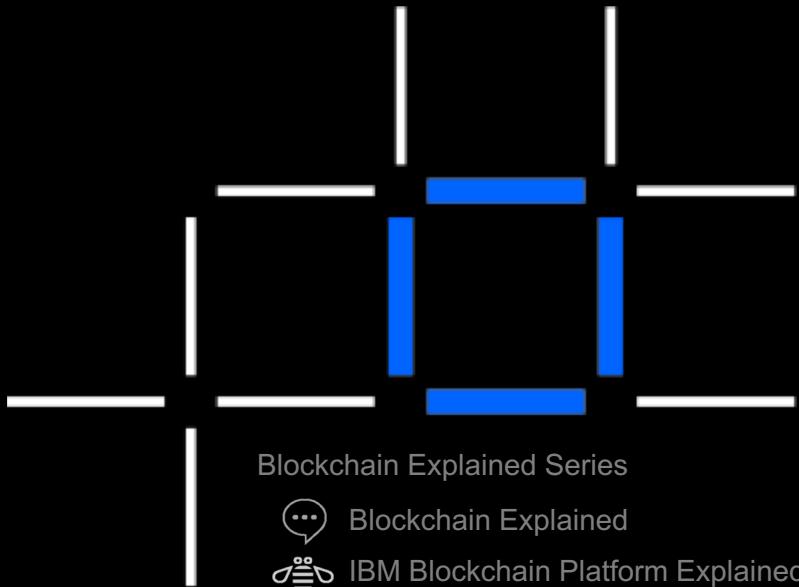


Blockchain Use Cases

IBM Blockchain Networks

Jin VanStee
NA Z Blockchain Architect



Blockchain Explained Series

- Blockchain Explained
- IBM Blockchain Platform Explained
- Solutions Explained**
- Garage Explained
- What's New
- Next Steps



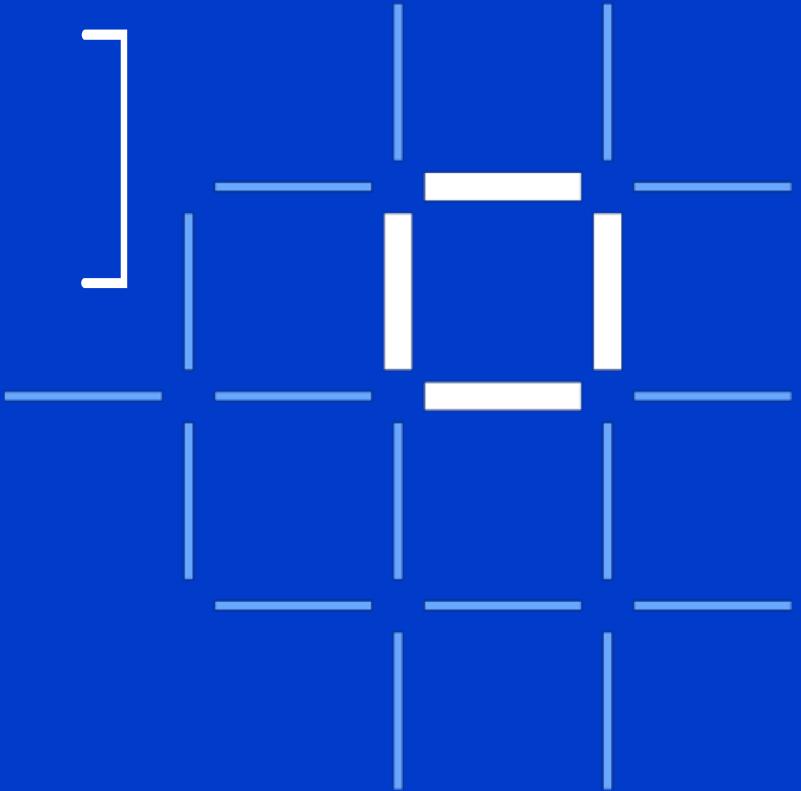


IBM Solutions

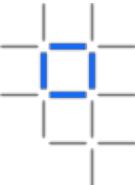
- Food Trust
- TradeLens
- World Wire
- Digital Identity



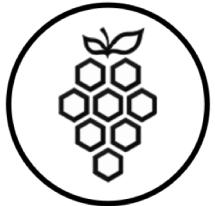
Your Solution



IBM Solutions



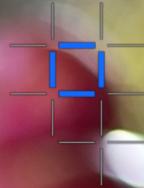
- The aim of this presentation is to provide introductions to IBM blockchain solutions
- It is suitable for clients and IBMers wishing to find out more about one or more of these solutions
- See also the [Client References](#) presentation that gives summary information on many more blockchain projects



Food Trust

IBM Blockchain





Introducing IBM Food Trust™ built on Blockchain technology

The IBM Food Trust solution is a set of modules providing traceability to improve food transparency and efficiency

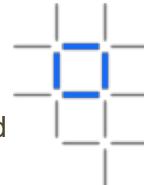
Blockchain is used to create a trusted connection with shared value for all ecosystem participants, including end consumers

The solution offers connectors for interoperability and leveraging existing standards (e.g., GS1)

Enterprise Ready leveraging the IBM Blockchain Platform to provide enterprise level security and scalability



IBM Food Trust provides value to the entire food ecosystem



Farmers / Producers

- Prove farm is not a source of outbreak
- Ease of connectivity to the supply chain



Food Manufacturers / CPGs

- Instill trust between retail, suppliers & customers
- Automate & reduce manual certificate management



Wholesalers/ Distributors

- Conduct targeted recalls
- Enable internal data sharing



Food Logistics

- Enhance ability to meet compliance standards
- Reduce manual processes



Food Retailers

- Assure customers food supplied is safe
- Conduct targeted recalls quickly



Consumers

- Learn about recalls and increased transparency
- Reduce risk of being victimized by food fraud



Certification Bodies

- Reduce fraudulent certificates
- Increase renewal speed



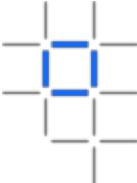
Food Service

- Assure customers food supplied is safe
- Reduce wasted food



Regulators

- Identify contamination quickly
- Reduce unnecessary testing



The effectiveness of the IBM Food Trust solution was demonstrated with a Walmart mango pilot

Pilot Test Case

How long does it take to trace a package of sliced mangoes back to the farm?



IBM Blockchain

Supply Chain



Results

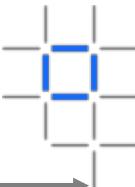
Typical manual, mixed digital and paper-based method
6 days
18 hours
26 minutes

IBM Food Trust digital solution

2.2 seconds

IBM

Where are we on our journey?



2016

2017

2018



Pork
Traceability /
safety



Mango
Traceability /
global trade



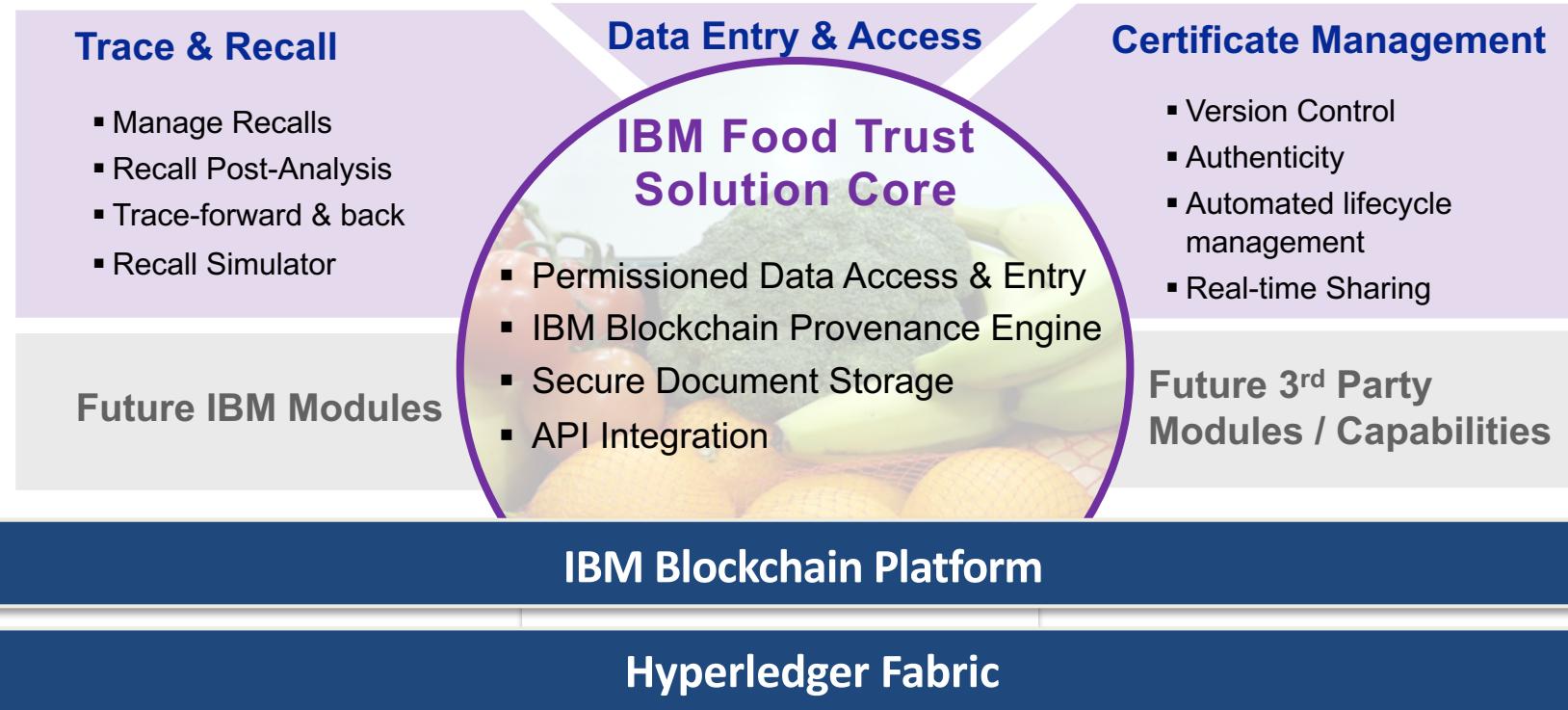
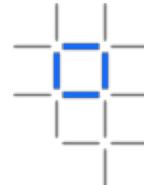
Additional partners joined the IBM Food Trust™ network, with growing food data transactions

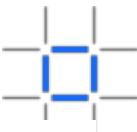


Onboarding agriculture,
ingredient suppliers, retailers,
CPGs, QSRs and others



The IBM Food Trust solution is a set of modules built for the industry





Traceability provides the starting point for other use cases



Sustainability
Initiatives



Freshness
Management



Transportation
Optimization



Provenance



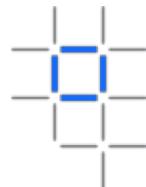
Inventory Optimization



TradeLens



IBM Blockchain



IBM and Maersk have launched TradeLens

An open and neutral supply chain platform poised to transform the industry

- TradeLens is built for the industry and offers benefits to trade participants from across the supply chain ecosystem
- Responding to industry feedback, IBM and Maersk have revised the approach and are proceeding under a Collaboration Agreement, which offers greater flexibility and responsiveness to industry feedback
- An Industry Advisory Board will help to shape the platform and drive standards
- Maersk Line and Hamburg-Sud are participants under the same terms as other network members
- Core platform components are available today under an Early Adopter program; full release remains on target for Q4 2018

Bloomberg

Business

Maersk, IBM Launch Blockchain-Based Shipping Platform TradeLens

By [Christian Wienberg](#)
August 9, 2018, 4:00 AM PDT

LISTEN TO ARTICLE ▶ .36

A.P. Moller-Maersk A/S, the world's largest container line, and International Business Machines Corp. have launched a blockchain-based platform for sharing transaction information in real time, to speed up shipments.

Forbes

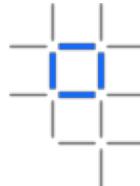
2,532 views | Aug 9, 2018, 07:01am

IBM-Maersk Blockchain Platform Adds 92 Clients As Part Of Global Launch

 Michael del Castillo Forbes Staff
I cover enterprise adoption of blockchain and cryptocurrency.

IBM

The cost of global trade is estimated at \$1.8 trillion annually¹ with potential savings from more efficient processes of ~10%



More than **\$16 trillion** in goods are shipped across international borders each year



80% of the goods consumers use daily are carried by the ocean shipping industry



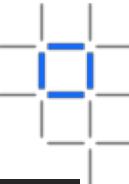
By reducing barriers within the international supply chain, global trade could increase by nearly **15%**, boosting economies and creating jobs²



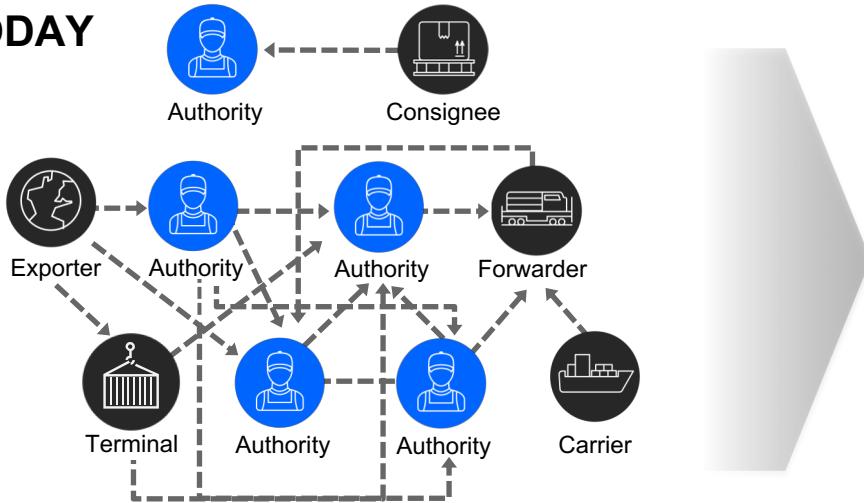
In many cases the administrative cost of moving a container is **higher** than the cost of physically moving it

1) Maersk Strategy Group (May 19, 2016) based on World Bank data for World Trade Costs
2) The World Economic Forum: Enabling Trade Valuing Growth Opportunities 2013

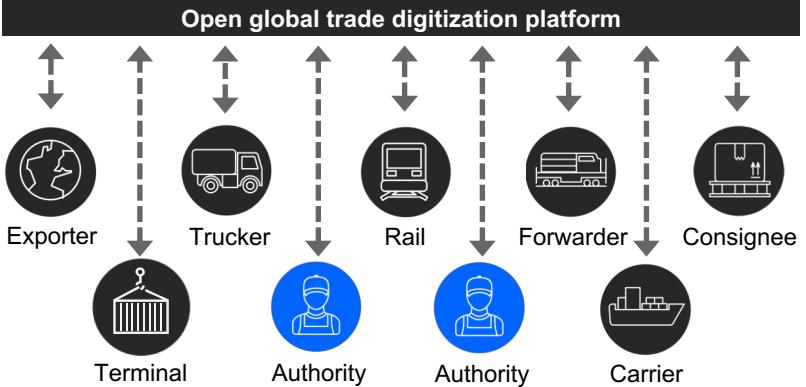
The case for a better way



TODAY

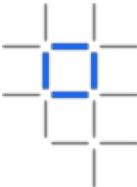


TOMORROW



- Inconsistent information across organizational boundaries and “blind spots” throughout the supply chain hinder the efficient flow of goods
- Complex, cumbersome, and costly peer-to-peer messaging
- Manual, time-consuming, paper-based processes
- Risk assessments often lack sufficient information; clearance processes subject to fraud
- The administrative cost of handling a container shipment is comparable to the cost of the actual physical transport

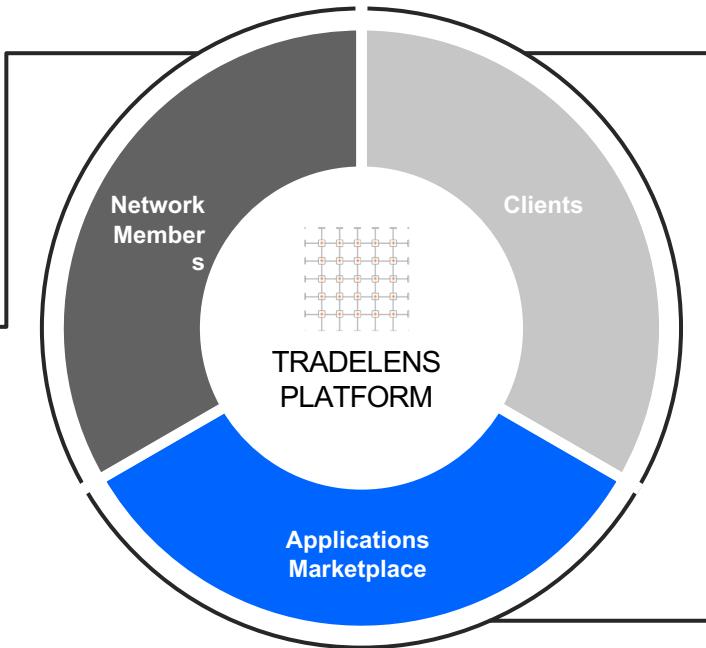
- Instant, secure access to end-to-end supply chain information; single source of the truth
- Assurance of the authenticity and immutability of digital documents
- Trusted cross-organizational workflows
- Better risk assessments and fewer unnecessary interventions
- Far lower administrative expenses and elimination of costs to move physical paper across international borders



The TradeLens ecosystem

Provide and gain access to end-to-end supply chain information

- Ocean carriers
- Ports and terminals
- Government authorities
- Inland transportation
- 3rd party data providers



Primary consumers and beneficiaries of the platform

- Shippers (BCOs, retailers, manufacturers, etc.)
- Freight forwarders, customs brokers, 3PL
- Network Members
- Financial institutions

Offer value added services to the ecosystem through a platform marketplace

- TradeLens offerings
- Offerings from third party ISVs
- Offerings from Network Members and Clients

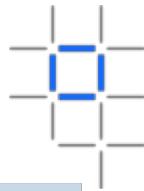


World Wire

IBM Blockchain



IBM Blockchain World Wire – the new global financial rail

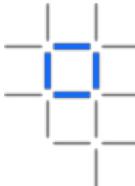


IBM is transforming cross-border payments with IBM Blockchain World Wire, the integrated network for real-time clearing and settlement. This new global financial rail allows banks and financial institutions to send and settle payments around the globe with finality in a matter of seconds, eliminating enduring challenges that have long hampered the cross-border payments industry.

Today's international payments systems are plagued by multiple intermediaries across multiple regions, each with their own rules, regulations, and practices. This makes cross-border payments and transactions costly, time-consuming, complicated and restrictive.

Let's settle
payments in
seconds —
not days

Current international payments



Correspondent banking fees, pre-funding requirements and exotic currency exchanges are just a few factors that continue to inflate the true **cost of cross-border payments** and transactions



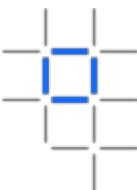
Cross-border payments rely heavily on traditional correspondent banking relationships
— a process requiring multiple intermediaries
— taking **days or even weeks to complete**



Privacy and security concerns have given rise to new, often competing regulatory requirements — **increasing the complexity of the governance structures** among disparate payment systems, inhibiting coordinated change



The involvement of multiple intermediaries creates a complex web of procedures **hindering end-to-end visibility** of cross-border payments — often resulting in error-prone and faulty transactions that must be reconciled later



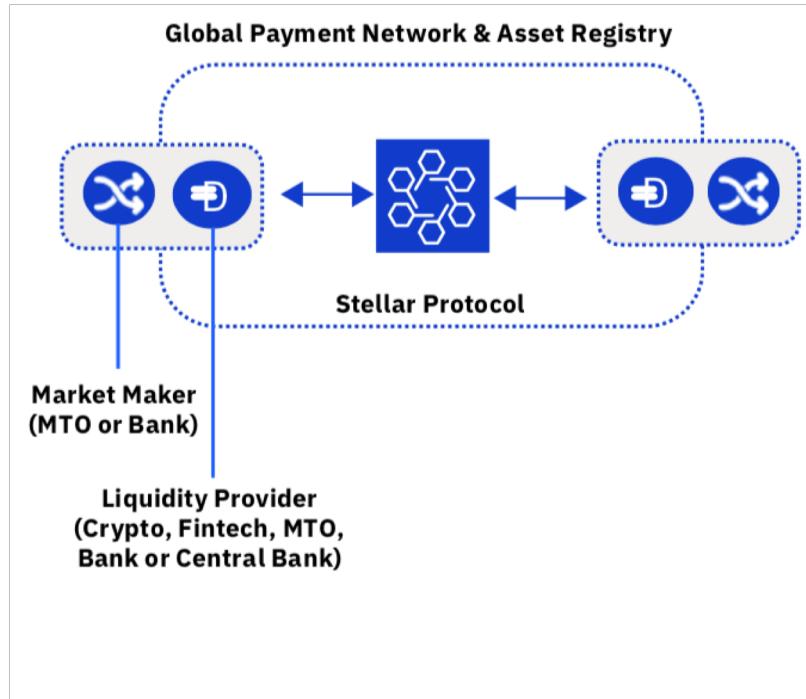
The IBM Blockchain World Wire difference

Sending money across borders today requires a series of intermediaries for both clearing and settlement, each adding time and cost to the process.

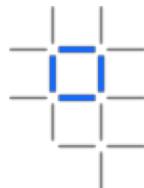
With IBM Blockchain World Wire, clearing and settlement with finality happens in near real-time. The solution uses digital assets to settle transactions, serving as an agreed-upon store of value exchanged between parties as well as integrating payment instruction messages.

It all means funds can now be transferred at a fraction of the cost and time of traditional correspondent banking.

Find out how to seamlessly integrate IBM Blockchain World Wire into your cross-border payment systems at <https://ibm.com/blockchain/solutions/world-wire> today.



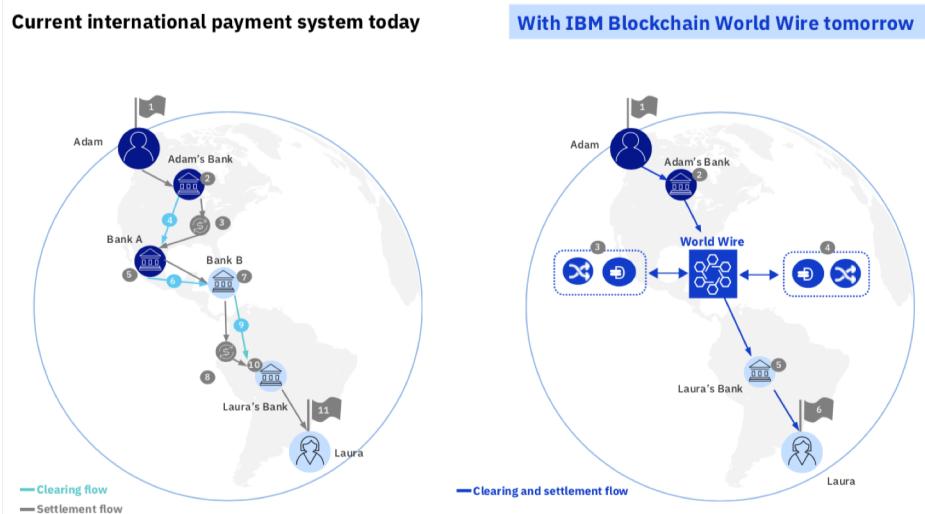
The IBM Blockchain World Wire difference in action



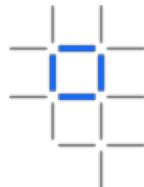
Using a digital asset model, World Wire enables the near real-time settlement of transactions with finality through the use and exchange of digital assets.

Holding real-world intrinsic value, a digital asset is used as the means for settling transactions — serving as an agreed upon store of value exchanged between parties to fulfill payment obligations.

By leveraging a digital asset model, our solution is able to uniquely integrate the payment instruction messages and the chosen digital asset to settle proposed transactions, into a single network that enables value exchange and funds transfer to be executed in near real-time at a fraction of the cost and time of traditional correspondent banking.



The IBM Blockchain World Wire benefits



24/7

Payment support regardless of size, origination, destination, or asset type



Higher visibility for streamlined transactions with reduced disputes and reconciliation needs



Enhanced regulatory compliance through improved transparency



Secure network with interaction and eligibility criteria as well as robust access controls



Identity

IBM Blockchain



The Different Dimensions of our identity

1. Me as an individual:

Identity: Unique traits associated with an individual; the owner of personal identification information.

Name

Age

Gender

Biometrics

Race

Family

Address

Birthplace

Nation

Education

Profession

Workplace

Belief

Belief

Hobby



2. How I am represented:

Identity Renderings: Digital or physical (paper/plastic) instrument as defined by providers.

National ID

Work ID

Driving ID

Address History



Social ID

Work History

Financial History

Driving History

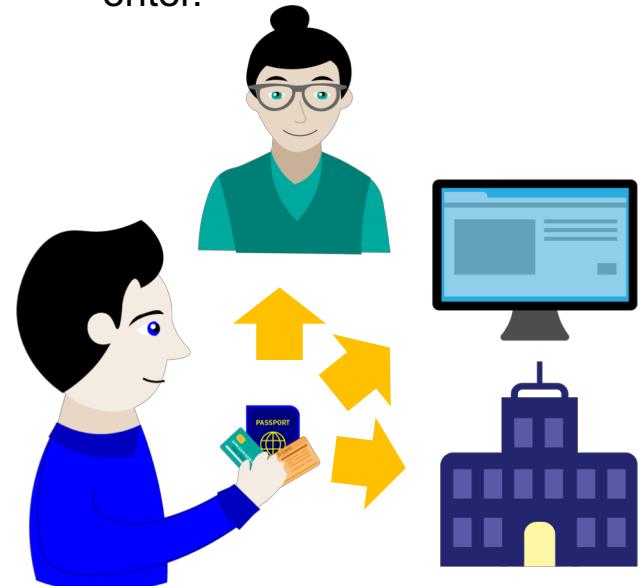
ID Card

Social Security

SSN

3. How I interact:

Identity Interactions: Situational usage such as pay, identify, participate, enter.



The Facts

Cyber attacks cost businesses as much as \$400 billion a year.²

Banks spend \$1 billion a year on identity management solutions²

1339 breaches of data stores of individual names, Social Security, drivers license number, medical record, or financial records in 2017 in the US alone.¹



175M records breached in 2017 that exposed millions of people's identities¹

It could have been your identity.

[1] http://www.idtheftcenter.org/images/breach/2017Breaches/DataBreachReport_2017.pdf

[2] <https://www.wired.com/beyond-the-beyond/2017/07/global-cybercrime-costs-trillion-dollars-maybe-3/>

[3] https://www.accenture.com/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_9/Accenture-Future-Identity-Banking.pdf

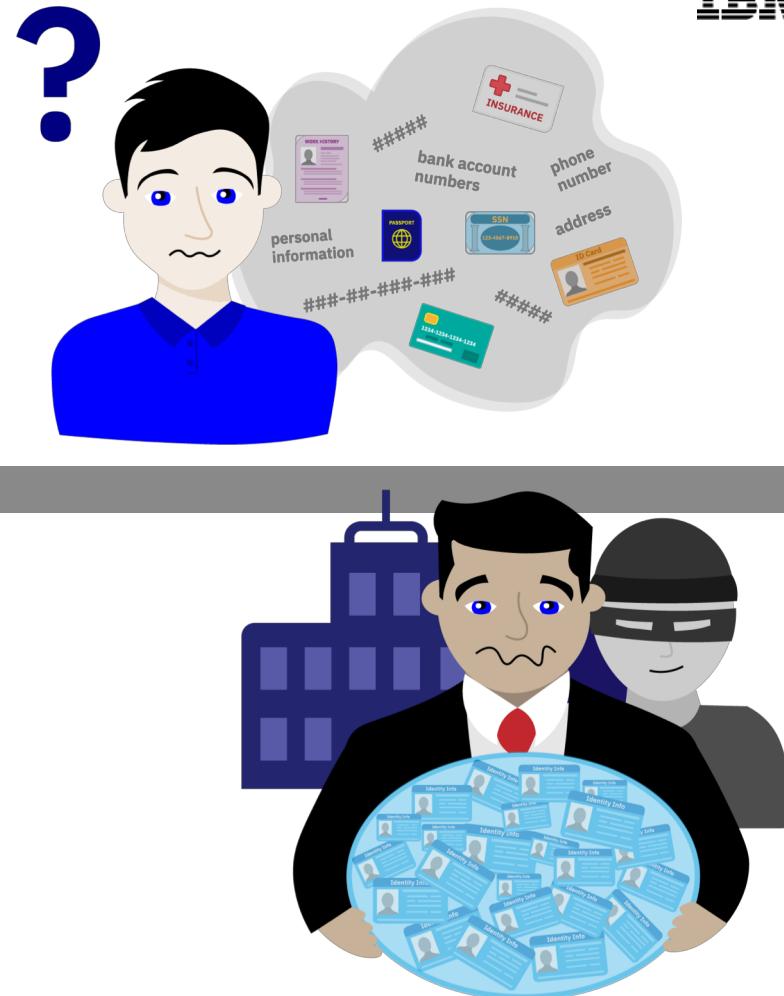
The Problem

Online identity systems are **broken...**

Today, **individuals and organizations** are not in control over their identity. Personal information is often shared without our awareness and is honeypot of personal data for hackers to exploit.

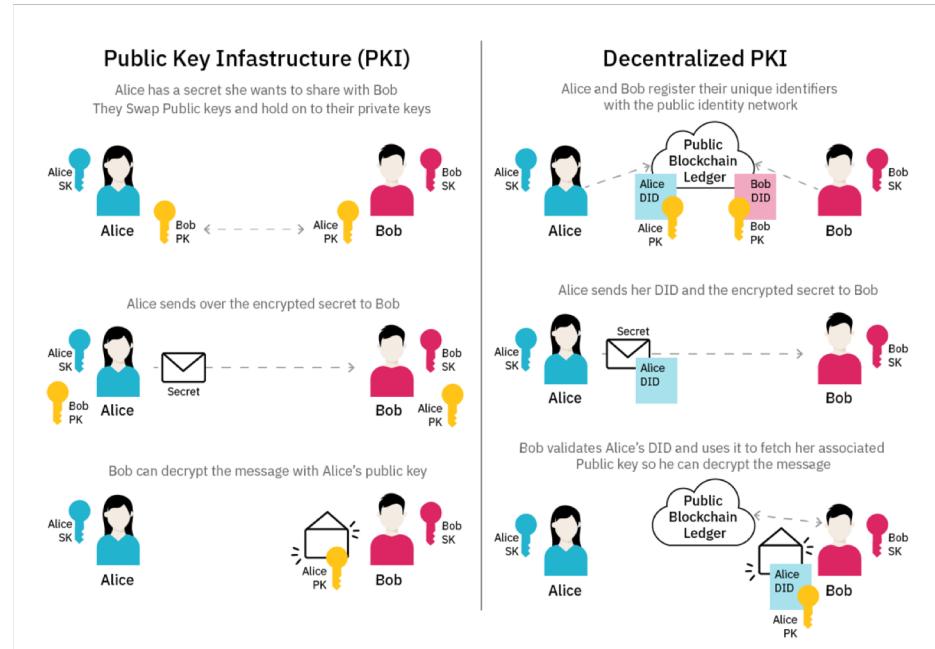
Enterprises and traditional data aggregators realize the shift to decentralization

- Costly
- Liability
- Difficult to establish trust



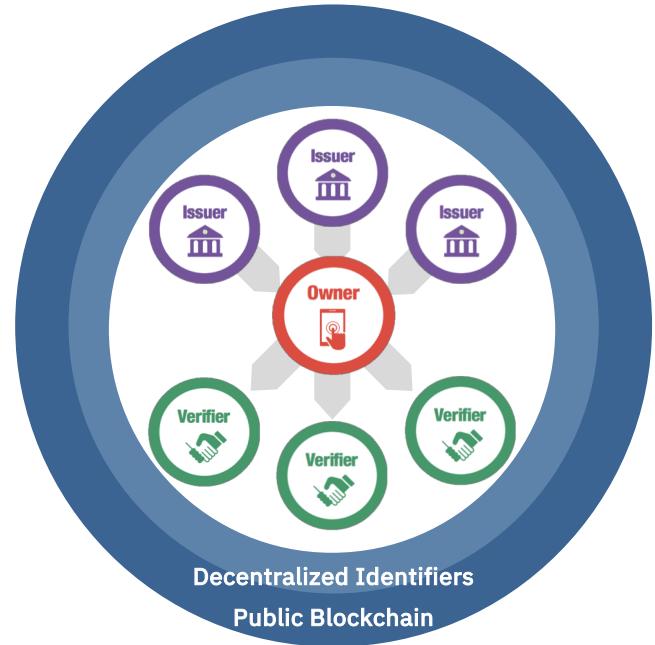
Decentralized Identity for trust & privacy at scale

- Blockchain enables **trust**
 - Users can verify the identity of a person, organization or thing on the public ledger
 - Users create and manage cryptographic identities; no central certificate authority
- Blockchain provides **privacy**
 - Zero knowledge proofs disclose only the information that needs to be shared
- Blockchain provides **scale**
 - Removal of centralized issuers allows identity to scale at the edges



Sovrin is a self-sovereign identity network

- Sovrin pushes identity to the **edge of the network**
- A decentralized approach that establishes trust and puts the **end user** in control
 - Every person, organization, and thing has a digital wallet to control the flow of their identity
 - No PII is stored on the public ledger!
- Cryptographic, point to point exchange of identity
 - Based on **Hyperledger Indy** technology



Sovrin Identity Concepts

Decentralized Identifier (DIDs)

- User owned and governed
- New type of identifier for verifiable, self sovereign identity
- Fully under the control of person, institution, or thing
- URL to relate an identity for a trusted interaction with a subject
- Standardization for universal identifiers



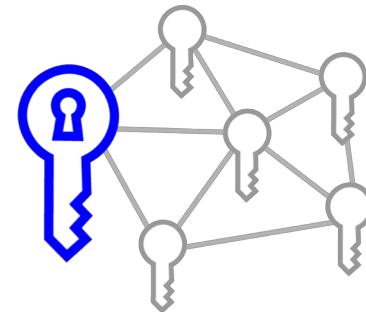
Verifiable Credentials

- Cryptographically backed statements of truth
- Standard way of defining, exchanging, and verifying digital information
- Ecosystem of issuers, verifiers, and owners

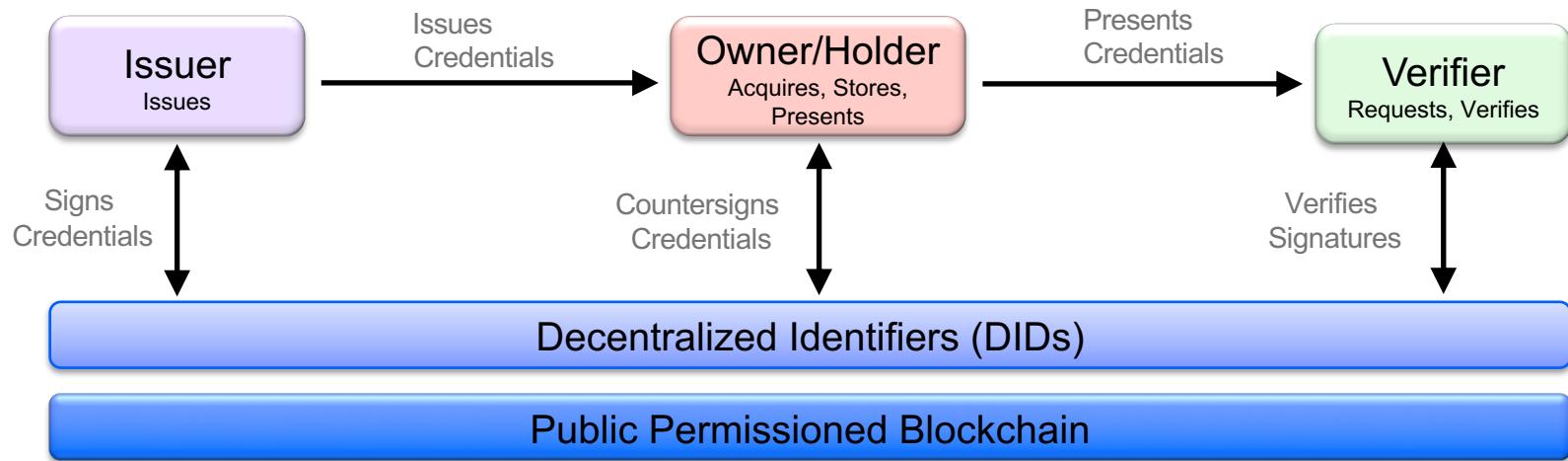


Decentralized Key Management

- User permissioning
- Entities own their own keys and have a “public key” ring for those they interact with
- “Public key” rings are used to resolve and verify interactions through DIDs

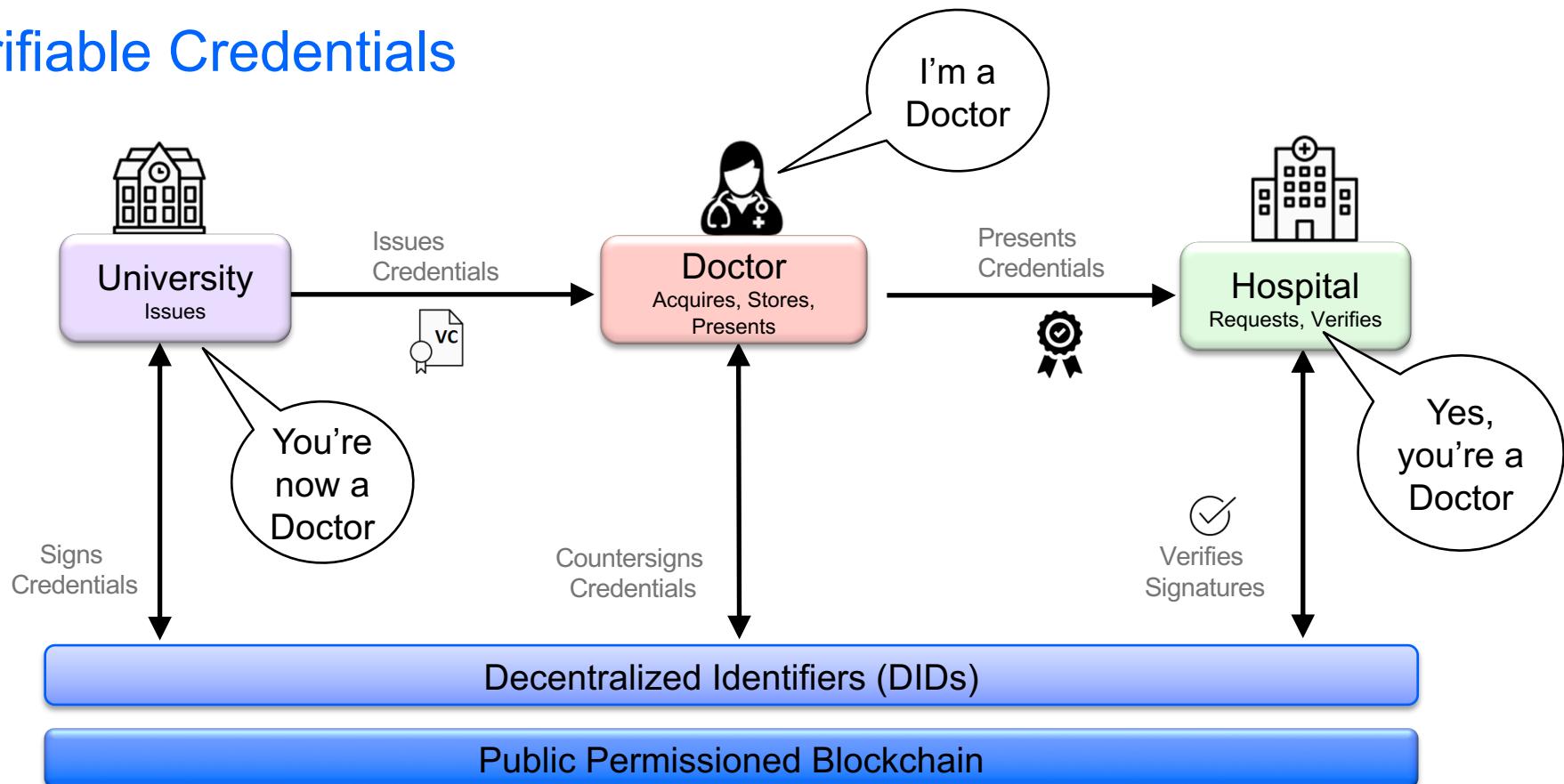


Decentralized Identity

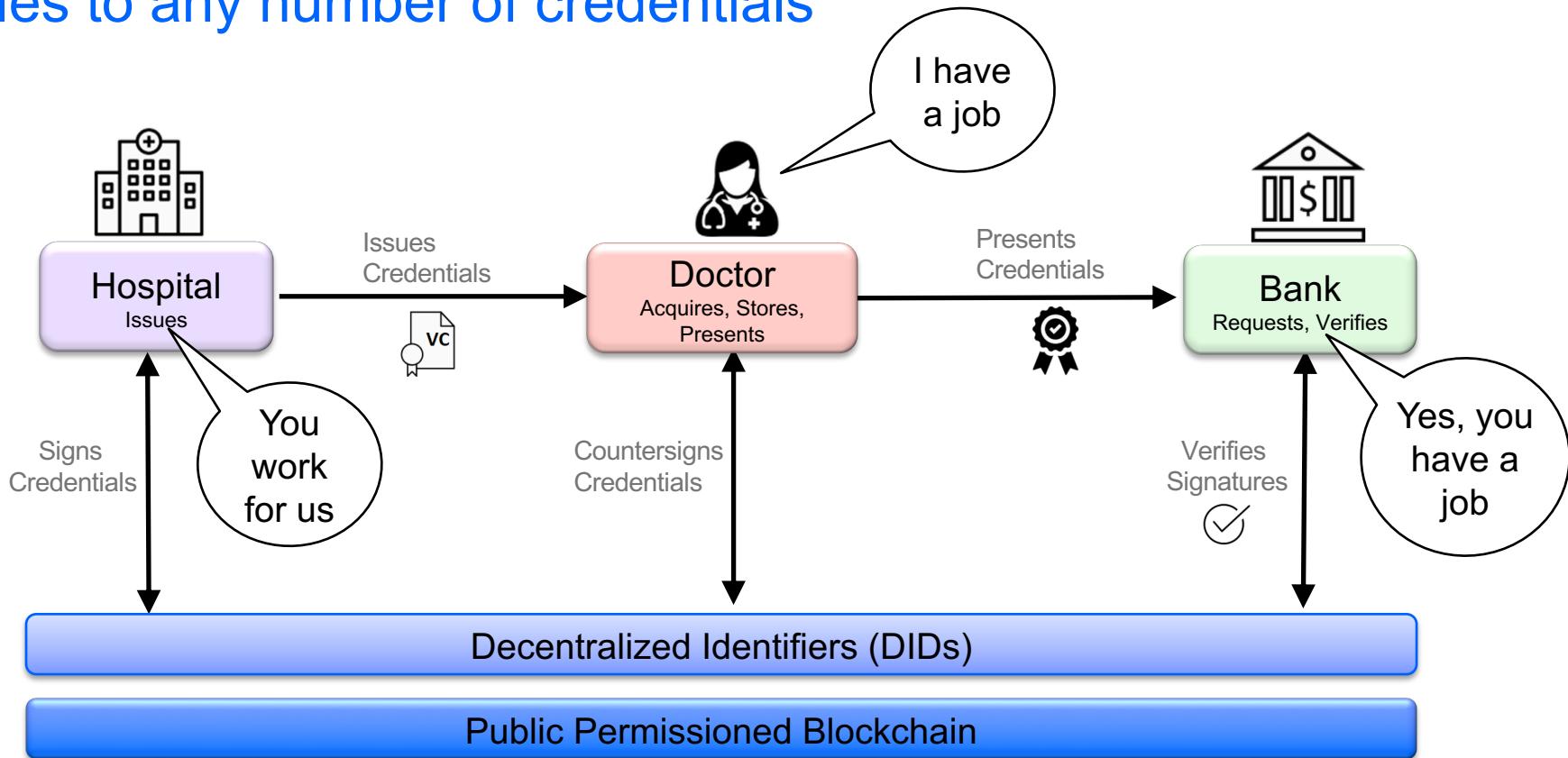


- All interactions between entities are point to point
- The public ledger serves as the distributed root of trust instead of CAs
- Credentials are accumulated over time through every peer to peer relationship

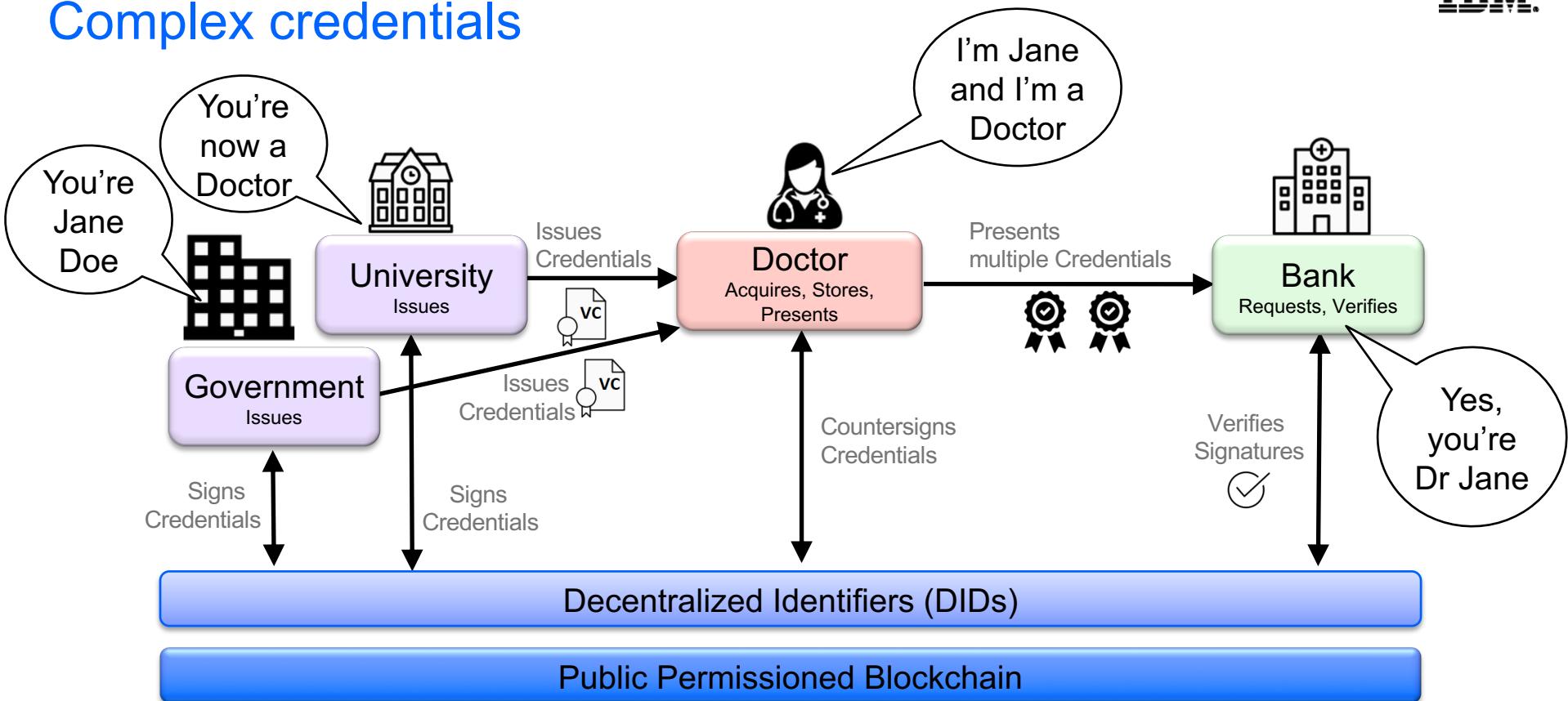
Verifiable Credentials



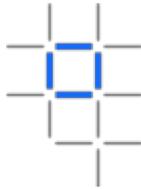
Scales to any number of credentials



Complex credentials



Example: Streamline operations – roaming agreements



What?

- Current system – Visited Public Mobile Network (VPMN) and the Host Public Mobile Network (HPMN) often go through a third party clearing house to process The Call Detail Records (CDRs). Often these clearing houses charge a fee per call. Roaming fraud occurs when a subscriber accesses the resources of the HPMN via the VPMN but the HPMN is unable to charge the subscriber for the services provided, but is obliged to pay the VPMN for the roaming services

How?

- A permissioned blockchain could be implemented between every pair of operators which have a roaming agreement. The roaming agreement is implemented between the HPMN and the VPMN as a smart contract that is triggered when a transaction containing the CDR data is broadcasted on the blockchain network.

Benefits

- Cost savings from eliminating the third-party clearing house .
- Automatic triggering of roaming contract based on call/event data which enables near-instantaneous charging and reduction in roaming fraud
- Repository of verifiable transactions between operators, allowing for quick dispute resolution
- Reduces fraud associated with longer detection and response time.

Blockchain in Banking

IBM Blockchain

Situation

DTC

Large financing gap for small and medium enterprises (SME) – a traditionally underserved market segment.

According to the World Bank, 50 percent of SMEs do not have access to formal credit.

Solution

Leveraged Blockchain technology hosted on the IBM cloud to simplify and facilitate domestic and cross-border trade for small and medium enterprises in Europe, while helping to increase overall trade transaction transparency.

Target Outcome

- Help open new revenue streams
- Initiate new trading relationships
- Foster trade growth



Bonus points cannot be freely exchanged among different banks, causing many bonus points go unused because of strict bonus points policies or a limited selection of goods for exchange

UnionPay and IBM created an innovative business platform on IBM Blockchain to create a permissioned network for the exchange of bonus points. Consumers see consolidated view of their loyalty points earned among their different banks. Consumers can easily exchange loyalty points against rewards.

- Improved user experience
- Increased customer loyalty
- Enhanced product offerings



The French bank currently serves 3.6 million customers and operates multiple systems to manage customer identity for different parts of the business

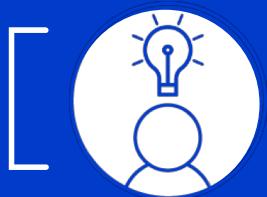
Using the open-source Hyperledger Fabric, the solution tapped into evidence already stored in the bank's multiple systems of record: from mortgage applications to life insurance enrollment and bank accounts opening – allowing business units to access the data in real-time.

- Verify customer bona fides in compliance with Know Your Customer (KYC) requirements
- Significantly lower costs for KYC process

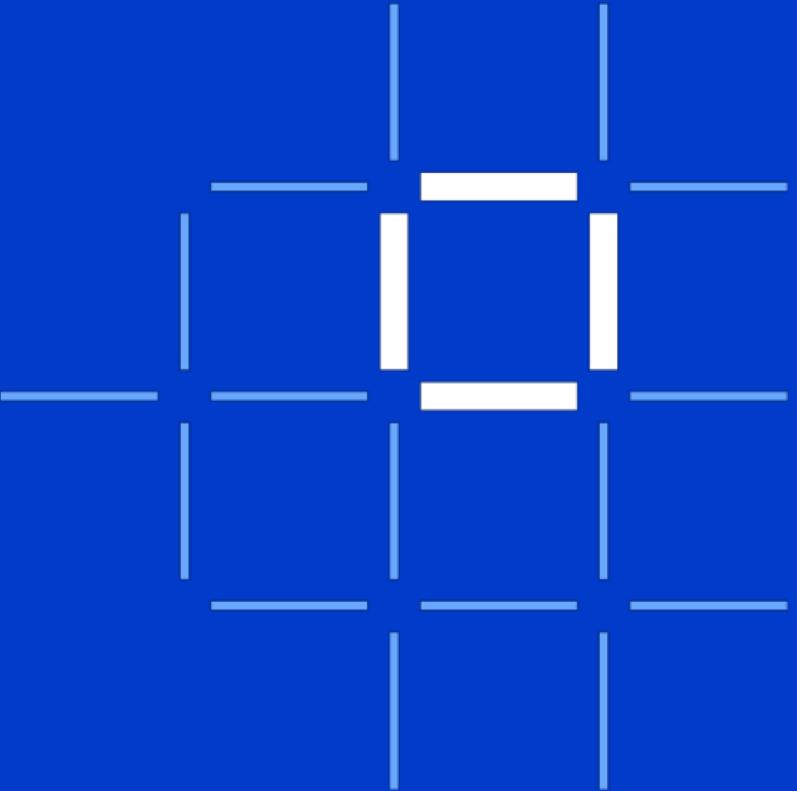


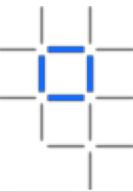
IBM Solutions

- Food Trust
- TradeLens
- World Wire
- Digital Identity



Your Solution





Good blockchain use-case or bad?

Food
Provenance

Holiday
Tracking
Tool

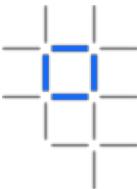
Secure
Document
Store

Track Your
Child

Know Your
Customer

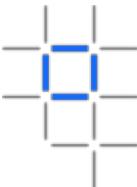
Electronic
Medical
Records





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 more efficiently solved with other technologies
 2. An identifiable **business network**
 - With Participants, Assets and Transactions
 3. A need for **trust**
 - Consensus, Immutability, Finality or Provenance

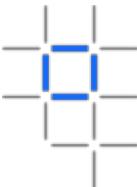


What makes a good first blockchain use case?

– 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!



Assessing Business Value

- It can be difficult to accurately quantify investment case for blockchain
- Things to consider:
 - Existing Pain Points
 - Scope – participants, assets, transactions
 - Benefits: baseline, minimum viable ecosystem (MVE) & mature network
 - Blockchain Design Points
 - References

Blockchain Value Design (BVD) activity will help elaborate these items!

Template – example only (Cross Border Supply Chain)

Problem	90% of goods in global trade are carried by the ocean shipping industry each year. Costs associated with trade documentation processing and administration are estimated to be up to 20% the actual physical transportation costs.	Pain Points
Solution	Manage and track the paper trail of tens of millions of shipping containers across the world by digitizing the supply chain process	<ul style="list-style-type: none"> Transport remains highly dependant on a flood of paper that is never digitised Shipping information must pass through many hands, increasing potential for delays in transport. One shipment can require sign-off from 30 unique organizations and up to 200 communications. One lost form or late approval could leave the container stuck in port The entire process can take more than one month.. Fraudulent changes may be made to the Bill of Lading
Participants	Supplier, couriers (*2), customs (*2) , ports (*2), shipper and retailer	
Asset & Trust	Need for trust around paperwork associated with a container	
Transactions	Supplier prepares to ship, release container to courier, load to ship, clear customs, retailer receipt	

Benefits benchmarks - Value Tree		Baseline	Phase 1	Phase 2-3	Blockchain : Design Points	References
KPI's (e.g.)						
New revenue	# new value propositions	-	-	1 to 3	<ul style="list-style-type: none"> Find new value propositions to exploit the network effect between members 	ANO -1
Improve client experience	Increase in customer satisfaction Increase in trade volumes Cycle times (transit & shipping)	- - 30 days	5% +5% 25 days	10% +15% 10 days	<ul style="list-style-type: none"> Securely and transparently trace the container's path through the supply chain on the blockchain Add trust (Immutability and Provenance) around the Bill of Lading and other container paperwork 	
Reduce transport costs	Waste as % of total shipped Fraud and errors as % of total costs Documentation admin. as % of total costs	6% 5% 20%	5% 4% 15%	1% 0.5% 5%	<ul style="list-style-type: none"> Automate the transit and shipping process with Smart Contracts reducing cycle times and delays No reconciliation or matching of documentation with near instant updates - eliminates the need for audit and verification Removes paper and intermediaries 	ANO -2

Thank you

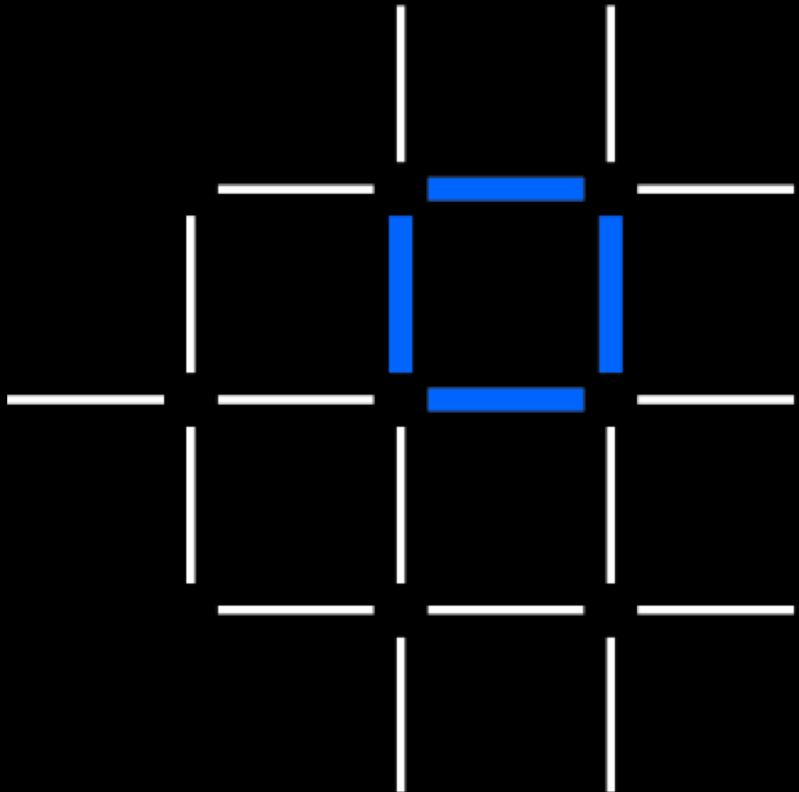
Jin VanStee

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