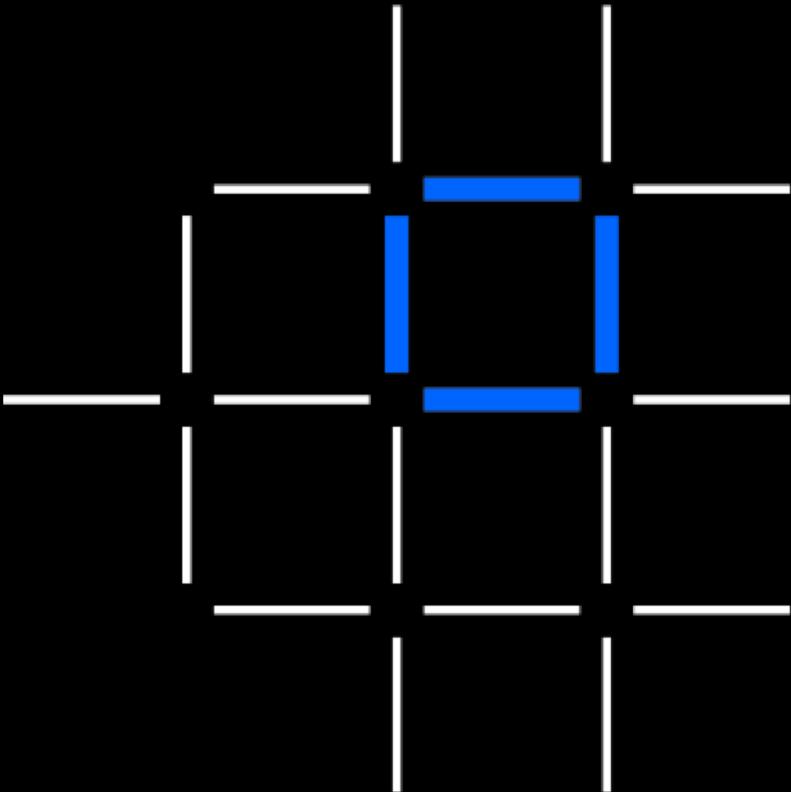


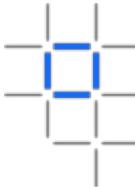
Blockchain Immersion Workshop

Tulsa, Oklahoma
November 7-8

Jasmine Burgess
IBM Z Client Technical Specialist
IBM North America Technical Sales

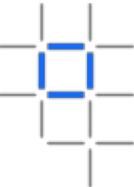


Day 1 Schedule



- **9am** – Blockchain Explained
- **10:00am** – Vehicle Lifecycle Demo
- **10:20am** – What Makes a Good Use Case
- **10:30am** – LAB: Hyperledger Playground, IMMUNIChain
- **11:30am** – Lunch/ Use Case Breakout
- **12:30pm** – Blockchain Integrated
- **1pm** – Lab: Hyperledger Composer Smorgasbord
- **3pm** – Blockchain Explored: Part 1

Day 2 Schedule



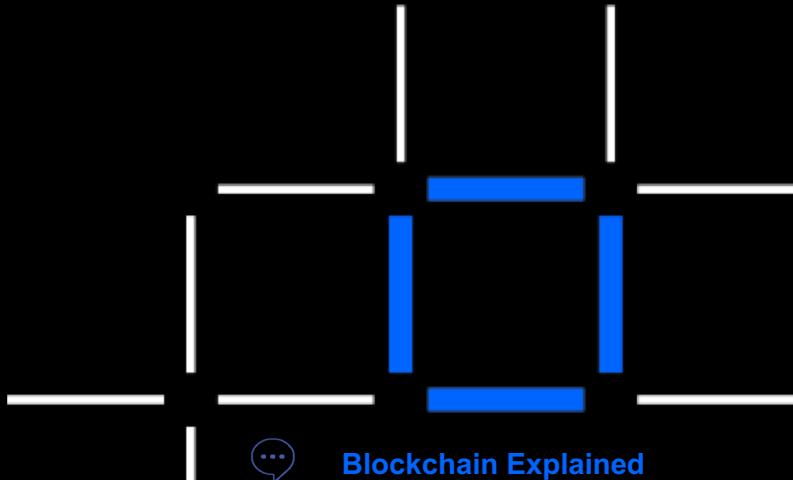
- **9am** – Blockchain Explored: Part 2
- **10am** – IBM Blockchain Platform Explained
- **11am** – Blockchain Next Steps
- **11:30am** – Lunch
- **12:30pm** – LAB: Hyperledger Fabric Verify & Install
- **2pm** – LAB: Marbles Smart Contract & Install
- **3:30pm** – LAB: Hyperledger Explorer

Blockchain Explained

An Introduction to Blockchain for Business

Jasmine Burgess
zClient Technical Specialist

Jnburges@us.ibm.com



Blockchain Explained



IBM Blockchain Platform



Blockchain Solutions



Blockchain Composed



Blockchain Architected



Blockchain Explored



Next Steps





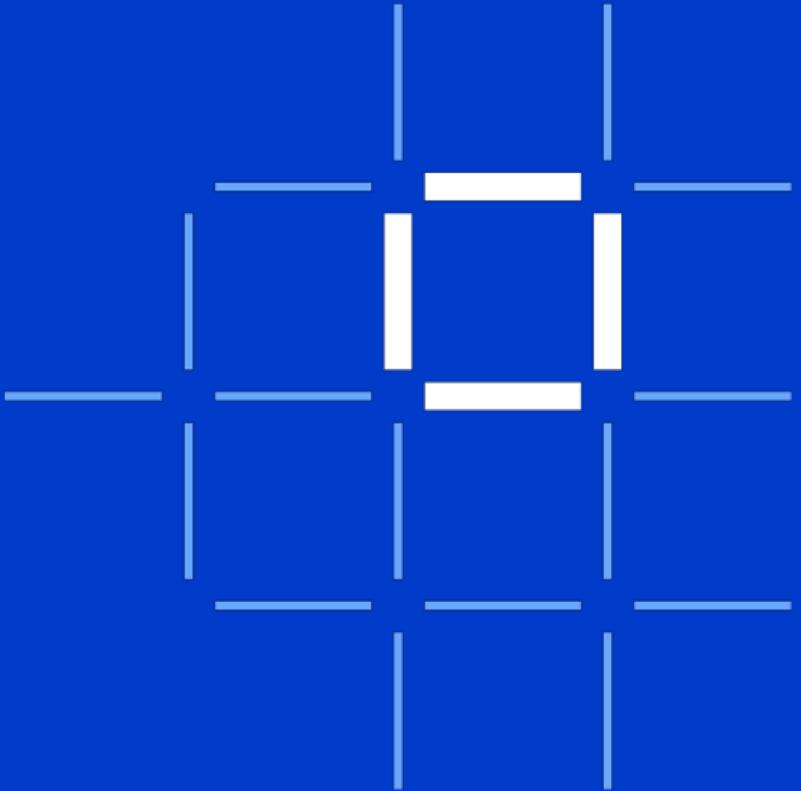
What is Blockchain?



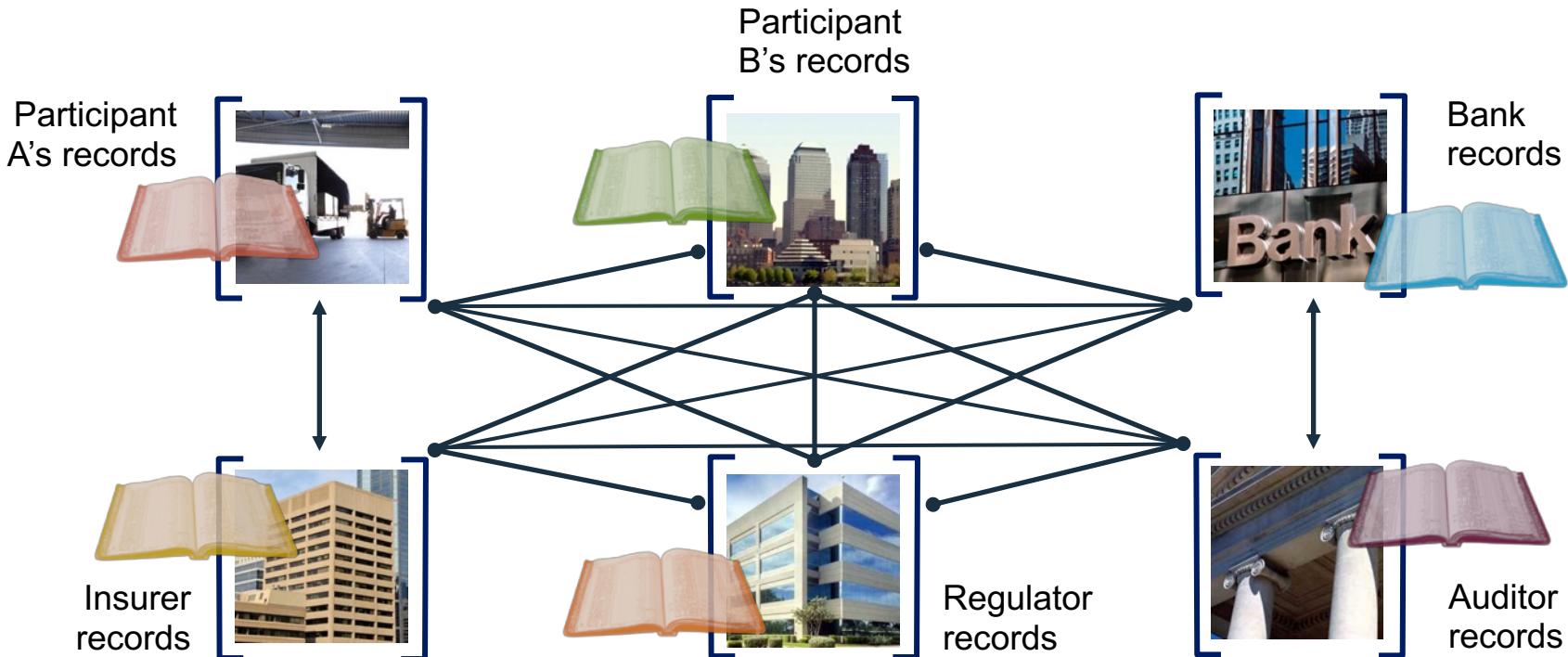
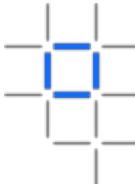
Why is it relevant for
our business?



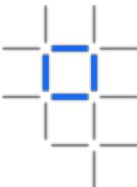
IBM and Blockchain



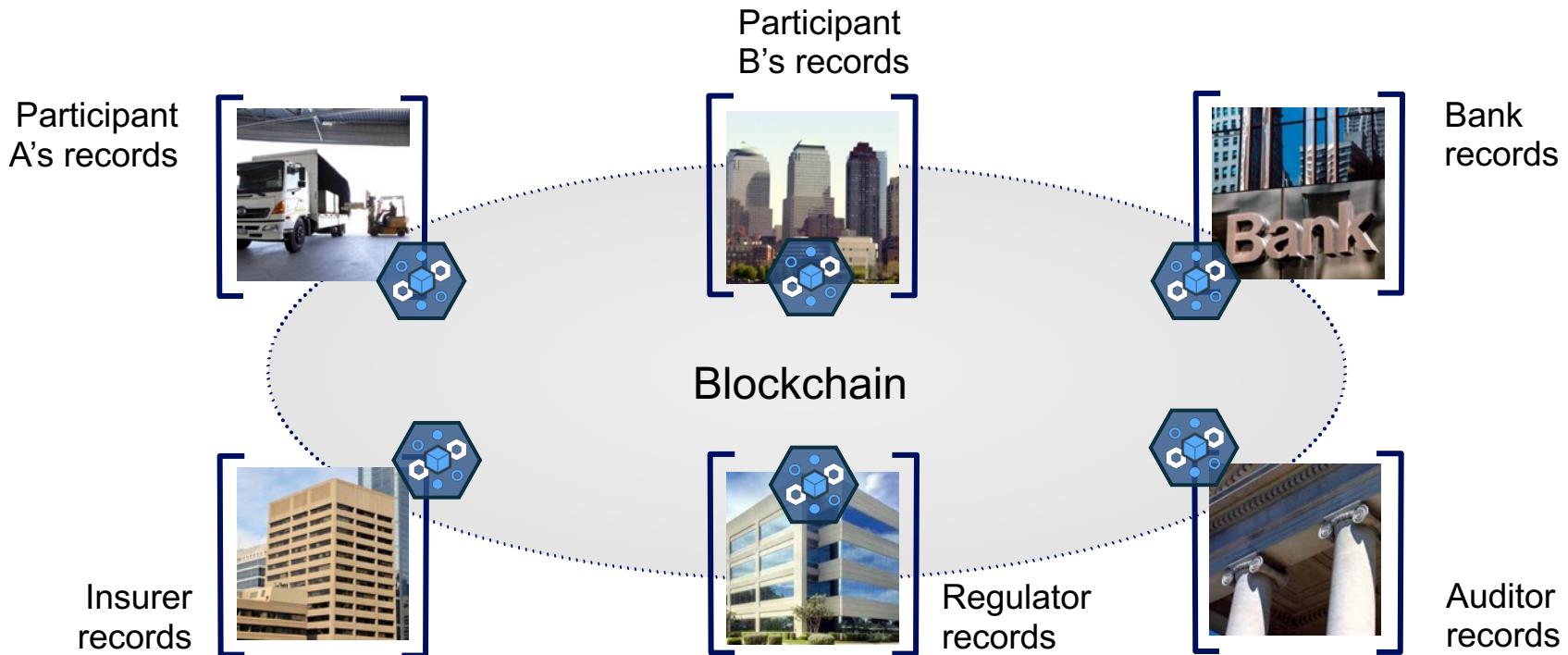
Problem...



... inefficient, expensive, vulnerable

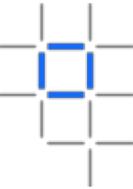


A shared, replicated, permissioned ledger ...



... with consensus, provenance, immutability and finality

Transferring assets, building value



Anything that is capable of being owned or controlled to produce value, is an asset



Two fundamental types of asset

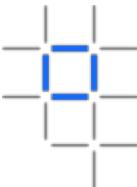
- Tangible, e.g. a house
- Intangible, e.g. a mortgage

Intangible assets subdivide

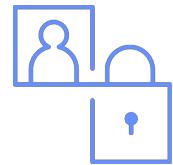
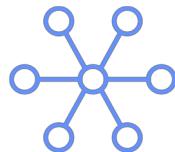
- Financial, e.g. bond
- Intellectual, e.g. patents
- Digital, e.g. music

Cash is also an asset

- Has property of anonymity



Requirements of blockchain for business



SHARED LEDGER

Participants decide which assets to share

IDENTITY

Participants know who they are dealing with

ENDORSEMENT

Participants give provable endorsement

CONFIDENTIALITY

Information shared is need-to-know



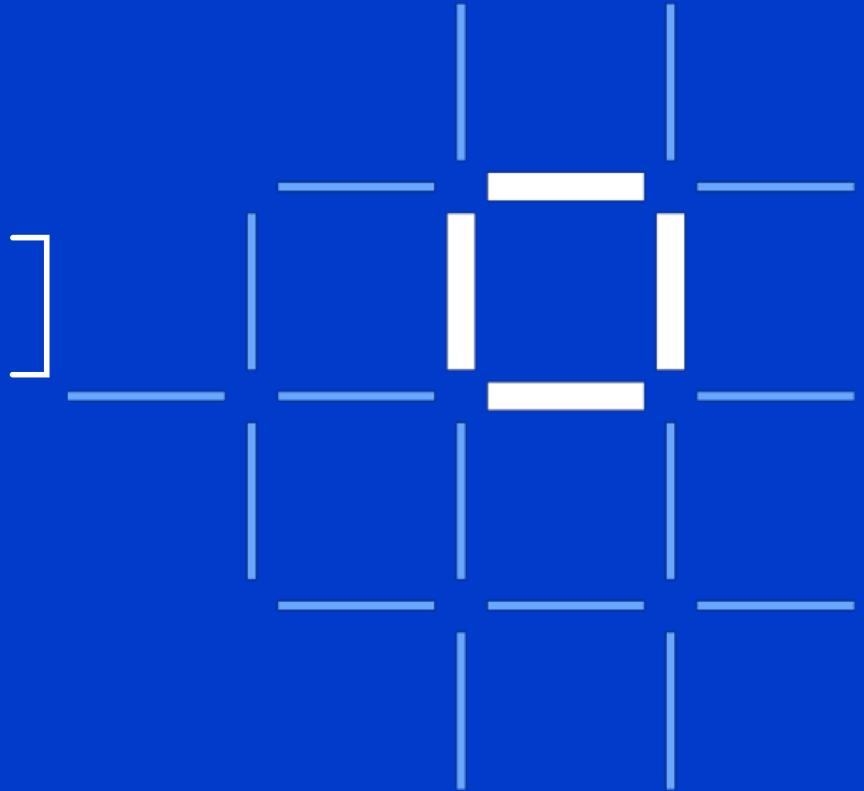
What is Blockchain?



Why is it relevant for
our business?



IBM and Blockchain



World Wire: Global Payments

What?

- A universal rail for real-time clearing and settlement on an integrated Blockchain network

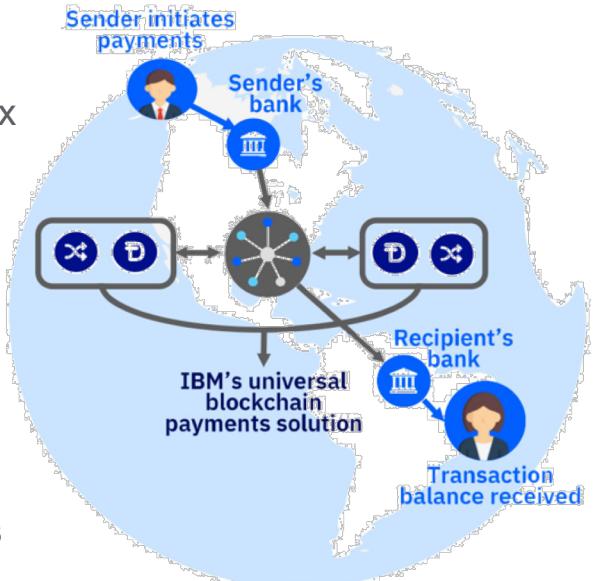


How?

- Collaboration between IBM and technology partners Stellar.org and KlickEx Group
- Initial participants include over 13 financial institutions

Benefits

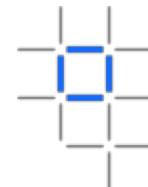
- Create secure, high volume, low-cost cross-border payments services without sacrificing margins
- Access new markets and currencies with limited risk
- Generate new sources of revenue with value-added products and services
- Aim: near real-time international payments



Food Trust



MCLANE
INTELLIGENT SOLUTIONS



Walmart

Nestlé

Tyson

gsf
golden state foods



What?

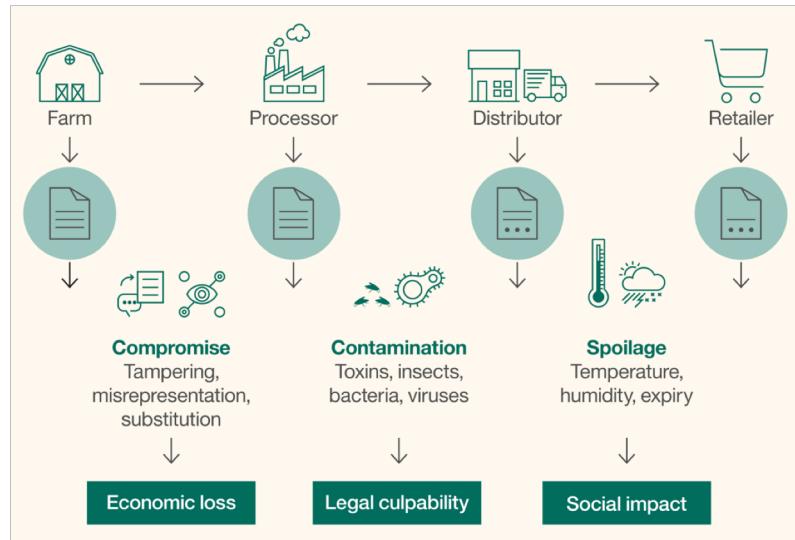
- Provide a trusted source of information and traceability to improve transparency and efficiency across the food network.

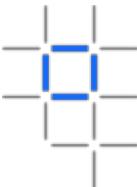
How?

- Shared ledger for storing digital compliance documentation, test results and audit certificates network.

Benefits

- Reduce impact of food recalls through instant access to end-to-end traceability data to verify history in the food network and supply chain.
- Help to address the 1 in 10 people sickened and 400,000 fatalities WW which occur every year from food-bourne illnesses.





Example: TradeLens

What?

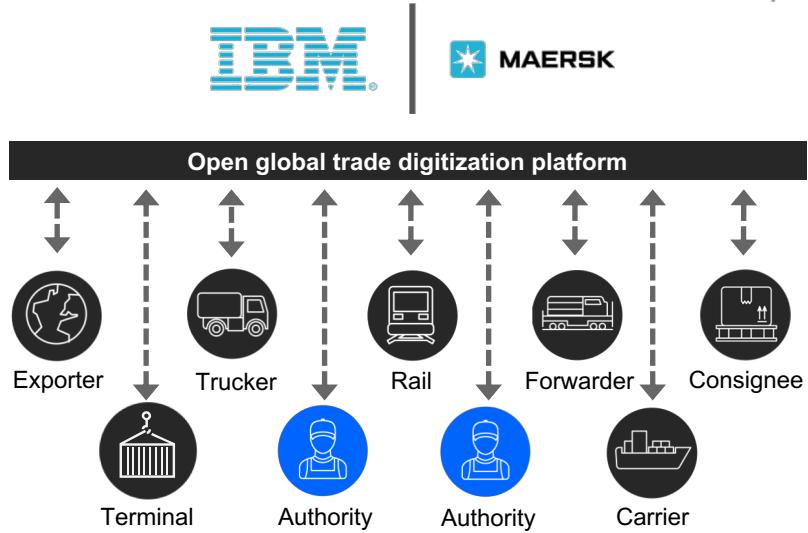
- An open, extensible platform for sharing shipping events, messages, and documents across all the actors and systems in the supply chain ecosystem.

How?

- Providing Shared Visibility and Shared State for Container Shipments

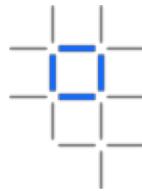
Benefits

- Increase speed and transparency for cross border transactions through real time access to container events.
- Reduced cost and increased efficiency through paperless trade





Global Financing: Dispute Resolution



What?

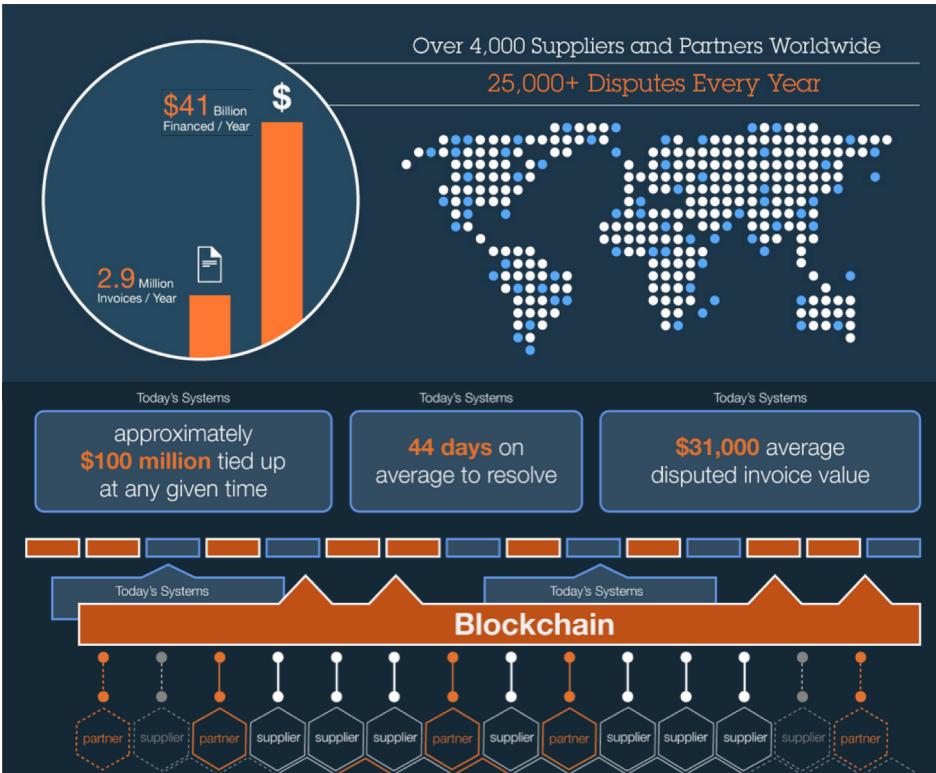
- IBM Global Finance provides a \$41bn channel financing per year. There are a number of disputes that take time to resolve and can lock up transactions costing time and money

How?

- Blockchain provides visibility and provenance end-to-end across supply chain

Benefits

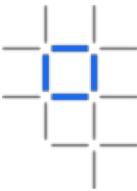
- Reduced dispute resolution time by 75%
- Released working capital from \$100m
- Combine IGF and Supplier info to further expand benefits further
- In production since Sept 2016



Making blockchain real for business...



Trade Finance	Pre and Post Trade	Complex Risk Coverage
 we.trade more trust. more trade.   	   	 
Identity/ Know your customer (KYC)	Unlisted Securities/ Private Equity Funds	Incentive Program
  	  	 
Medicated Health Data Exchange	Government	Distributed Energy/ Carbon Credit
		 
Supply Chain	Food Trust	Provenance/ Traceability
  IBM Blockchain	       	 



Further examples by (selected) industry



Financial	Public Sector	Retail	Insurance	Manufacturing
<ul style="list-style-type: none">• Trade Finance• Cross currency payments• Mortgages	<ul style="list-style-type: none">• Asset Registration• Citizen Identity• Medical records• Medicine supply chain	<ul style="list-style-type: none">• Supply chain• Loyalty programs• Information sharing (supplier – retailer)	<ul style="list-style-type: none">• Claims processing• Risk provenance• Asset usage history• Claims file	<ul style="list-style-type: none">• Supply chain• Product parts• Maintenance tracking



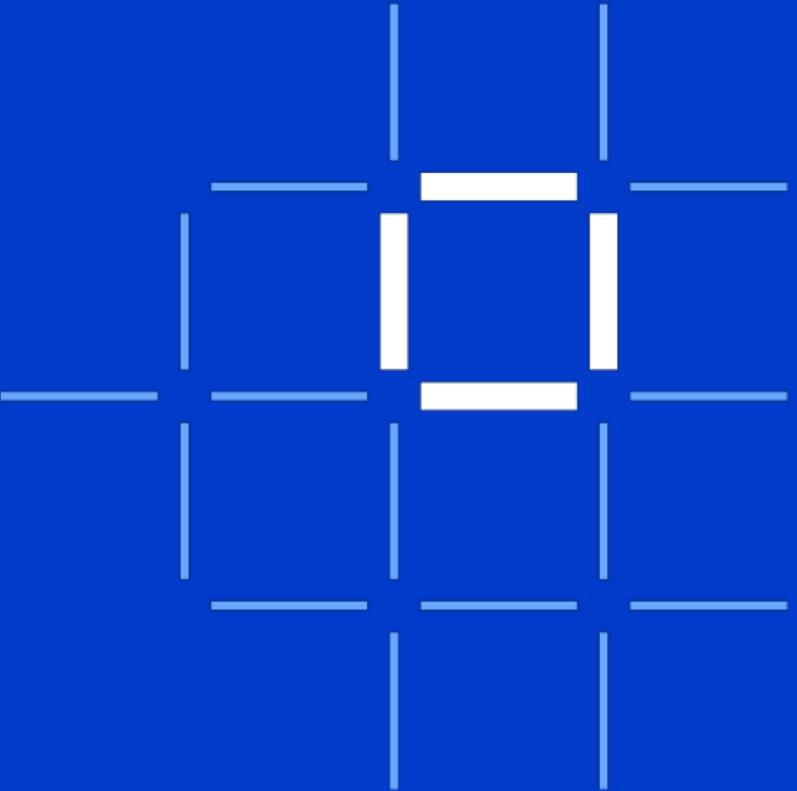
What is Blockchain?



Why is it relevant for
our business?



IBM and Blockchain



IBM

The certainty to solve business challenges together.



Security at Scale

Enterprise-grade security and control on a platform where businesses and industries are reinventing themselves



Trusted Expertise

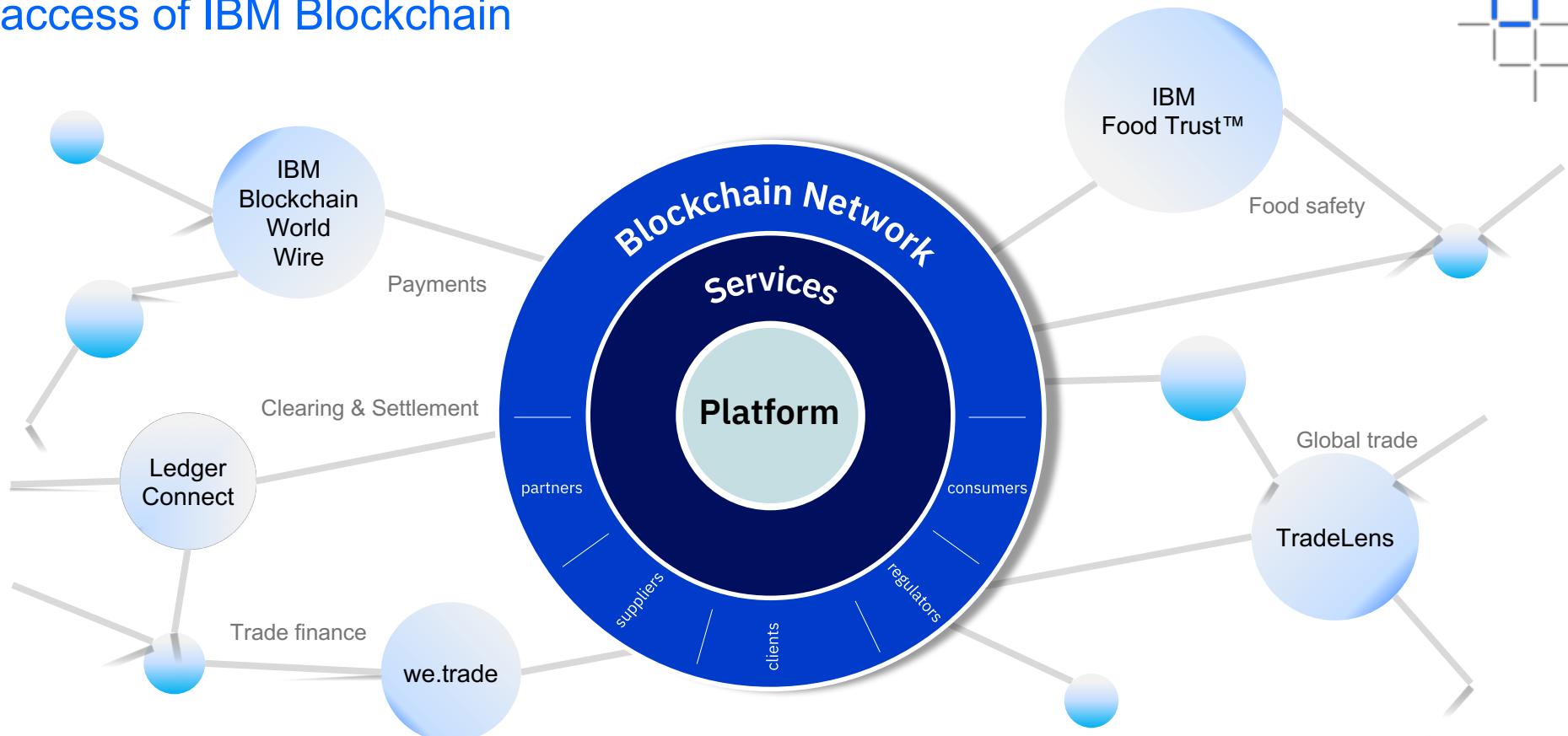
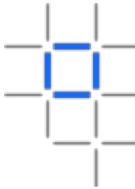
Reinventing business processes through unrivaled industry and technical knowledge as you start, accelerate and innovate your blockchain network.



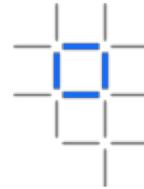
Network Convening Power

Bringing together an expansive partner network of innovators, regulators and suppliers to establish, join or run your blockchain network.

Leverage the unrivaled technology, expertise and access of IBM Blockchain

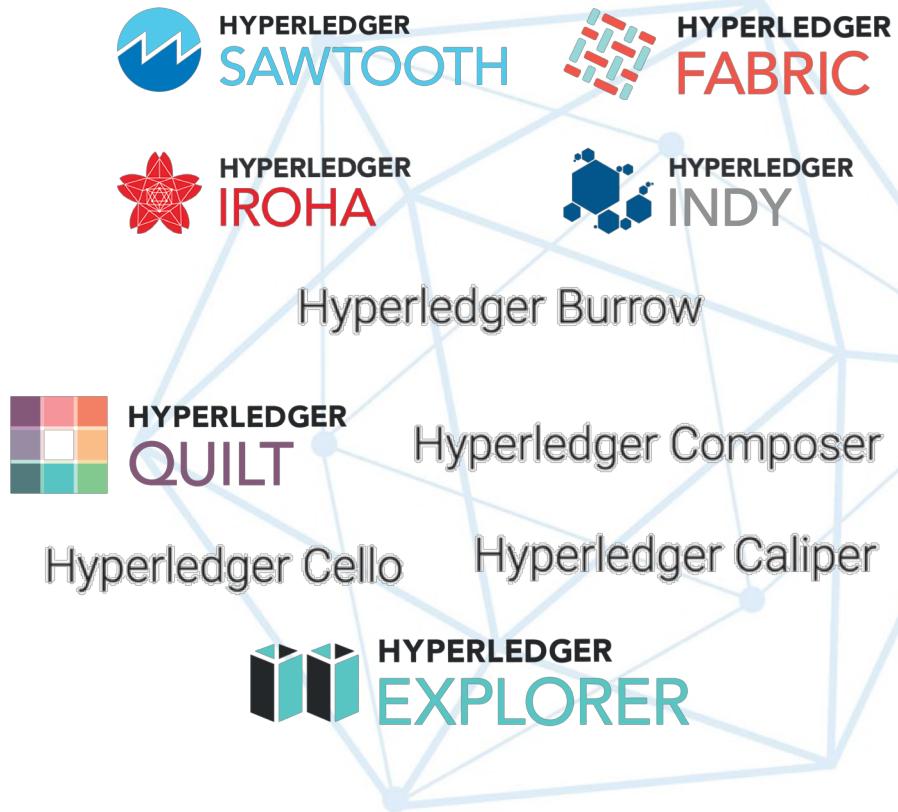


Hyperledger: A Linux Foundation project



- A collaborative effort created to advance cross-industry blockchain technologies for business
- Founded February 2016; now more than 230 member organizations
- Open source, open standards, open governance
- Five frameworks and five tools projects
- IBM is a premier member of Hyperledger

www.hyperledger.org



Hyperledger Members

Premier



Associate



Source: <https://www.hyperledger.org/members>
Updated: 3 April 2018

General



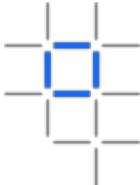
Associate (Academia)



IBM.



Distributed ledger platform



A screenshot of a web browser displaying the Hyperledger Fabric project page. The URL is https://www.hyperledger.org/projects/fabric. The page features a dark blue header with the Hyperledger logo and the word "HYPERLEDGER". Below the header is a large banner with the Hyperledger Fabric logo and the text "GET THE CODE" and "BUILD YOUR FIRST NETWORK". The main content area has a dark blue background with a network of white dots and lines. At the bottom left, there is a section with the text "Type: DLT, Smart Contract Engine" and "Status: Active". On the right side, there is a small video player with the text "Hyperledger Fabric Explainer". The browser's address bar shows the full URL, and the top navigation bar includes links for About, Members, Projects, Community, Industries, Resources, News & Events, and Blog, along with social media icons.

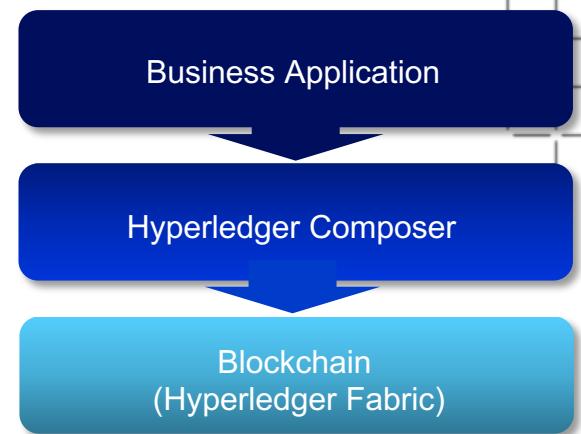
- An implementation of blockchain technology that is a foundation for developing blockchain applications
- Emphasis on ledger, smart contracts, consensus, confidentiality, resiliency and scalability.
- V1.3 released September 2018
 - Includes performance enhancements and additional security with Private Data
- IBM is one of the many contributing organizations

<http://hyperledger-fabric.readthedocs.io/>

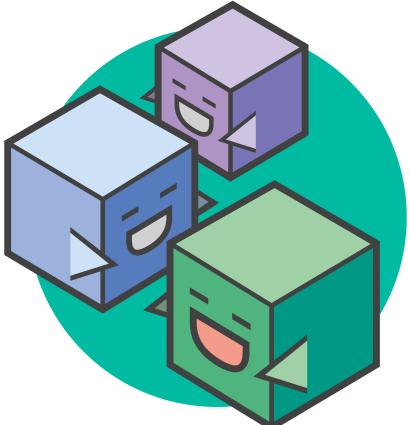


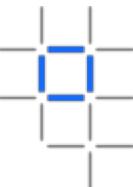
Hyperledger Composer: Accelerating Time to Value

- A suite of high level application abstractions for business networks
- Emphasis on **business-centric vocabulary** for quick solution creation
- Reduce risk, and increase understanding and flexibility



- Features
 - Model your business networks, test and expose via APIs
 - Applications invoke transactions to interact with business network
 - Integrate existing systems of record
- Fully open and part of Linux Foundation Hyperledger
- Try it in your web browser now:
<http://composer-playground.mybluemix.net/>



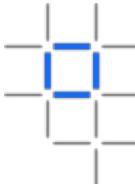


Composer Playground

The screenshot shows the Hyperledger Composer Playground interface. On the left, there's a sidebar with file management options: 'About README.md', 'Model File models/sample.cto', 'Script File lib/sample.js', 'Access Control permissions.acl', '+ Add a file...', 'Update' button, 'Import/Replace' button, and 'Export' button. The main content area displays the 'Basic Sample Business Network'. It includes a brief description: 'This is the "Hello World" of Hyperledger Composer samples, which demonstrates the core functionality of Hyperledger Composer by changing the value of an asset.' Below this, it lists the components of the network: Participant SampleParticipant, Asset SampleAsset, Transaction SampleTransaction, and Event SampleEvent. A note explains that SampleAssets are owned by a SampleParticipant, and the value property on a SampleAsset can be modified by submitting a SampleTransaction. The SampleTransaction emits a SampleEvent that notifies applications of the old and new values for each modified SampleAsset. Instructions for testing are provided: 'To test this Business Network Definition in the Test tab: Create a SampleParticipant participant.'

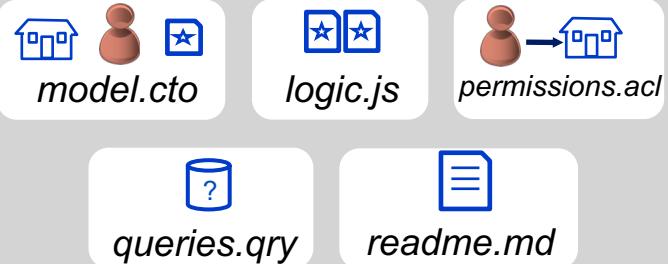
- Web tool for defining and testing Hyperledger Composer models and scripts
- Designed for the application developer
 - Define assets, participants and transactions
 - Implement transaction processor scripts
 - Test by populating registries and invoking transactions
- Deploy to instances of Hyperledger Fabric v1.1, or simulate completely within browser
- Install on your machine or run online at <http://composer-playground.mybluemix.net>

BNA File



- Business Network Archive (.BNA) is a package of the resources used by Fabric:
 - Model files (.CTO)
 - Transaction processors (.JS)
 - Access Control Lists (.ACL)
 - Static queries (.QRY)
 - Documentation and versioning (.MD)
 - It does *not* contain the client application
- The BNA simplifies deployment of blockchain and promotion between environments
 - c.f. TAR, WAR, EAR, JAR, BAR...
- Create BNA files from Playground or command line
 - Build from filesystem or NPM module

Business Network Archive



```
composer archive create -archiveFile my.bna  
--sourceType module --sourceName myNetwork
```

Business Network Cards

- Business Network Cards are a convenient packaging of *identity* and *connection profile*
 - Contains everything you need to connect to blockchain business network
 - Each card refers to a single participant and single business network
 - Similar to an ATM card

Hyperledger Composer Playground

My Business Networks

Connection: hlfv1

Import Business Network Card Create Business Network Card

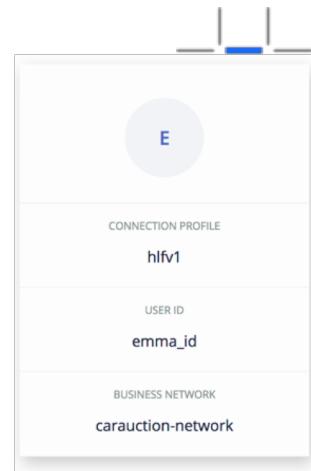
P A

PeerAdmin@hlfv1 myadmincard

User ID: PeerAdmin User ID: admin

BUSINESS NETWORK: none BUSINESS NETWORK: carauction-network

Connect now → Connect now →



- Manage cards from both Playgroud and command-line
 - Create, delete, export, import, list
 - Create requires userid/secret or certificate/private key
- Use cards to connect to Fabric from Playgroud, command-line or from within your application

```
composer network deploy -a my.bna -c my.card
```

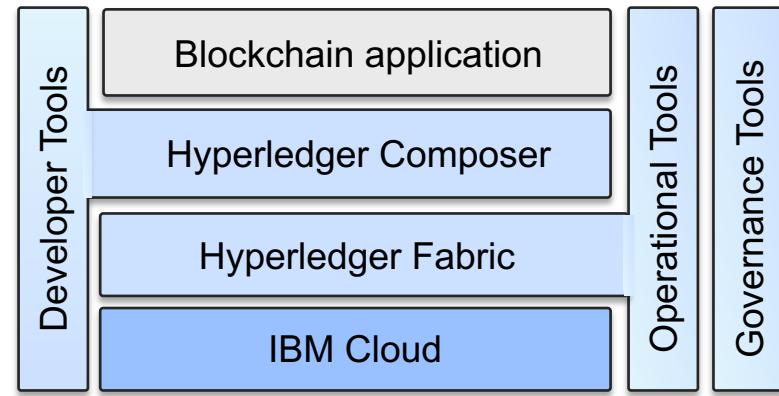
```
// Connect and log in to HLF
var businessNetwork = new BusinessNetworkConnection();
return businessNetwork.connect('cardName')
.then(function(businessNetworkDefinition){
    // Connected
});
```

Introducing the IBM Blockchain Platform

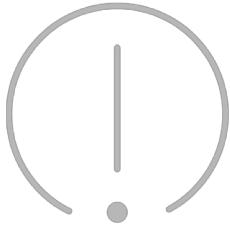
http://ibm.biz/Platform_Demo

IBM Blockchain Platform is a fully integrated enterprise-ready blockchain platform designed to accelerate the development, governance, and operation of a multi-institution business network

- **Developer tools** that make use of Hyperledger Composer to quickly build your blockchain application
- Hyperledger Fabric provides the ledger, which is managed through a set of intuitive **operational tools**
- **Governance tools** for democratic management of the business network
- Flexible deployment options, including a highly secure and performant **IBM Cloud** environment



Why IBM Blockchain Platform



Reduces risk

- Flexible pricing and support options for all sizes of deployments
- Democratic governance policies to help prevent unauthorized network changes



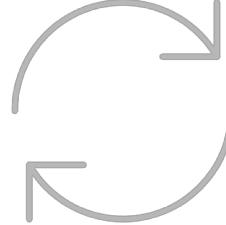
Saves time

- Implement blockchain projects more quickly
- Extensive toolset for development, governance and operation of blockchain networks



Enterprise ready

- Architected for High Availability and Disaster Recovery
- Highly secured and suitable for transactional workloads



Open

- Based on popular and open Linux Foundation Hyperledger technologies
- Avoid vendor lock-in! Embraces open source, open standards and open governance

Thank you

*Jasmine Burgess
IBM Z Client Technical Specialist*

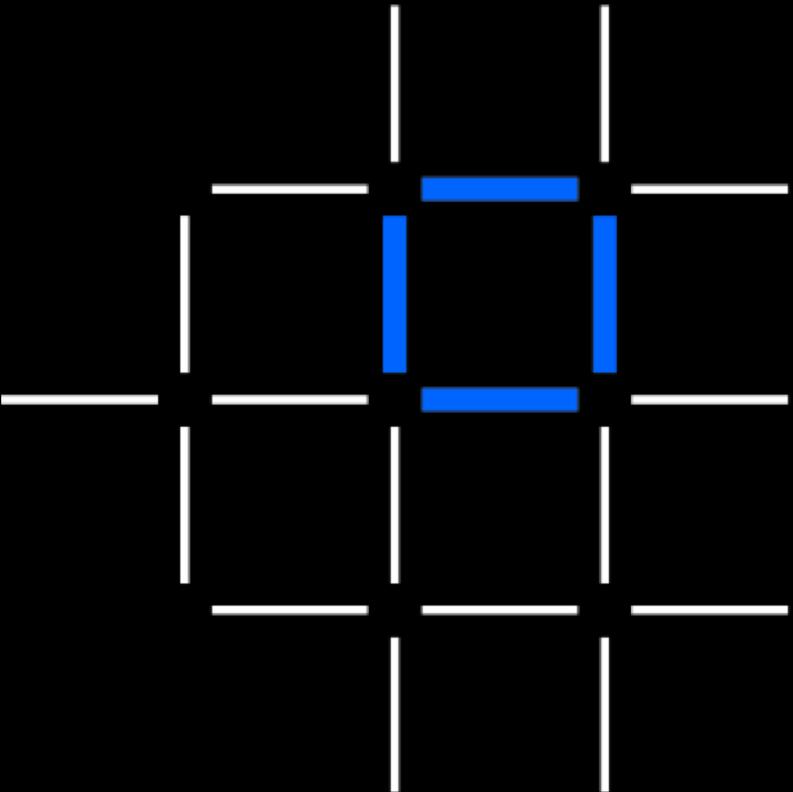
jnburgess@ibm.com

*Questions? Tweet us or
go to ibm.com/blockchain*

 @IBMBlockchain

 IBM Blockchain

 IBM Blockchain





Alex
Agency for Vehicle Standards



Paul
Buyer/Owner



Debbie
VDA
Regulations Administrator



Tommen
Insurer



Mike
Arium Logistics
Employee



Vada
Police

The central element of the diagram is a dark grey hexagonal shape containing three rectangular boxes arranged horizontally. The word "BLOCKCHAIN" is written in large, bold, orange capital letters across the middle box. The top and bottom boxes are smaller and have thin orange outlines. Lines connect the central hexagon to each of the six user avatars around it, symbolizing the distributed nature of the blockchain network.



Alex
Agency for Vehicle
Standards



Paul
Buyer/Owner



Debbie
VDA
Regulations
Administrator



Tommen
Insurer



Mike
Arium Logistics
Employee



Vada
Police

The diagram features a central dark teal hexagon containing the word "BLOCKCHAIN". Four white rectangular boxes are positioned around it, each connected by a thin black line to a point on the hexagon's perimeter. The background of the entire diagram is a dark teal color.

BLOCKCHAIN



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