Introduction to Blockchain

Utah Business and Labor Interim Committee

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Blockchain

- **Business Problem:** A faster, more secure way of conducting business transactions.
- **Solution**: Blockchain. A new way of doing business that is very specifically for tracking of assets — tangible or intangible assets — recording transactions efficiently in a verifiable and permanent way.
- **Targets**: Supply chain types of business processes that have the potential for fraud.
- **Use-cases**: Supply chain, asset registration (vehicles, firearms, real estate), identity services (licensure (professional, contractors), publicly funded medical services, academic credentials), fraud prevention and compliance.
- **Value**: Blockchain speeds processes, lowers transaction costs, and provides security and trust.

- **Why IBM:** IBM is the global leader with 400+ engagements. The IBM Blockchain Platform is the world's only enterprise ready, multi-cloud Blockchain platform

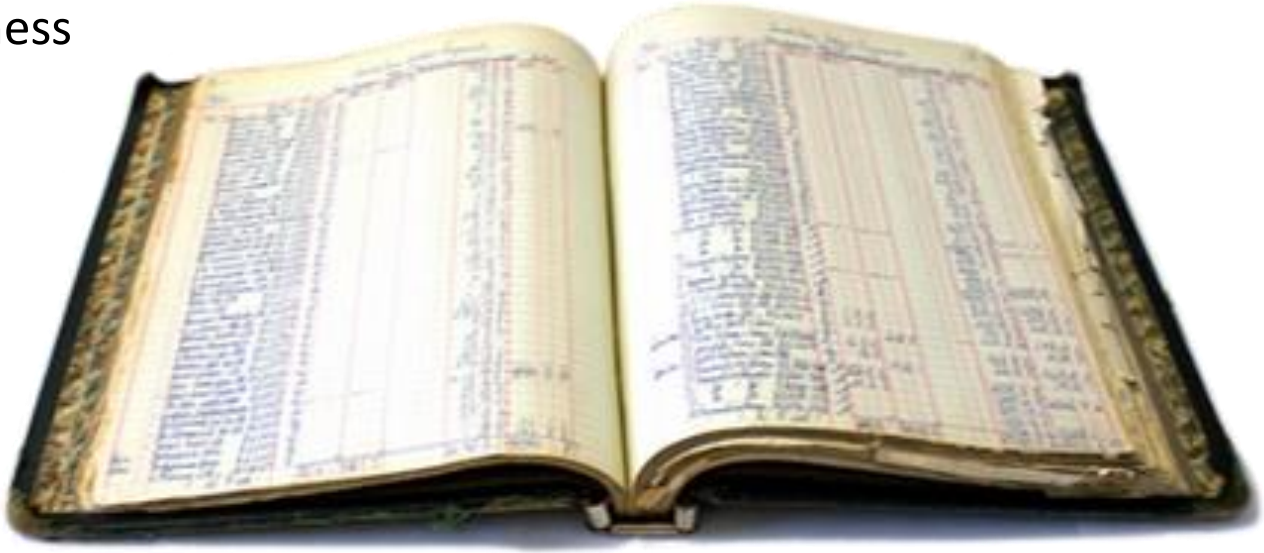
Blockchain in Utah

- **Blockchain-Based Primary Election Voting Pilot** will allow overseas voters, including active-duty military personnel and holidaymakers, to register their votes for the upcoming municipal primary election using the Voatz app.
- **Utah Eyes Blockchain for Vehicle Registration App. Utah Wants to Use Blockchain to Cut Costs, Improve Services.** The existing process costs all involved “a lot of money”, CIO Mike Hussey notes, and he expects blockchain will help with streamlining.
- HJR019
- In 2018, a total of 18 states introduced some form of legislation related to blockchain technology and nine bills became law (CO, CA, TN, WY, to name a few)

Ledgers are key

Ledger is THE system of record for a business.

Business will have multiple ledgers for multiple business networks in which they participate.



Transaction – an asset transfer onto or off the ledger

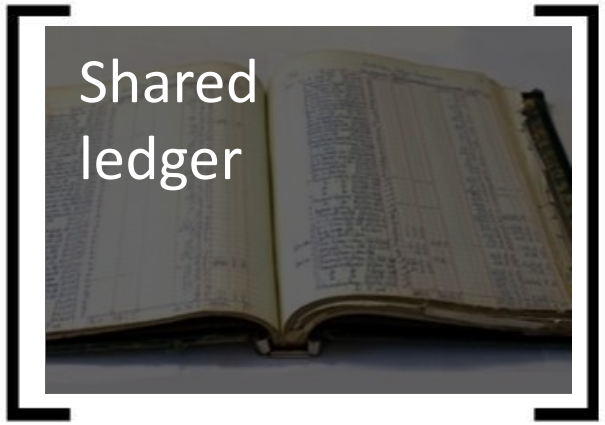
- John gives a car to Anthony (simple)

Contract – conditions for transaction to occur

- If Anthony pays John money, then car passes from John to Anthony (simple)
- If car won't start, funds do not pass to John (as decided by third party arbitrator) (more complex)

The elements of a Blockchain for business

Append-only distributed system of record shared across business network



Business terms embedded in transaction database & executed with transactions

Ensuring appropriate visibility; transactions are secure, authenticated & verifiable

Transactions are endorsed by relevant participants

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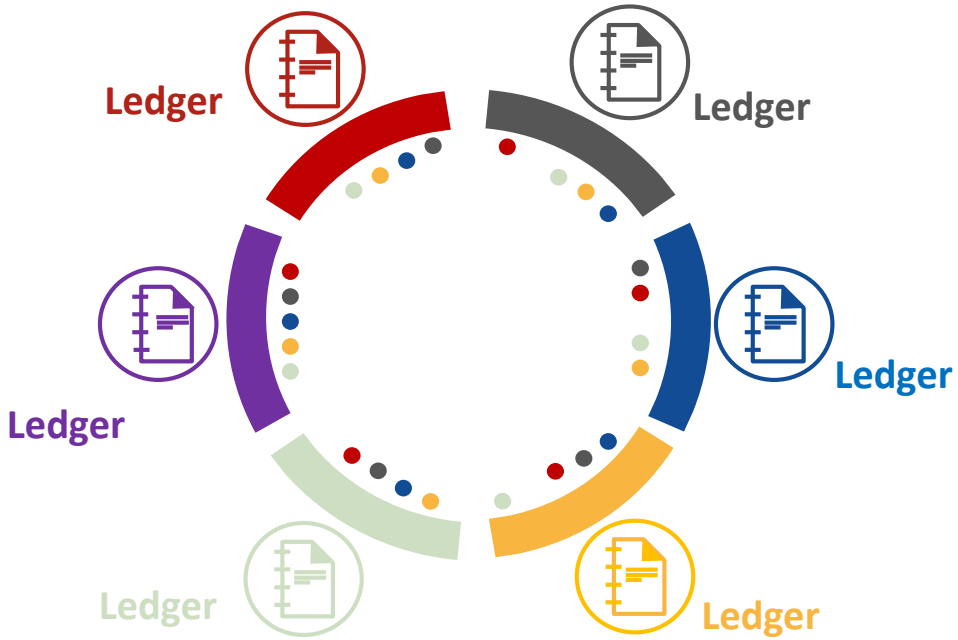
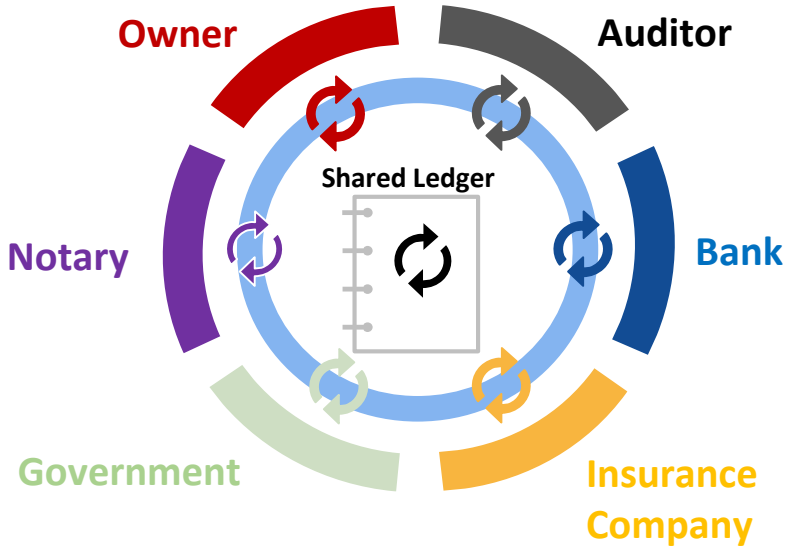
Current State



Pain Points

- Siloed Information
- Lack of information-sharing
- Manual paperwork/processes

Future State



Blockchain Advantages

- Permissioned Information Sharing
- Supply chain visibility
- Provenance of goods
- Easy regulation and compliance
- Increased trust within the business network

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Where companies derive Blockchain ROI

Blockchain Insurance Industry

30% Productivity

The consensus amongst the companies is that a productivity gain of up to 30% is achievable.

Container Shipping

20% is admin.

Estimated that 20% of actual physical transportation costs is administrative effort.

Major Bank

Commercial Real Estate lending

25-40% Productivity

Lending today it is paper/labor intensive. Blockchain could eliminate 25% to 40% of the administrative staff costs.

- B2B process efficiencies
- Target 20-30% productivity improvement
- Reduced delays & distribution costs

- Increased trust
- More consumer & partner trust → more business
- Less fraud & error

- New business opportunities
- Serve the un-served
- Join the dots in new ways

- Capital Efficiency
- Optimise working capital
- Reduce risk exposure

But you have to have a good use case!

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State & Local Government Use Cases

State Government

- **Government Efficiency, Industry Creation and Global Trust (Smart Dubai)**
- **Delaware Blockchain Initiative for Uniform Commercial Code**
- **Citizen Identity (Illinois)**
- **Educational Credentials (Consortium forming)**
- **Supply Chain for Regulated Products (Marijuana, Tobacco, Alcohol)**
- **Verifying eligibility for welfare payments**
- **Criminal Justice & Parole**

Local Government

- **Equipment tracking**
- **Proof of maintenance cycles (aka contract management checkpoints)**
- **Spreadsheet reduction down to single source of truth**
- **Field Maintenance with multi-channel viewing such as mobile.**
- **Proof of Anti-Fraud Controls, disbursement tracking & decomposition of spend**
- **Credentials and Certification - Files to track current state of parties and creds**

Supply chain

Challenges

Whether it's the replacement of a street sign, an emergency generator or vital engine part, the ability to track and trace where an object is in the supply chain is vital within large-scale government purchasing systems.

Limited visibility can lead to waste either through over-ordering or a failure to anticipate shortages. Late delivery can lead to significant losses across government – from municipal services to military operations.

Solutions: IBM Blockchain makes the precise location of an object — and its accompanying digitized documentation — part of a traceable permanent record giving government full visibility of the supply chain.

Asset registration

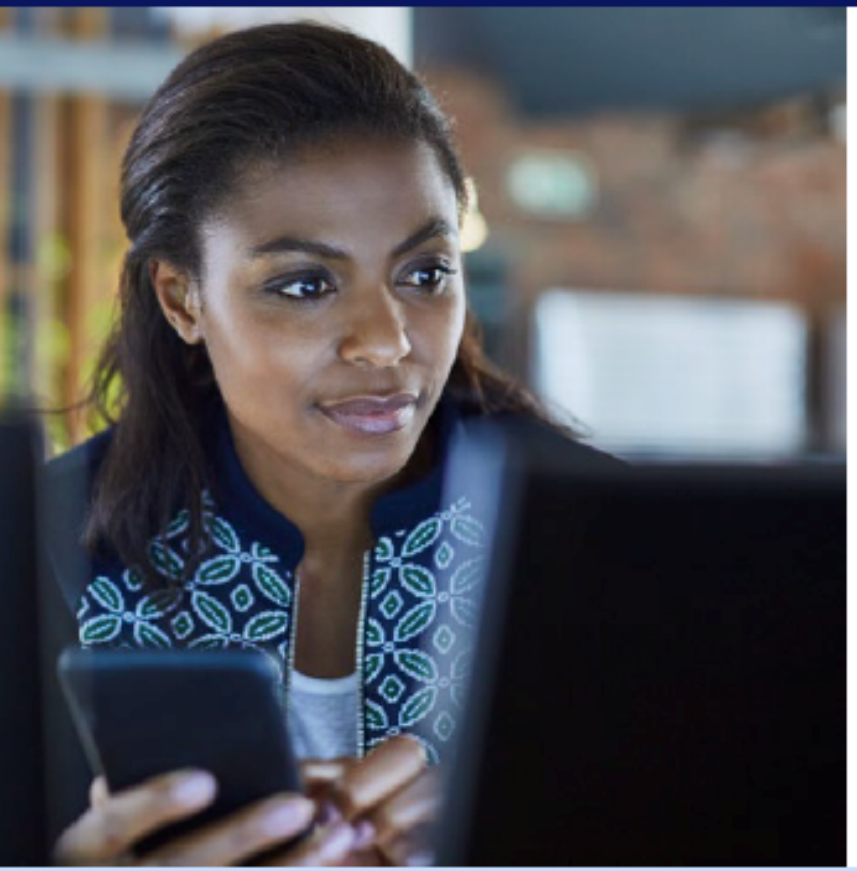
Challenges

We rely on government to accurately record and track our homes, businesses, cars and more, verifying ownership and ensuring smooth financial transactions. Accurate and accessible registries are crucial to engender trust and transparency in government.

Despite this need, today's registries suffer from slow, duplicative processes and an over reliance on error-prone, incomplete and manual data entry.

Solutions: IBM Blockchain enables government agencies to increase the accuracy and efficiency of publicly held records by linking ownership of an asset to a single, shared ledger without disrupting existing registry data.

Identity services



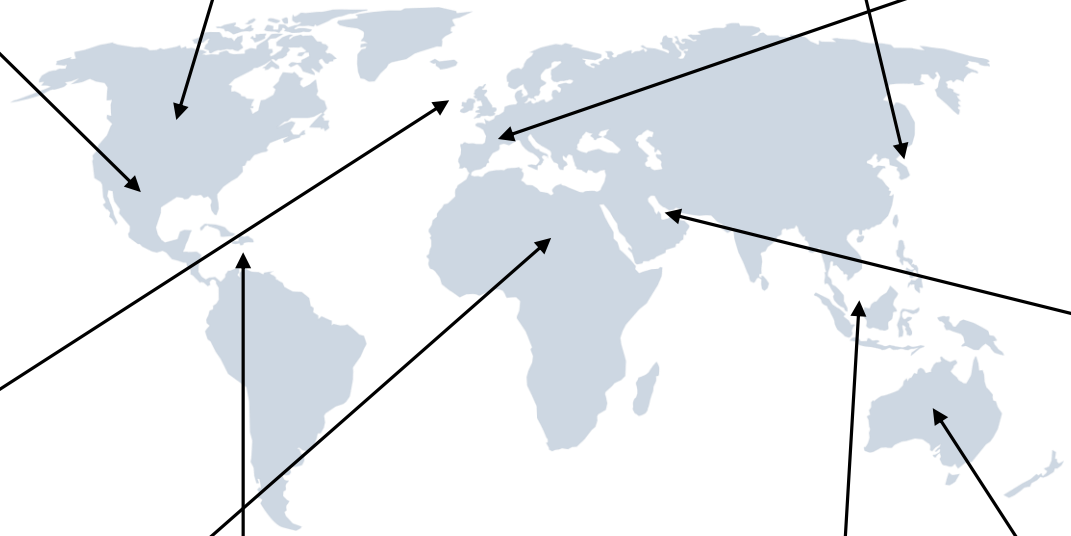
☐ Challenges

From licensure to passports to publicly funded medical services, establishing and verifying identity is vitally important for both citizens and government agencies themselves. The financial and personnel costs of providing rigorous identity services, though, are enormous.

The great need for identification documents and verification of existing credentials arises partly from the difficulty in linking enough verifiable personal data on which to base any kind of government-issued identification. What sounds like a simple task is complicated by records in different formats, of varying provenance, and containing sometimes-conflicting data.

☐ **Solutions:** IBM Blockchain enables government agencies to create a single, trustworthy collection of digital identity documents. These documents make it easier for government officials to reconcile data conflicts and provide citizens with control over their own identity.

Blockchain helping government spans the globe



USA
- Register of Births
- Vehicle licensing
- ***HR records***
- Data use agreements
- ***Parcel tracking***
- Prescription drugs tracking
- ***Corporate registrations***
- Student locker
- Credentials register

Canada
- ***Corporate Registry***
- ***Importation of Goods***
- ***Patient Consent***

Japan
- ***Registration of address change***

Europe
- Invoicing and payments
- Tax compliance and fraud
- Grants management
- Trade supply chain
- Defense logistics supply chain
- ***Registry of electric bikes***
- ***Immigration – document verification***

UK
- ***Livestock information***
- ***Inspection in the abattoir***
- ***Authorized Economic Operator***
- Firearms register
- Immunization record
- ***Doctor credentials and identity***
- ***Payment of social benefits***
- Blood supply chain
- Benefits status and identity
- Defense Logistics supply chain
- ***Property Exchange***

MEA
- Blockchain Strategy
- Municipal Blockchain Strategy (UAE)
- ***Student Records*** (UAE)
- ***No Objection Certificates*** (UAE)
- ***Business Register*** (UAE)
- ***Credentials for Medical Staff*** (UAE)
- ***Blockchain Platform*** (UAE)
- ***Vehicle lifecycle*** (UAE)

Africa
- Identity and payment
- Tax compliance and VAT

Caribbean
- Business Register

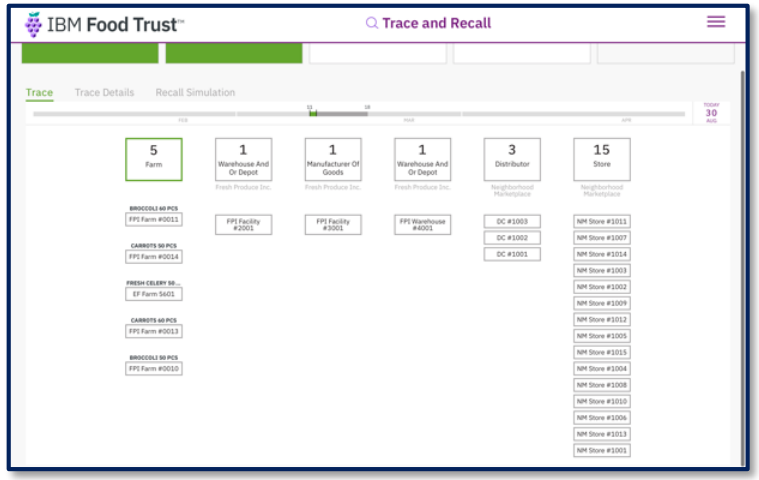
ASEAN
- Register of beneficiaries
- Transmission of payment files
- ***Property transfer***

ANZ
- Vehicle lifecycle
- Payment of social benefits
- Defense logistics supply chain
- Tax payments on land title transfer
- e-invoicing
- Corporate registry

Production Blockchain Examples

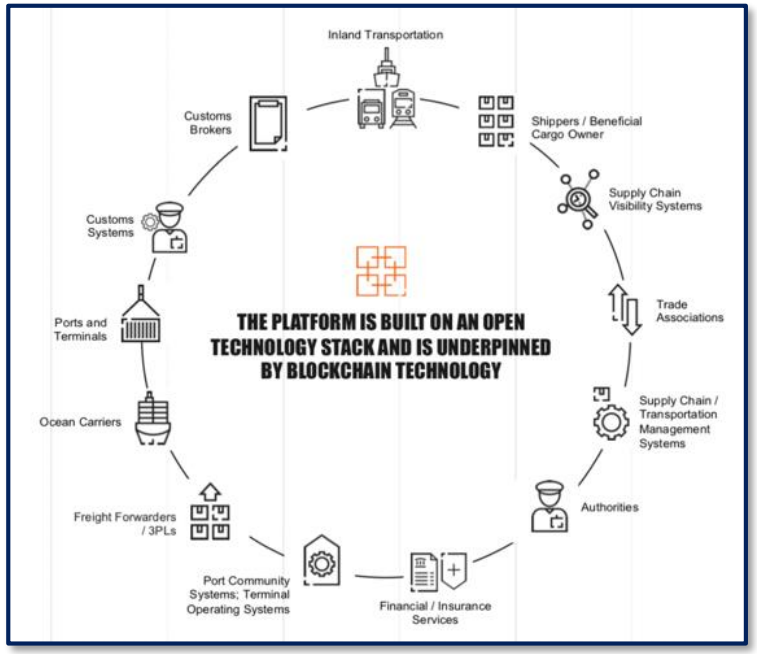
Providing Value to Extended Business Network Participants:

we.trade



Extending the Business Network:

Global Food Trade



Digitizing the Global Supply Chain:

TradeLens

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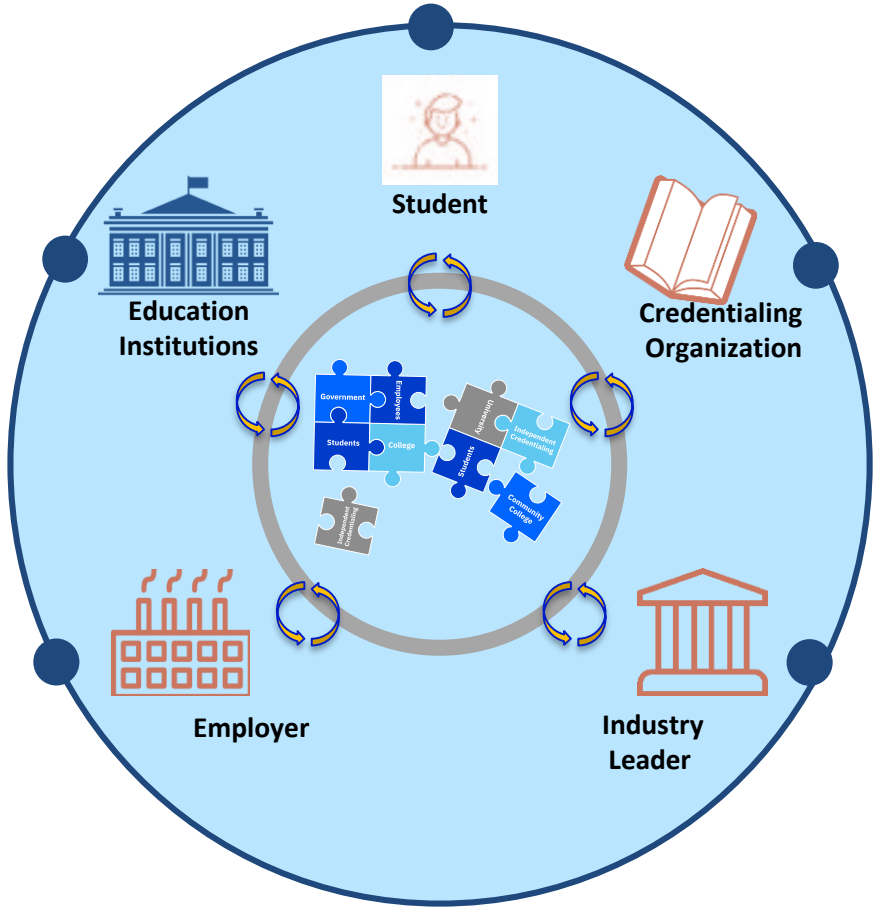
A learning credential blockchain is the transformative technology to unlock the future

" A shared, replicated, permissioned ledger with consensus, provenance, immutability and finality for credentials*"

- Built on existing education industry and technical standards
- Founded by key education institutions and leaders of the education industry
- Supporting all credential use cases
- Available to all stakeholders working with credentials

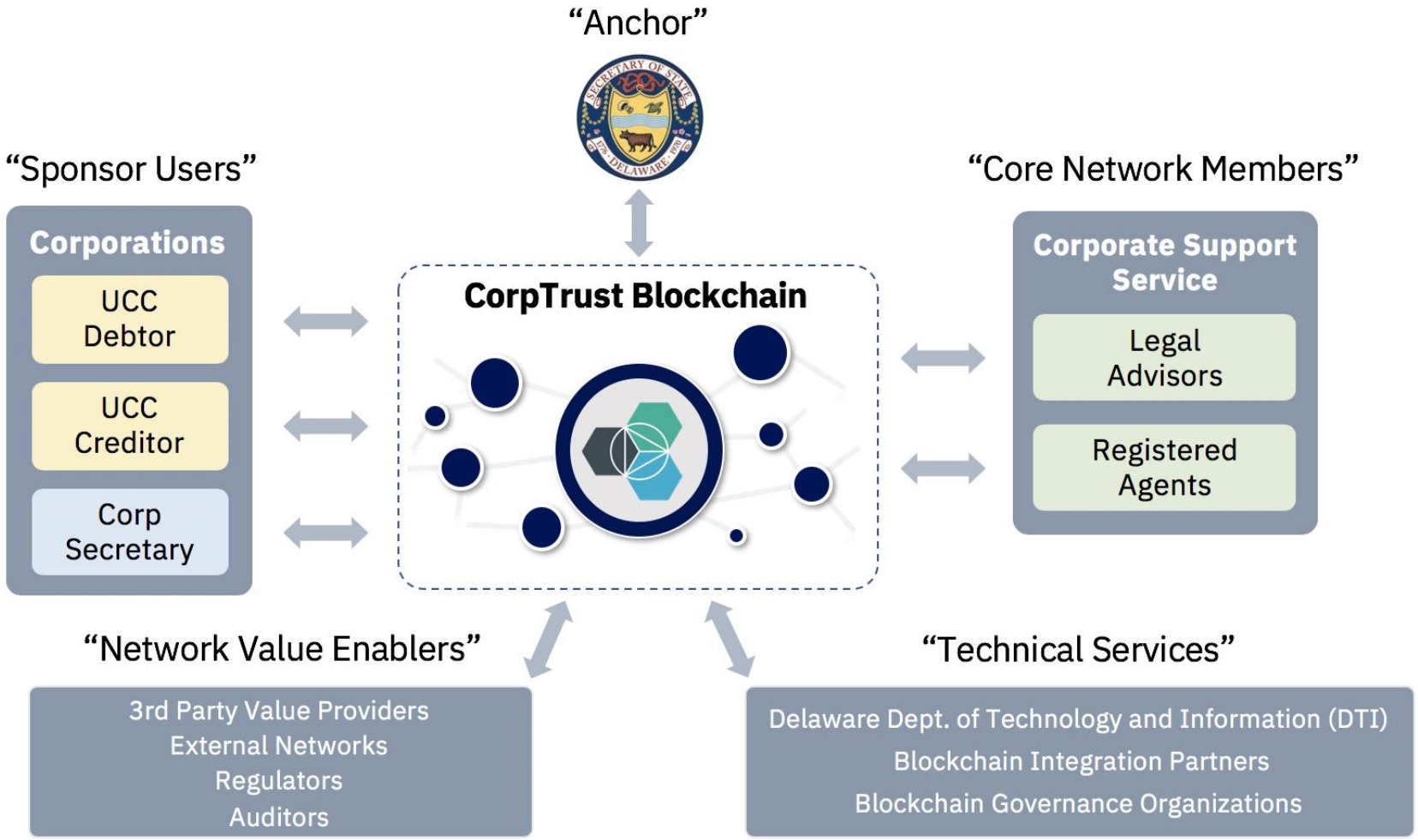
* "Blockchain: What It Is, What It Does, and Why You Probably Don't Need One" David Andolfatto, Economic Research Federal Reserve Bank of St Louis, Vol. 100, No. 2 Posted 2018-04-16



State of Delaware
"DoCTrust"

Blockchain Proof of Concept

Top-level goal: ***One source of truth*** *for UCC and Stock Ledger information*



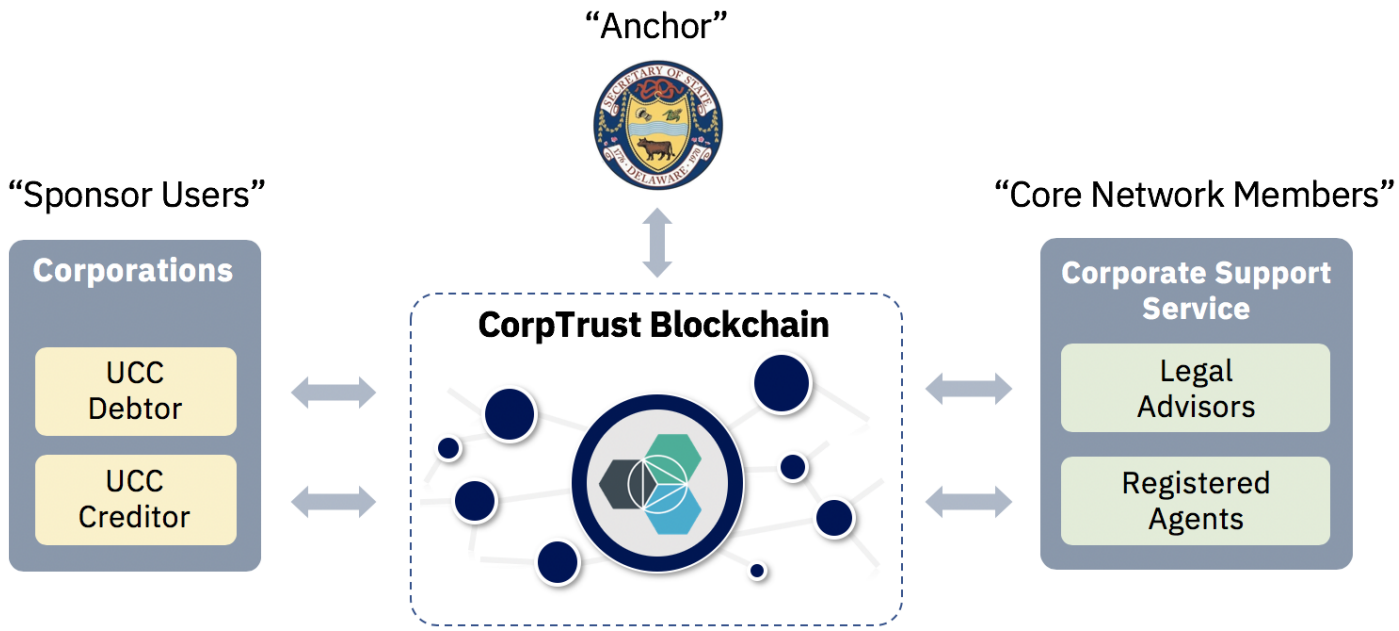
USE CASE | UCC FILINGS

Focus of the Blockchain PoC

1. Improve transparency, security, and efficiencies
2. Prioritized due to its higher feasibility and positive impact

Drivers

- Potential for malpractice risks
- A need to increase in security through the provision of accurate data
- A need to easily view the status of a particular UCC filing and the underlying collateral
- Ecosystem-wide event monitoring and alert system would minimize the risk of errors and inaccurate information while adding certainty, timeliness and trust to data being accessed



UCC transactions in Delaware have grown by an average of more than 5.5% from 2015 to 2017.

Creating a business-friendly ecosystem is paramount to maintain that leadership position. The State identified **blockchain** as a potential enabling technology platform that could help maintain, even grow, their leadership position.

Total Uniform Commercial Code (UCC) Transactions CY 2015 - 2017

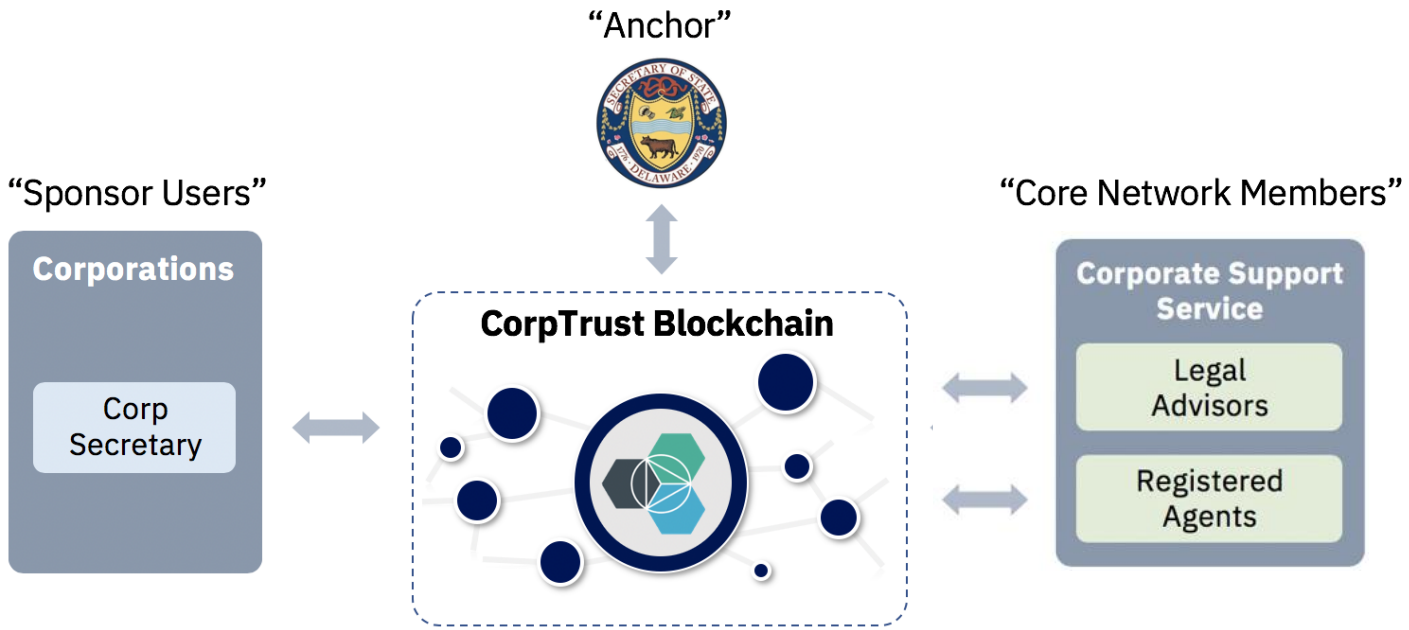
	2015 CY	2016 CY	2017 CY
UCC 1	116,756	113,808	121,457
UCC 3	128,360	133,581	141,588
Searches	206,404	223,796	240,824
Total Number of Transactions	451,520	471,185	503,869

Focus of the Blockchain PoC

1. Ability to accurately track Stock Ledger activity in near real-time
2. Stock Ledger use case was prioritized due to its higher feasibility and positive impact to the State

Drivers

- Over-issuance of shares has led to massive complications that had significant financial impact
- Maintaining latest capital stock information and ownership records for a Corporation to prevent from an over-issuance
- Meeting compliance and regulation by having more timely and accurate stock record keeping
- No current systematic guidance for a Corporate Secretary's stock related duties



80% of U.S. based Initial Public Offerings chose Delaware as their corporate home in 2017 alone.

With such a **large profile of private corporations** transitioning to public, stakeholders have voiced an increasing **need to maintain capital stock information and stock ownership records** early on in the private stages.

Business Entity Formations CY 2015-2017

	2015 CY	2016 CY	2017 CY
LLCs	128,042	128,852	143,996
LPs/LLPs	10,746	10,337	11,517
Corporations	38,288	40,253	41,553
Statutory Trusts	1,645	1,724	1,391
Totals	178,721	181,166	198,457

North Carolina Digital Identity

Tracy Doaks
Chief Deputy State CIO
and Chief Services Officer

Tracy Doaks – How to Pick a Blockchain Project

Tracy Doaks
Chief Deputy State CIO
and Chief Services Officer

Find a compelling use case. Avoid focusing on technology for technology's sake. Learn what users are struggling with and focus on a use case that solves an urgent, real-world problem.

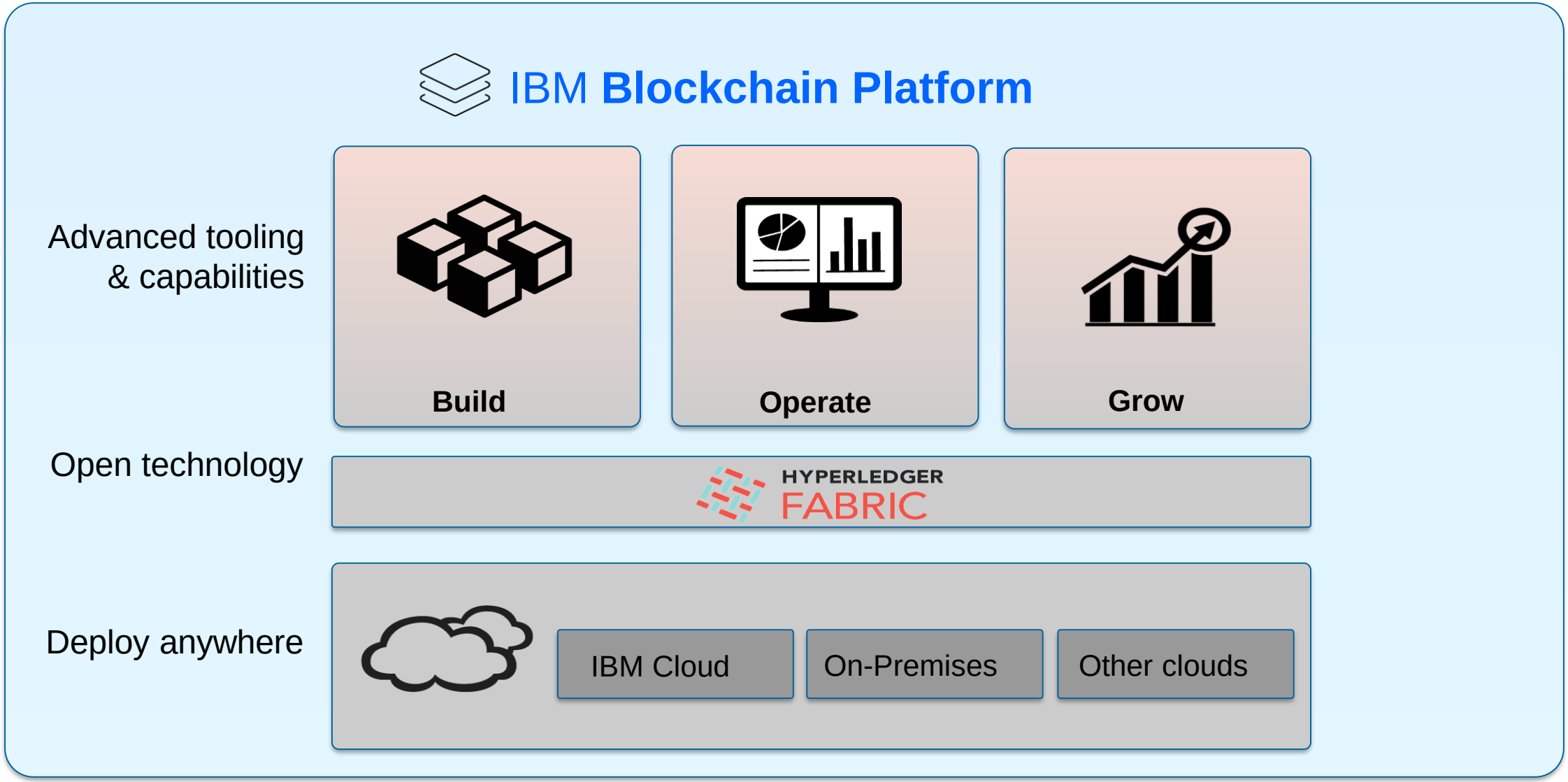
Gain executive sponsorship. Top-down support is essential. A passionate leader can use his or her platform and resources to drive interest, ensure adequate funding and align the project with the organization's long-term goals.

Bide your time. Wait for the right circumstances and use case. "It's about things coming together that make sense, that help it become a compelling story or use case," Doaks says. "You have to pick the right time, because we're not technologists for the sake of technology; we're business enablers."

What makes a good *first* blockchain use case?

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
4. Or go to hacera.com and join an established Blockchain

Learning now, start small, succeed, then grow fast!



IBM is a founding member of the Linux Foundation's Hyperledger Fabric project and has been a leading voice in developing collaborative open standards for distributed ledgers and smart contracts

Blockchain Services

Garage Services for Blockchain

Help clients co-create with blockchain experts, taking ideas from concept to reality with speed and impact in under 12 weeks, while leveraging the IBM Cloud Garage methodology.

https://www.ibm.biz/sellgarage

Getting Started Services

IBM Cloud Garage with [No Title] ckchain Offerings provide you the services you need to **get started** with Blockchain.

IBM **Blockchain**

Discovery Workshop
Understand market opportunities and select a use case which represents the value your organization and your business network seek, while also gaining a deeper insight in blockchain technology.
Length: Half Day

Architecture Workshop
Engage an IBM Blockchain architect to help you plan and define the architecture for your enterprise blockchain solution, which includes a two-day in person workshop.
Length: 1 week

Design Thinking Workshop
Apply IBM Design Thinking principles to evaluate current business processes, identify business network and define the minimal viable product for your blockchain solution.
Length: 2 days

Design Thinking & Architecture Workshop
Combine an IBM Design Thinking workshop with IBM Blockchain's approach to solution architecture to define the minimal viable product, as well as, a blockchain solution architecture.
Length: 3 days

MVP Build-up
Develop a functioning blockchain solution using agile methodologies, leveraging experts in IBM Blockchain, UX/UI design and development, and cloud architecture.
Length: 4 – 12 weeks

Blockchain Education
Engage with an IBM Blockchain technical expert to learn about Hyperledger Fabric, IBM Blockchain, and general blockchain concepts.
Length: Up to 1 week

Lab Services for Blockchain

Help clients deploy their blockchain solution on the IBM Blockchain Platform to their environment of choice, check their architecture or configuration, or review the performance of their solution.

https://soda.w3ibm.mybluemix.net/s/blockchain

Deployment and Production Services

Expert services to help you deploy your network in production and perform at scale.

IBM **Blockchain**

Quickstart Deployment
Deploy a Distributed Peer on IBM Cloud Private with an existing IBM Blockchain Platform network instance on IBM Cloud or deploy a Full Network including CA and Orderer.
Length: 1 week

Health Check
Provide an expert review of your current Blockchain architecture, configuration and implementation to identify issues and areas for improvement, resulting in recommendations for improvement.
Length: 1 week

Planning Assessment
Evaluate client readiness for deploying IBM Blockchain Platform on IBM Cloud Private. May require multiple 1-week assessments.
Length: 1 week

Performance Assessment
Holistic review of the client app and blockchain network to identify potential performance bottlenecks. Starts with architectural review and leverages an IBM test harness to compare client's environment to a predefined benchmark.
Length: 2 weeks

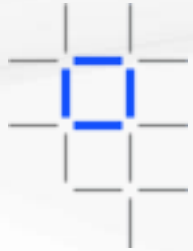
Remote Peer Deployment
Deploy a custom IBM Blockchain Platform network on IBM Cloud Private based on recommendations from planning assessment. Suitable for a broad range of requirements and use cases.
Length: custom

What Differentiates IBM Blockchain?

IBM is THE leader in enterprise blockchain technology today

We are the only provider of end to end services in the industry	**IBM has more blockchain development experience than any other company**	**More live blockchain enterprise networks (>400) than any other competitive platform**
Only platform with true multi-cloud capabilities	**Most advanced developer and operator tools that makes configuration simple**	**Only blockchain platform that doesn't lock you in to a single environment**

Thank You!



More info…

Government Blockchain Projects: On Path to Production

Streamline the Ecosystem for doing Business in the State of Delaware	**Simplifying Resource Hiring Actions with Visibility, Smart Contracts, and a Blockchain-enabled Business Process**
State of Delaware – The Delaware Secretary of State is building out a Pilot prototype from their base Proof of Concept application addressing Delaware's UCC filing process between secured party and debtor companies, registered agents, and legal representatives while using blockchain to aggregate a shared Stock Ledger and capitalization table for registered corporations registered to track share ownership.	**USINDOPACOM** - IBM is working to create a blockchain-enabled process for hiring under the IPA Act. This system will enable USINDOPACOM to more accurately, easily and accountably procure high-value resources at low cost. It addresses the current inefficient, error-prone IPA process to keep IPAs paid and focused on their mission tasks while facilitating procurement of new IPAs.
International Mail tracking, Analytics, Alerts, and Error resolution	**Exploring Plans for Blockchain as a Service**
USPS is continuing to scale their Pilot blockchain solution to help better track and understand international mail between itself, air carriers, and foreign post offices. By leveraging the trusted, immutable, blockchain ledger, the network can create an actionable data source to feed analytics engines, operational alerts, and reporting on a per-member basis for USPS, carriers, and foreign posts.	**DISA** is working to create Blockchain as a Service (BaaS) capability on a secure, scalable, and fully-accredited DoD blockchain environment using permissioned Hyperledger Fabric to offer a managed service. Having the environment on a certified infrastructure will enable resource management, network administration, and Cloud support services as well as enhance network monitoring and security.

Note: demo video links embedded in logos

Government Blockchain Projects: Completed POCs

Blockchain, Artificial Intelligence, and Robotic Process Automation	**Selective Data Sharing around the Federal Employee HR Record**
HHS has received Authority to Operate (ATO) for a blockchain based application, Accelerate, to facilitate the Federal Acquisition Lifecycle and standardize taxonomy of their acquisition data. Accelerate also addresses acquisition workforce process challenges, strengthen industry interactions, improve IT security, and increase the savings and quality for procurement activities across the Department leveraging machine learning and AI.	**OPM** wants to accomplish selective data sharing for the Federal Employee Human Capital Lifecycle to ensure the security, privacy, and consistency of their employees' data. OPM and IBM created a prototype that addressed the challenges around employee transfer including single field entry and record access changes, both of which were accomplished through the implementation of smart contracts.
Disaster Response	**EHR Reference Data Chain of Custody and Consent**
FEMA's Blockchain will enable an immutable, trusted ledger tracking projects, providing FEMA and its PA applicants veracity of metadata and spends while automating manual processes through smart contracts while sharing of data among recipients.	**CDC** and IBM implemented a robust consent management process within CDC's data surveying processes and captured data governance events like consent to access, change in ownership, and access to EHR data on a blockchain ledger to be shared with relevant stakeholders.

Note: demo video links embedded in logos

Where is the IBM CIO Leveraging Blockchain Capabilities?

Procurement of Contingent Labor

- Achieving consistent on-time payments and eliminating invoice disputes between client and contingent labor supplier

Counterfeit Parts Provenance

- Validating customers' counterfeit part replacement requests to streamline the replenishment process

Customs Import Declaration

- Automating and digitizing the customs import declaration documentation process

Indirect Tax Compliance

- Streamlining tax filing and compliance activities for tax analysts

Cross-Border Intercompany Transactions

- Linking siloed systems and fragmented processes to increase audit readiness and transaction provenance

Trusted Digital Identity Management

- Reducing identity theft by evolving identity models and removing identity mediators

Asset Management

- Providing full visibility into asset lifecycles to improve transaction settlement time and reduce inventory discrepancies

Enterprise Software Licensing

- Enabling the floating of software license usage across users and time

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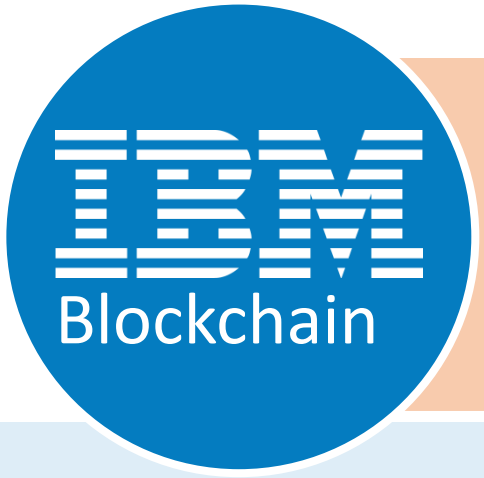

Updated Takeaway:
Blockchain will enable an immutable ledger tracking data, allowing USPS to easily view tracking scans both internally and from carriers to decrease fraud and increase payment speed in the international delivery business network.

Customer Challenges

1. Delays in payment due to late data
2. Inability to predict all inbound (domestic and international) mail volume
3. Inadequate staffing during operating hours due to peak volume spikes
4. Inability to confirm true measure of items that were processed by the Foreign Postal Administration

Blockchain Capability and Relation to Challenge

1. Creates trust through visibility of actions across the business network
2. Allows for financial reconciliation due to the tracking of all transactions
3. Creates different levels of privacy for different business network members through permissioned Blockchain
4. Allows for data sharing through the distributed ledger
5. End-to-end logging of transactions creates an immutable record, enabling provenance tracking

Pain Points by Business Network Member

1. **US Postal Service (USPS)** – needs to be able to quickly and easily get tracking data on their international packages and where they are internally
2. **Carrier** – wants to know when and how much they will be paid / be able to see where packages are in transit
3. **Dummy Carrier** – needs to be able to intake scans, view them to verify, and send to USPS for reimbursement

Why Blockchain:

Blockchain will enable an immutable, trusted ledger tracking projects, providing FEMA and its PA applicants veracity of metadata and spends while automating manual processes through smart contracts while sharing of data among recipients.

FEMA

Click Logo for Demo Video

Customer Challenges

1. No single understanding of truth among FEMA, its employees, applicants, and contracted services
2. Statusing of large volume of requests takes considerable resources and effort
3. Inability to create sufficient custom reporting requirements and requests with current process rules
4. Inability to link requests across multiple disasters due to lack of visibility, causing duplicated requests
5. Burdensome appeal process for PW requests

Blockchain Capability and Relation to Challenge

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5. End-to-end logging of transactions creates an immutable record, enabling provenance tracking
6. Smart-contract rules allow automation of agreed upon business logic and process flows, as well as real-time veracity checks of information being entered into the ledger

Pain Points by Business Network Member

1. **FEMA PA** – Current grant process is slow, hard to track, and prone to fraud; limited data sharing and trusted transactions among network members; high staff turnover with no official handover process
2. **FEMA Auditor** – Difficult, inaccurate auditing processs; not recouping granted money deemed erroneous
3. **Applicant** – Non-automated data aggregation process required for grant approval; numerous, disparate sub-applicants; stovepipe systems for processing grants
4. **Sub-Applicant** – Costly, lengthy, manual grant process that has difficult-to-track status

IBM Blockchain

Takeaway:
Blockchain will turn the DUA process into a Smart Contract, facilitating data sharing and creating an immutable record that can be deployed across multiple projects, reducing transaction time.

CDC
Centers for Disease Control and Prevention

Customer Challenges:

1. Complexity and burden of Data Usage Agreement (DUA) administration
2. Need to get the correct data to the appropriate level: there are departments at federal, state, and local levels
3. Each government program engages independently with data source organizations like providers and labs

Blockchain Capability and relation to challenge:

1. Using the capability to store data off-chain, blockchain can reference data without having to store medical information on-chain
2. By implementing DUAs as smart contracts, the business network can reduce time and effort to establish DUAs
3. Because a smart contract can serve as a template, DUAs can be deployed and re-used across multiple projects

Pain Points by Business Network Member

1. CDC Division of Health and Information Services (DHIS) – rely on sites to corral facilities, get contributors, and to participate in data sharing
2. Specific Surveillance Program –administrative burden, inconsistent/dirty data, efficiency, budget, staffing
3. State and Local Agencies –covering a large population, decentralized data/larger IT footprint at individual sites
4. Facility (hospital or physician) –varied, have different electronic health record (EHR) vendors
5. Individuals –consent and data usage

Cost reduction and Efficiency

Problem Statement	Extensive paperwork which causes delivery delays and product spoilage Inefficient trade finance process Large number of parties involved High cost associated with moving and keeping track of all this paperwork Billions of dollars lost in maritime fraud No visibility into cargo ships arrival by ports and stores
Solution Overview	First Trials: Blockchain platform to track shipments between Port of Rotterdam and Port of Newark Broader Network: Customs Administration of the Netherlands, the U.S. Department of Homeland Security, and U.S. Customs and Border Protection. Expanded Scope: Electronic letters of credit to accompany containers
Benefits	Reduce or eliminate fraud and errors Minimize time products spend in transit Improve inventory management Reduce waste and cost (including cost of goods for consumers) Make global trade more accessible to a larger number of players from both emerging and developed countries Benefits reaching all the way through the supply chain, including retail warehouses and ports

Reducing global trade barriers and increasing efficiency across international supply chains (1H2018)

Bringing to market a trade platform for containerized shipping connecting the entire supply chain ecosystem

1

Shipping Information Pipeline (SIP)

Will provide end-to-end supply chain visibility that enables all actors involved in a global shipping transaction to securely and seamlessly exchange shipment events in real time

2

Paperless Trade

Will digitize and automate paperwork filings for the import and export of goods by enabling end users to securely submit, stamp and approve documents across national and organizational boundaries

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The TradeLens Platform

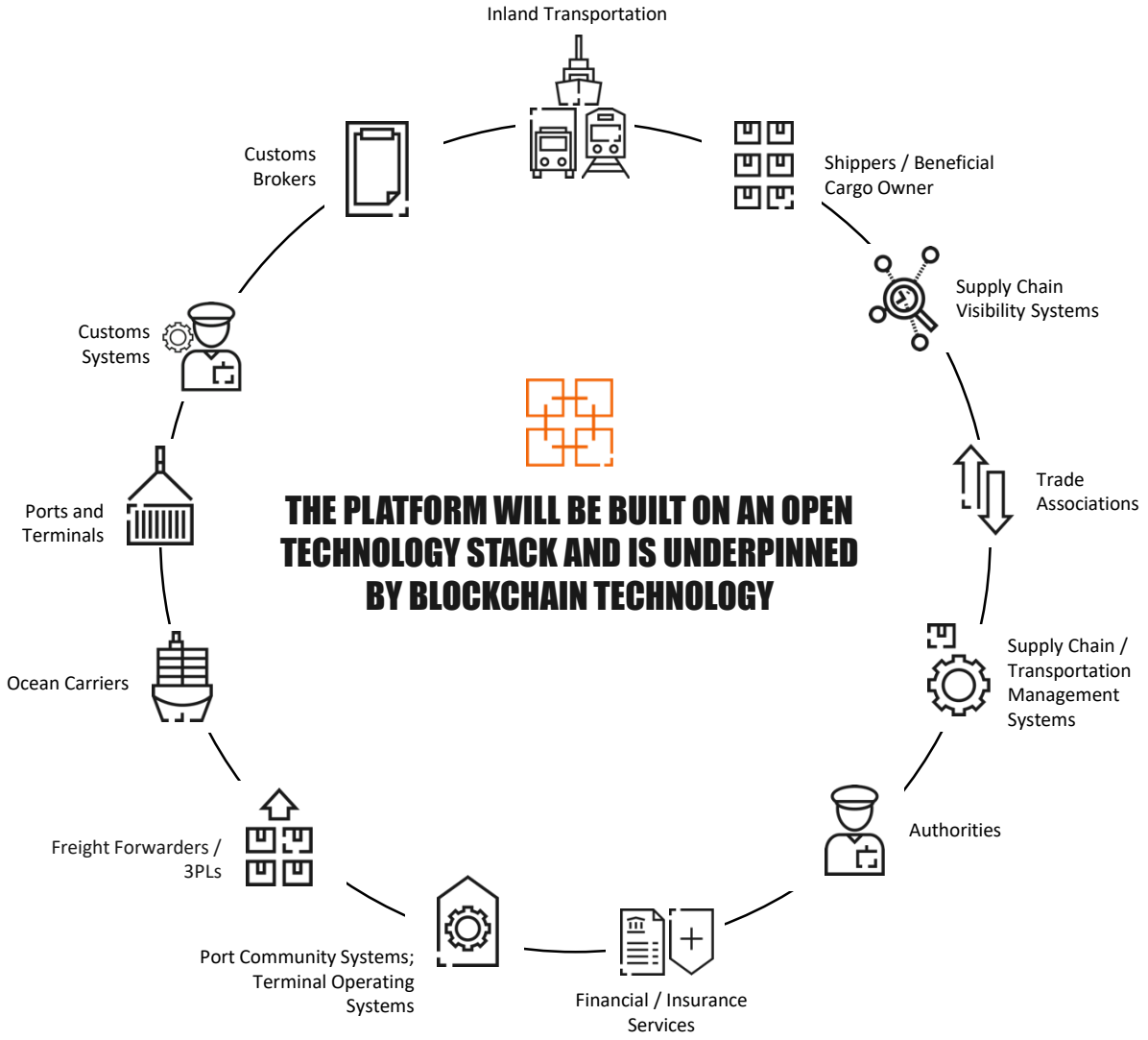
Digitizing the global supply chain

Connects the ecosystem
Brings together all parties in the supply chain - including traders, freight forwarders, inland transportation, ports and terminals, ocean carriers, customs and other government authorities, and others - onto a Blockchain-based platform with a secure permission and identity framework

Drives true information sharing
Provides for the seamless, secure sharing of real-time, actionable supply chain information across all parties to a trade - encompassing shipping milestones, cargo details, trade documents, the structured data embedded in trade documents, customs filings, sensor readings, and more

Fosters collaboration and trust
Enables the digitization and automation of the cross-organization business processes integral to global trade, including import and export clearance, with Blockchain ensuring secure, auditable, and non-repudiable transactions

Spurs innovation
Lays the foundation for ongoing improvement and innovation through an open, non-proprietary API, the use of standards and promotion of interoperability, and the launch of an Applications Marketplace that parties can use to build and deploy TradeLens-powered applications for themselves, their partners, and their customers



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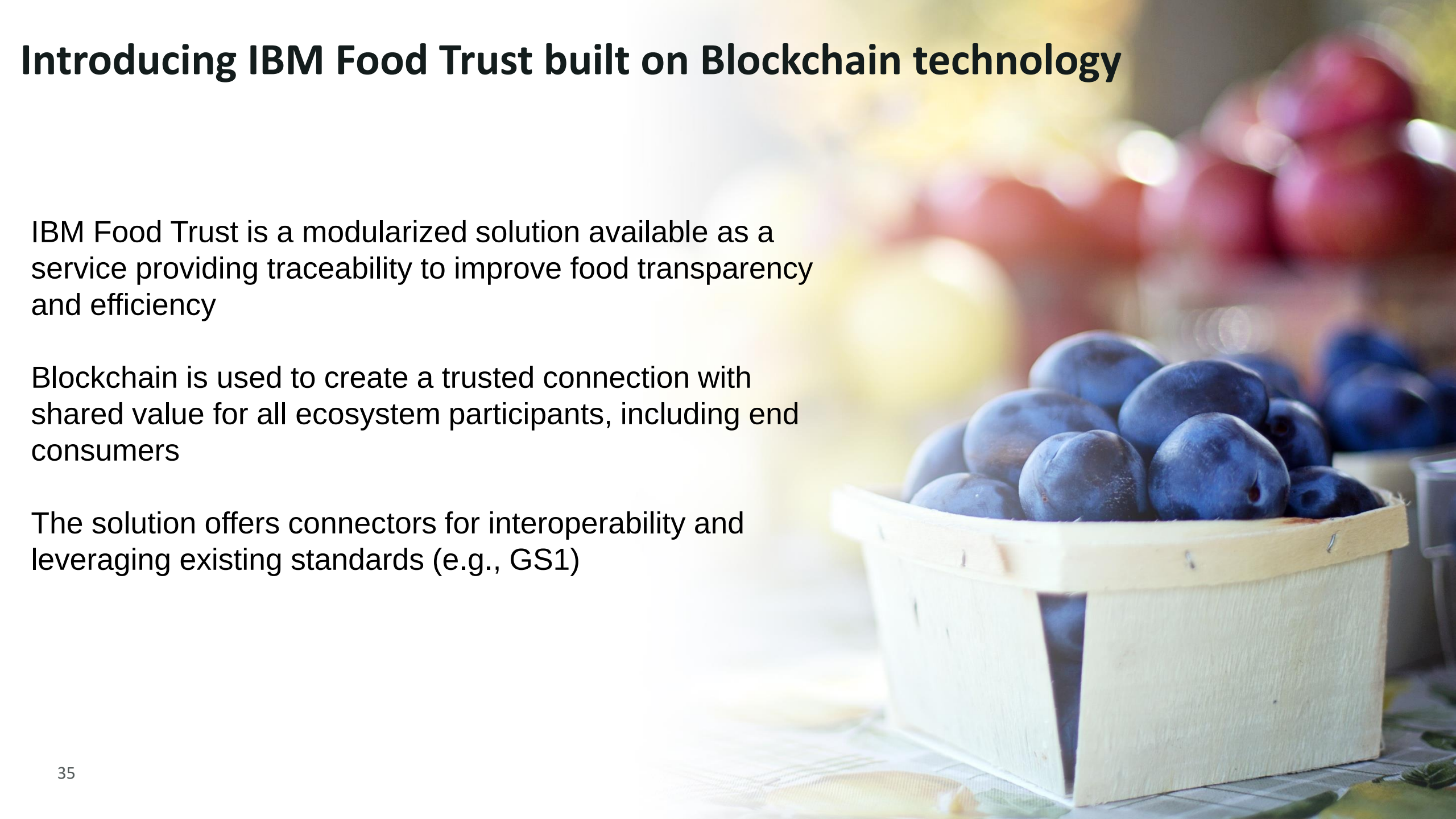
Introducing IBM Food Trust built on Blockchain technology



IBM Food Trust is a modularized solution available as a service 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)

IBM Food Trust Provides Value to the Entire Food Ecosystem

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

Growers

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

Food Manufacturers/CPGs

- Conduct targeted recalls
- Enable internal data sharing

Wholesalers/ Distributors

- Enhance ability to meet compliance standards
- Reduce manual processes

Food Logistics

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

Food Retailers

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

Consumers

- Reduce fraudulent certificates
- Increase renewal speed

Certification Bodies

- Assure customers food supplied Is safe
- Reduce wasted food

Food Service

- Identify contamination quickly
- Reduce unnecessary testing

Regulators

What makes for a great Blockchain use case?

Provenance
Enable any asset to be secured to a Blockchain ledger, physical or virtual.

Immutability
Once data has been written no one, not even a system administrator, can change it.

Finality
Once an operation is completed, that operation is completed for good.

Controlled Access & Transformation
Smart agreements on how to use the data embedded in transaction database & executed with transactions.

Consensus
All parties agree to network verified transactions.

Privacy & Permissioned
Ensure appropriate visibility; transactions are secure, authenticated & verifiable.

Results

- Removing Friction
- Getting rid of the “middle man”
- Leveraging an Existing Business Network but not a Closed Network
- Valuing Transparency and History of a Shared Ledger to all participants
- Adding the Citizen/Customer to the value chain

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