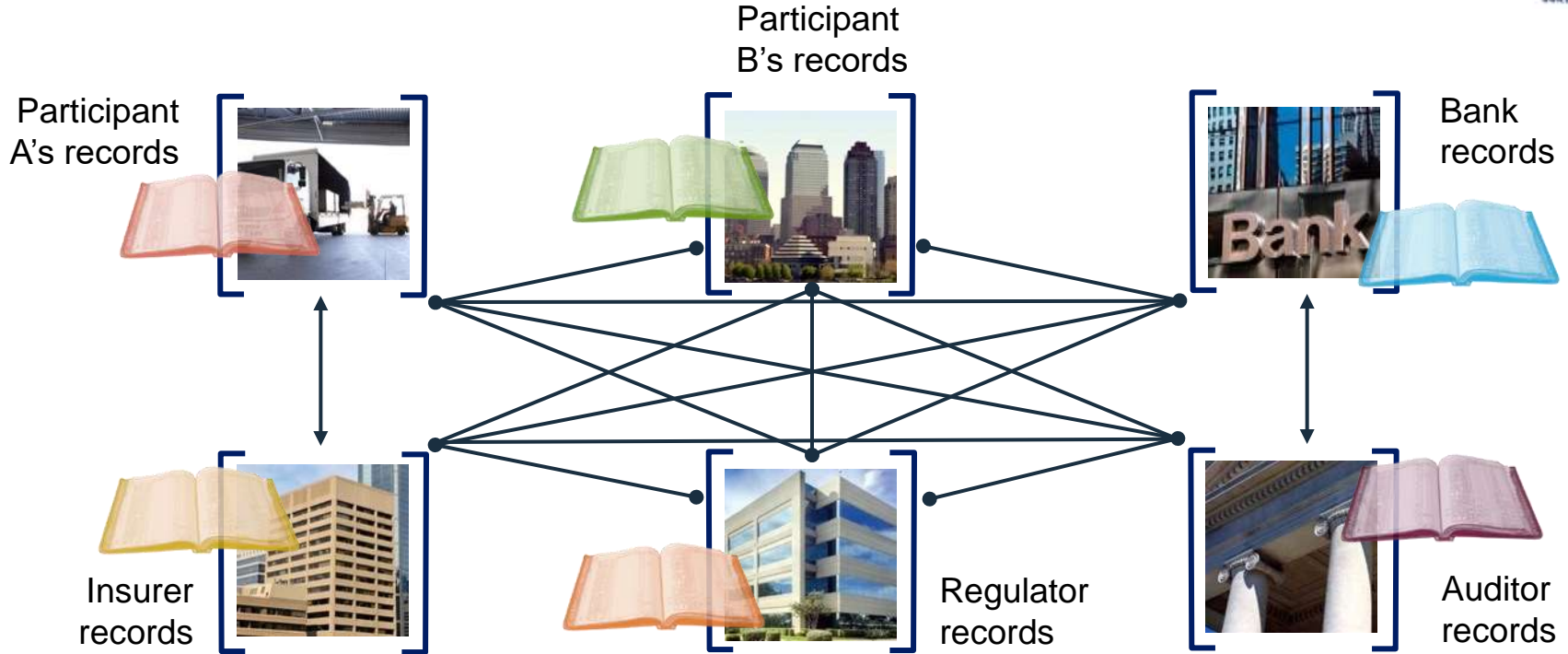
Smart contracts



- Shared between participants
- Participants have own copy through replication
- Permissioned, so participants see only appropriate transactions / data
- Holds current value of smart contract data
- Holds historic sequence of transactions
- Immutable

- Verifiable, signed
- Encapsulates business logic
- Each invocation of a smart contract is a “Blockchain transaction”
- Contract executes on multiple nodes and results compared to reach consensus

Problem...



... inefficient, expensive, vulnerable

A shared, replicated, permissioned ledger ...

Participant
A's records



Participant
B's records



Bank
records



Blockchain

Insurer
records



Regulator
records



Auditor
records



... with consensus, provenance, immutability and finality

IBM sees Blockchain as enabling the Quadruple aims for Healthcare

**Better
Outcomes**

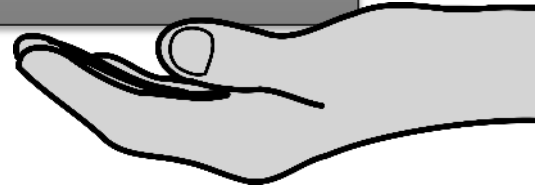
**Improved
Patient
Experience**

**Lower
Costs**

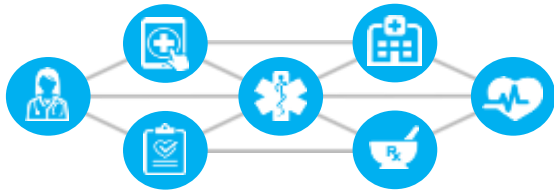
**Improved
Provider
Experience**

How can Blockchain help?

- **Reduce information silos** and **increase data transparency** through **shared ledgers**
- **Secure data** through **cryptography**
- **Enforce consistency** through executable **smart contracts**
- **Decrease paperwork** and **reduce reconciliation effort**
- **Improve audits and verification**

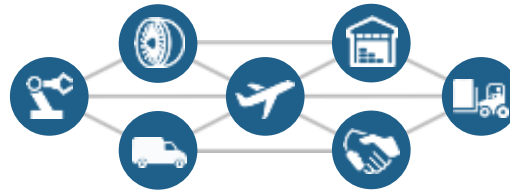


Blockchain Use Cases for Healthcare



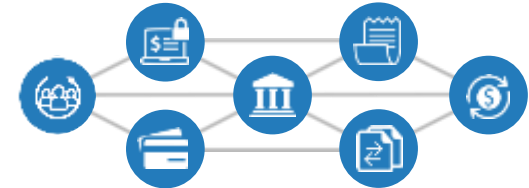
Patient Engagement

Electronic Health Record Access
Patient Consent Management
Preauthorization
Clinical Trials
Medication Reconciliation
Surgical Tray Mgmt.



Supply Chain

Provenance & Traceability
Cold Chain and Product Safety
Drug Serialization and API
Supply Chain Visibility
Controlled Substance Ordering
Medication Tracking



Finance

Dispute Management
340B and Medicaid Rebate
Management
Accounts Payables
Revenue Cycle Management

Credentialing and Privileging



- *What is Credentialing & Privileging?*
 - **Credentialing** is the process of verifying practitioner qualifications to ensure current competence to grant privileges. The term credentialing involves verification of education, training, experience, and licensure to provide care or services in or for a healthcare organization.
 - **Privileging** is the process of authorizing a specific scope of practice for patient care, for a practitioner, based on credentials and performance.

Credentialing and Privileging



- Credentialing is the first step to vet a practitioner for hospital practice. Privileging authorizes a practitioner's scope of practice.
- This process attempts to **decrease the chances of liability** for the facility and practitioner by ensuring that practitioners currently providing care are **licensed**, have been **educated** for the role they are working, and are **safe and competent**.
- Practitioners are credentialed and privileged **upon hire and every two years**.
(Except Illinois, which is every three years)
- All clinical staff licensed, registered, certified and non-licensed, registered or certified must be credentialed and privileged.

Why is it important?

- *Importance of credentialing and privileging*



Protect your patients
Patient Safety



Ensure the highest level of care
Quality of Care



Secure your organization
Risk Management

CMS is taking action

- *The CMS is intensifying provider directory penalties*
 - A CMS audit found that **52.6%** of listed locations on provider directories had inaccuracies
 - Due to troubling findings of audit, CMS is detailing new proposed violations consequences, including
 - Civil Money Penalties
 - Public Reporting of providers receiving penalties
 - Other Enforcement Actions



Penalties on a per determination basis
Costly



Poor public perception
Visibility

Pain Points

- *Pain points associated with credentialing & privileging*
- Provider credentialing is a core healthcare delivery system process that ensures the integrity of the healthcare workforce. Unfortunately, the current provider credentialing systems are archaic, slow, inefficient, and place a significant burden on one of the most important healthcare resources, the physician.



Utilize Valuable Time and Resources

Expensive



Slow and Archaic

Inefficient



Burdensome for Physician and Organization

Burdensome

- Credentialing and privileging a physician can be lengthy and expensive, and utilizes a good amount of resources.
- A cornerstone of the physician credentialing system is verified provider data from primary sources.
 - Despite an annual investment of \$2B to maintain provider data bases¹, accurate provider data remains elusive.
 - Enclarity, a LexisNexis Company, estimates 30% to 40% of a payer's provider records contain errors or missing records.²
 - Estimates suggest 12% of National Provider Identifier (NPI) numbers are inaccurate or missing,² with approximately 2.5% of provider information changing each month and delays in timely updates to sanctions representing a significant cost burden for states, insurers, and hospitals that introduces additional risks for everyone

A Blockchain Solution for Credentialing and Privileging



Privileging is the process of authorizing a specific scope of practice for patient care, for a practitioner, based on credentials and performance. Privileges are granted within area of practice. Factors that affect the outcome of privileging include:

- State Practice Acts (most influential factor)
- Agency Regulations
- License
- Education
- Training
- Experience
- Competence
- Health Status
- Judgement



Provider Directories

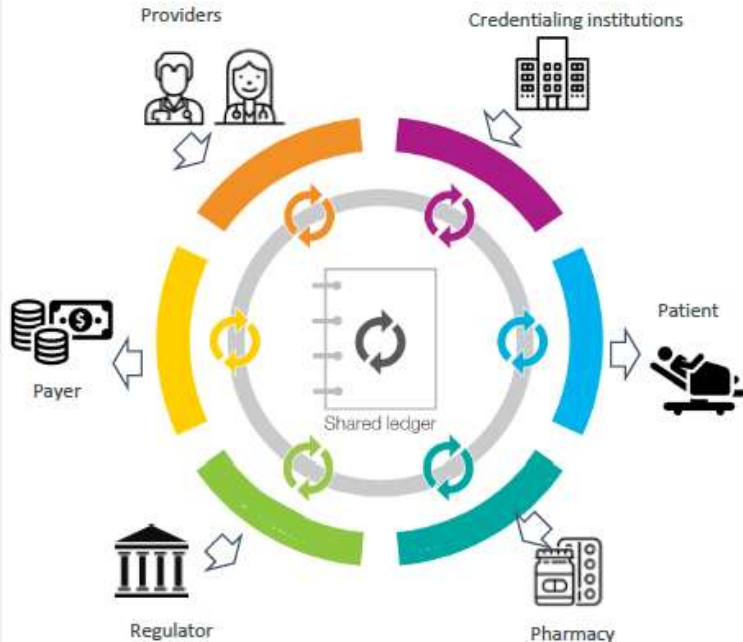
Problems

- Provider information is often out-of-date, incomplete, and inaccurate, creating a burden on payers, consumers and also providers themselves. This creates opportunities for fraud.
- Estimates are that 30% to 45% provider information used by payers are erroneous, exposing them to fines from the Department of Health and Human Services, and representing a major risk for the healthcare system as a whole
 - 20% of provider directories change each year
- Health plans face several main challenges in updating provider directory data:
 - Claims data does not give health plans correct provider locations or contact details.
 - High administrative burdens for providers prevent health plans from talking to the right person.
 - Fine from regulators despite Billions (~\$2B) of investment on provider database maintenance.
 - Medicare Advantage fines can equate to \$25,000/day per beneficiary
 - Marketplace fines are \$100/day for each person adversely affected
 - Members satisfaction impacted: members obtain treatment from a listed doctor only to find that their “in-network” doctor was actually out-of-network.

Causes

- There are many primary sources of information. Primary sources of accurate information are distributed: Providers, credentialing organizations, health systems, payers, etc.
- Sources of information have little incentive to provide/access timely update
- Process to reconcile all the information is highly inefficient and lacks transparency

A blockchain based solution for provider directories



AUTHENTICATION OF PRIMARY RESOURCES BY BLOCKCHAIN NETWORK

Blockchain uses secure mechanisms to authenticate primary sources, allowing authenticated providers and credentialing institutions to directly manage the information on the ledger

DIRECT ACCESS OF PRIMARY SOURCES TO **UPDATE** THE SHARED DIRECTORY

Distributed ledger technology is used to create a trusted directory of curated data protected blockchain encryption technology and continuously updated and validated by the healthcare ecosystem in near real time

ACCESS TO VIEW A VERIFIABLE INFORMATION

Blockchain manages permissions & verifies access control to directory which is making updates visibly in near real time.

VALIDATION AND CREATION OF UPDATES BY SMART CONTRACT

Smart contracts will provide and enforce the rules necessary to enforce the quality and validity of all information in the ledger and updates

Blockchain Provider Directory

1A. Provider
AUTHENTICATES w/
blockchain and
UPDATES own personal
information



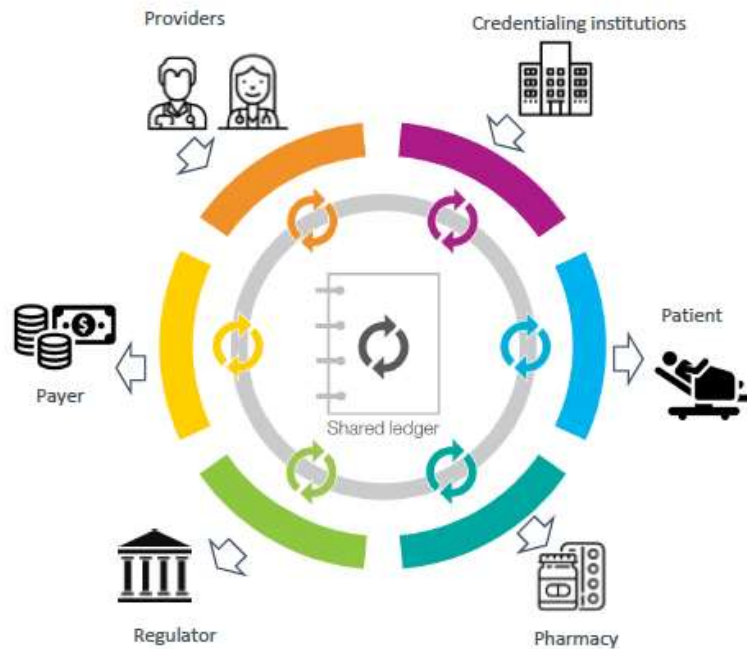
1B. **AUTHENTICATED**
authorized
credentialing
institutions send
UPDATES of provider
status



2. Data is **VALIDATED** by the
trusted network and made
available to the healthcare
ecosystem



3. Payers, health systems,
regulators and patients **ACCESS**
up to date, accurate directory for
full reducing error, fraud and
regulatory sanctions



- Primary sources: Providers and credentialing institutions provide updates
- **Blockchain validates updates**
- Healthcare ecosystem participants access trusted, verified data

Selection Criteria

- Start with the business need first, not technology
 - Determine desired outcome
 - Define the business structure or process

3 P's

People / Process / Paper

What makes a good Blockchain use case?

- Identifying a good blockchain use-case is not always easy!
 - However there should always be:

1. A **business problem** to be solved
 - That cannot be solved with more mature technologies
2. An identifiable **business network**
 - With Participants, Assets and Transactions
3. A need for **trust**
 - Consensus, Immutability, Finality or Provenance

What makes a good *first* blockchain use case?

– First use-cases are even more difficult to identify!

1. **A limited scope**, but still solves a real business problem
 - Minimum Viable Product in a few weeks of effort
2. A smaller **business network**
 - Usually without requiring regulators and consortia
3. Allows for **scaling with more participants and scenarios**
 - Consider shadow chains to mitigate risks

Start small, succeed and grow fast!

QUESTIONS



?s