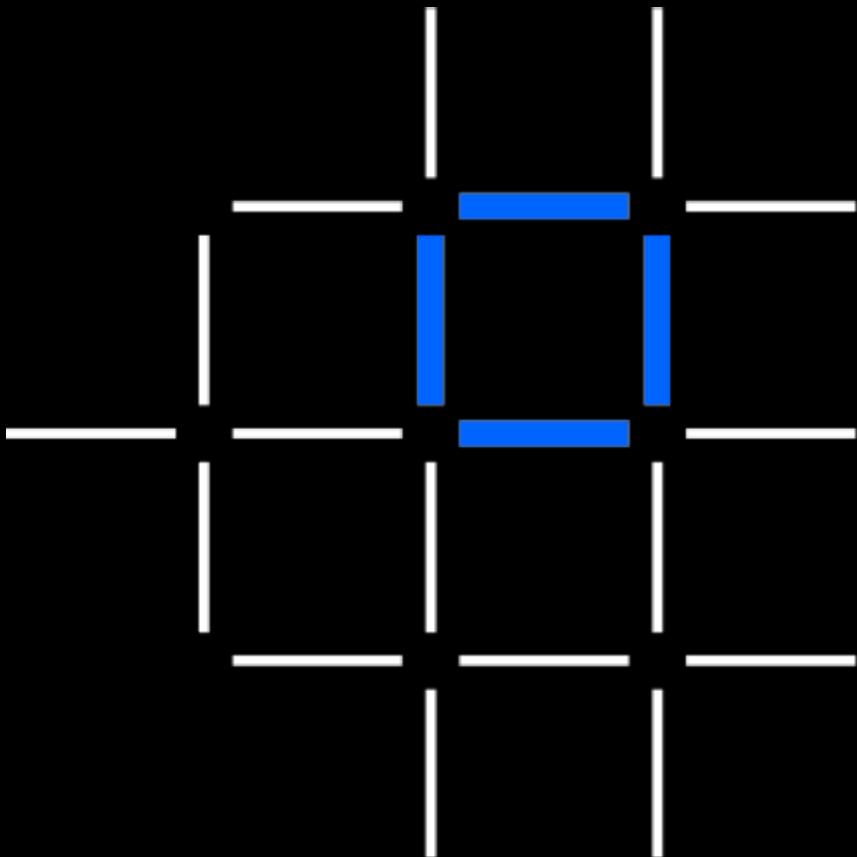


# Blockchain Explained

An Introduction to Blockchain for Business

*Jeff Tennenbaum  
Blockchain Solutions Architect  
Tennenjl@us.ibm.com*



V5.22, 25 Aug 2020

IBM **Blockchain**





What is Blockchain?



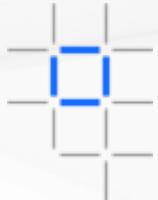
Example networks



How can IBM help?



# Tradelens - Reducing global trade barriers and increasing efficiency across international supply chains



1

## Shipping information pipeline

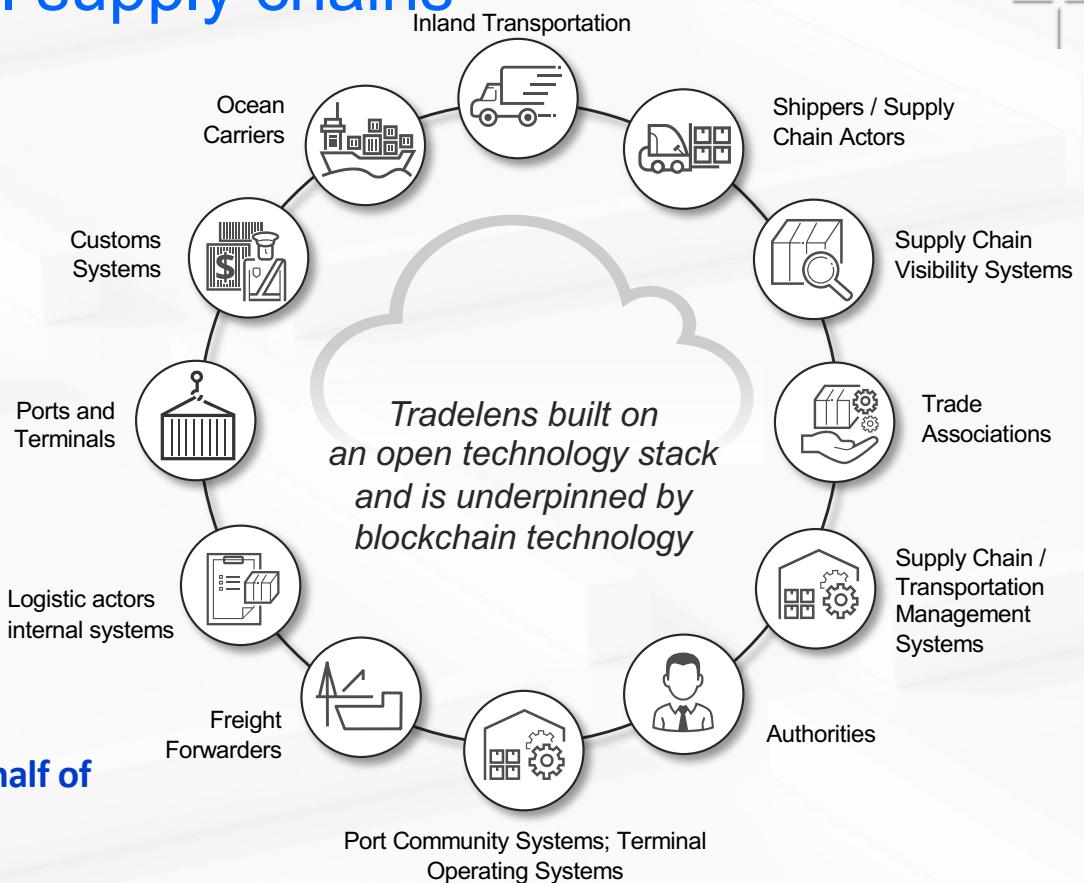
Will provide end-to-end supply chain visibility that enables all actors involved in a global shipping transaction to securely and seamlessly exchange shipment events in real time

2

## Paperless trade

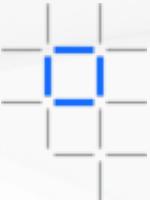
Will digitize and automate paperwork filings for the import and export of goods by enabling end users to securely submit, stamp and approve documents across national and organizational boundaries

**The scope of the platform now extends to more than half of the world's ocean container cargo.**

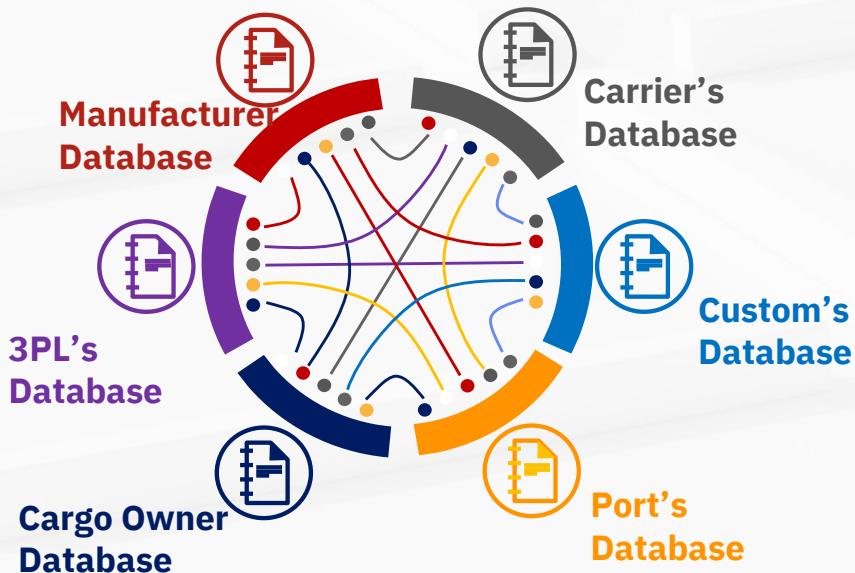


IBM Blockchain

IBM



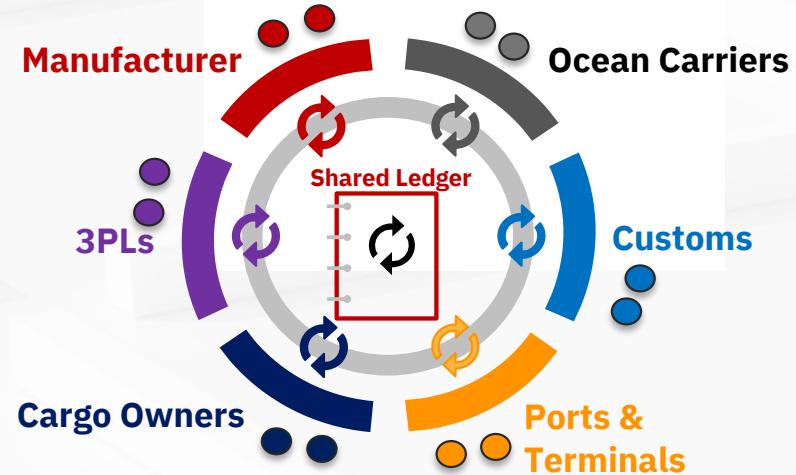
## Current State



### Pain Points

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

## Future State



### Blockchain Advantages (Why)

- Permissioned Information Sharing
- Supply chain visibility
- Provenance of goods
- Drives regulation and compliance
- Immutable Audit Trail
- Increased trust within the business network
- Shared executable business Rules

**Clients do not require blockchain infrastructure**

# Different types of blockchain

- All blockchains aim to provide **irrefutable proof** that a set of transactions occurred between participants
- Different types of blockchain exist:

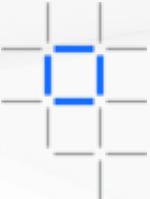


is an example of an unpermissioned, public blockchain

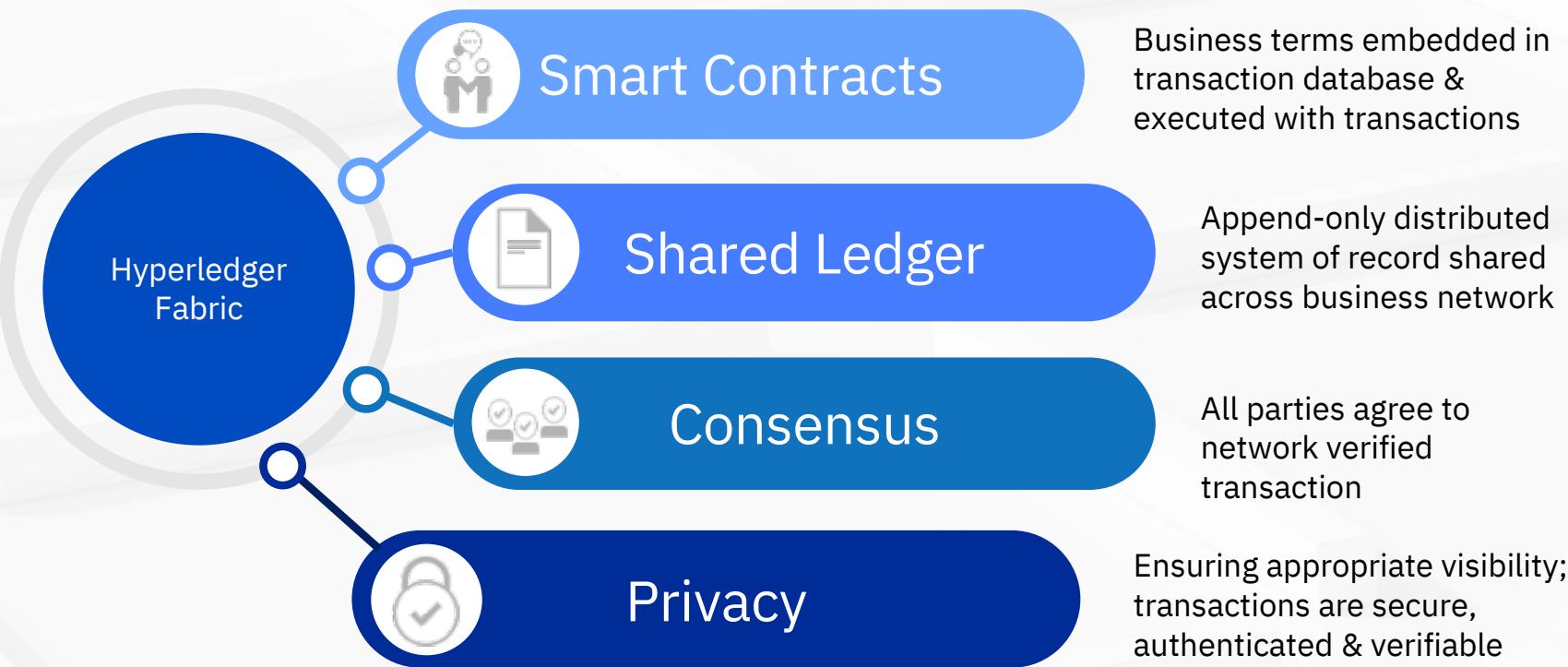
- The first blockchain application
- Defines a crypto-currency and its ledger
- Resource intensive

- Blockchains for business generally prioritize
  - **Assets** over cryptocurrency; **Identity** over anonymity; **Selective endorsement** over proof of work





## Permissioned Blockchain for Business



**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**

# Requirements of blockchain for business



## ASSETS

Participants decide which assets to share



## IDENTITY

Participants know who they are dealing with; information shared is need-to-know



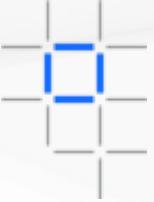
## ENDORSEMENT

Participants give provable endorsement

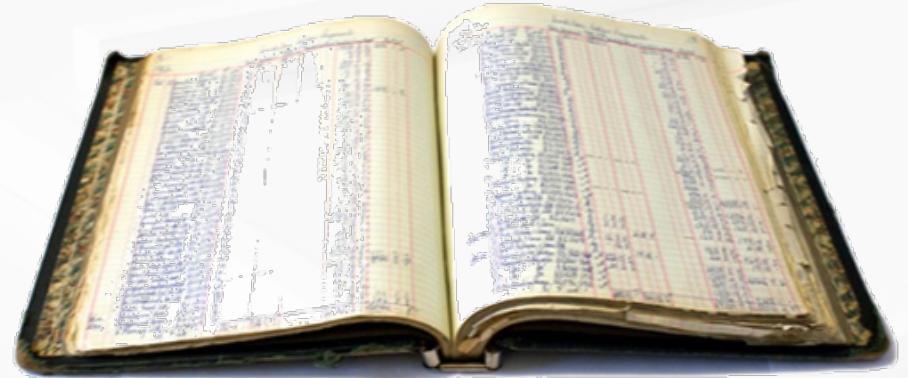


# Assets

*The business network decides what to share on the ledger*



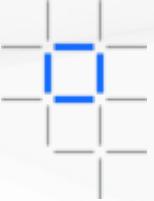
- **Assets** are anything of value
  - On the blockchain, these are represented digitally using a pre-agreed format
- **Transactions** change the state of an asset and are provably recorded on the blockchain
  - e.g. transfer ownership, change color
- Transactions are underpinned by **smart contracts**
  - Verifiable business rules that cause the asset to change state





# Identity

*Knowing who you're dealing with*



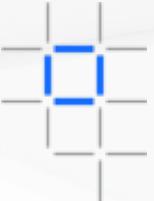
- Various regulations applied to businesses require them to know who they are dealing with
  - e.g. KYC, AML, CFT
- Identity is used to ensure business networks are kept **private** and individual transactions **confidential**
  - With transparency for the regulator
- There are established methods for obtaining and asserting identity
  - Cryptography is central to these
  - Identity allows transactions to be signed and encrypted





# Transaction Endorsement

*Provable verification by relevant participants*



- Endorsement is the process in which a transaction is verified as “good”
  - Ensures that participants are happy to accept the transaction according to the smart contract, prevent double spending, etc.
- Endorsement can be expensive in public blockchains
  - Without identity, transactions are thrown to the whole network for endorsement
  - Proof of work is particularly CPU intensive
- In the real world, transactions are endorsed by a **smaller number of participants**
  - e.g. sender bank, receiver bank, payments provider
  - Must be completed in an appropriate timeframe





What is Blockchain?



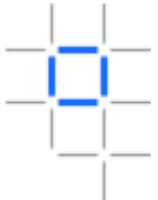
Example networks



How can IBM help?



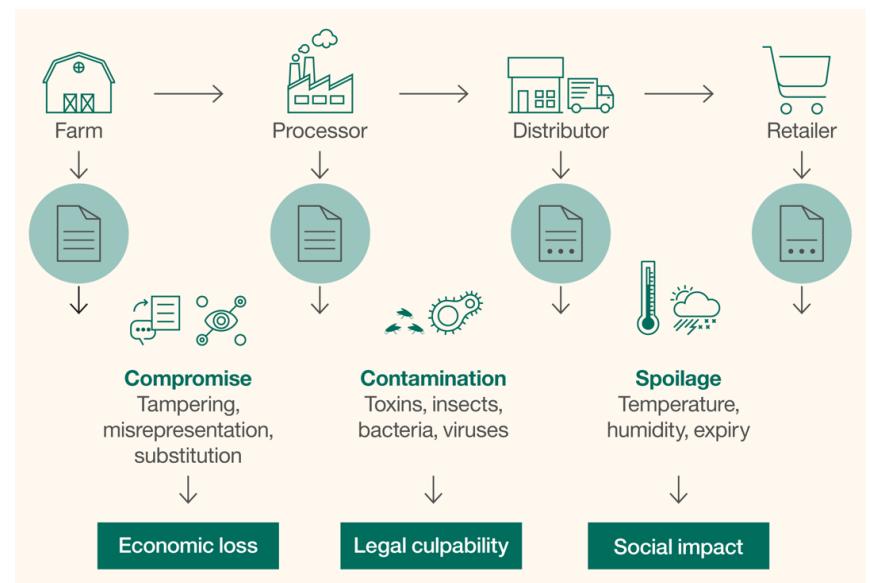
# IBM Food Trust for supply chain transparency



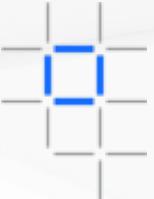
- IBM Food Trust is a set of modules providing traceability to improve food transparency and efficiency
- Blockchain is used to create a trusted connection with shared value for all ecosystem participants, including end consumers.

## 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 world wide which occur every year from food-born illnesses.



## Further examples by (selected) industry

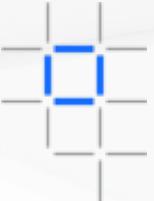


Financial	Public Sector	Retail	Insurance	Manufacturing
<ul style="list-style-type: none"><li>• Trade Finance</li><li>• Cross currency payments</li><li>• Mortgages</li><li>• Letters of Credit</li></ul>	<ul style="list-style-type: none"><li>• Asset Registration</li><li>• Citizen Identity</li><li>• Medical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

IBM is making blockchain real for business with cross-industry solutions and over **100 active networks**



# Key players for blockchain adoption



## Regulator

- An organization who enforces the rules of play
- Regulators are keen to support Blockchain based innovations
- Concern is systemic risk – new technology, distributed data, security



## Industry Group

- Often funded by members of a business network
- Provide technical advice on industry trends
- Encourages best practice by making recommendations to members



## Market Maker

- In financial markets, takes buy-side and sell-side to provide liquidity
- More generally, the organization who innovates
- Creates a new product and business process, or a new business process for an existing product



What is Blockchain?



Example networks

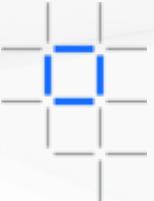


How can IBM help?



# How IBM can help

*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.



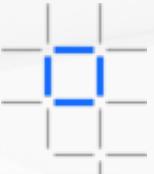
## Network Convening Power

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

**IBM Blockchain**

**IBM**

# IBM's end-to-end Blockchain Strategy



Services

Collaborate  
with services  
teams from  
ideation all the  
way to  
production



Ecosystem

Tap into our diverse ecosystem to develop strategic partnerships and create your competitive advantage



Solutions

Solve critical industry challenges by building and joining new business networks and applications



IBM Blockchain Platform

Build and operate blockchain networks in heterogeneous environments

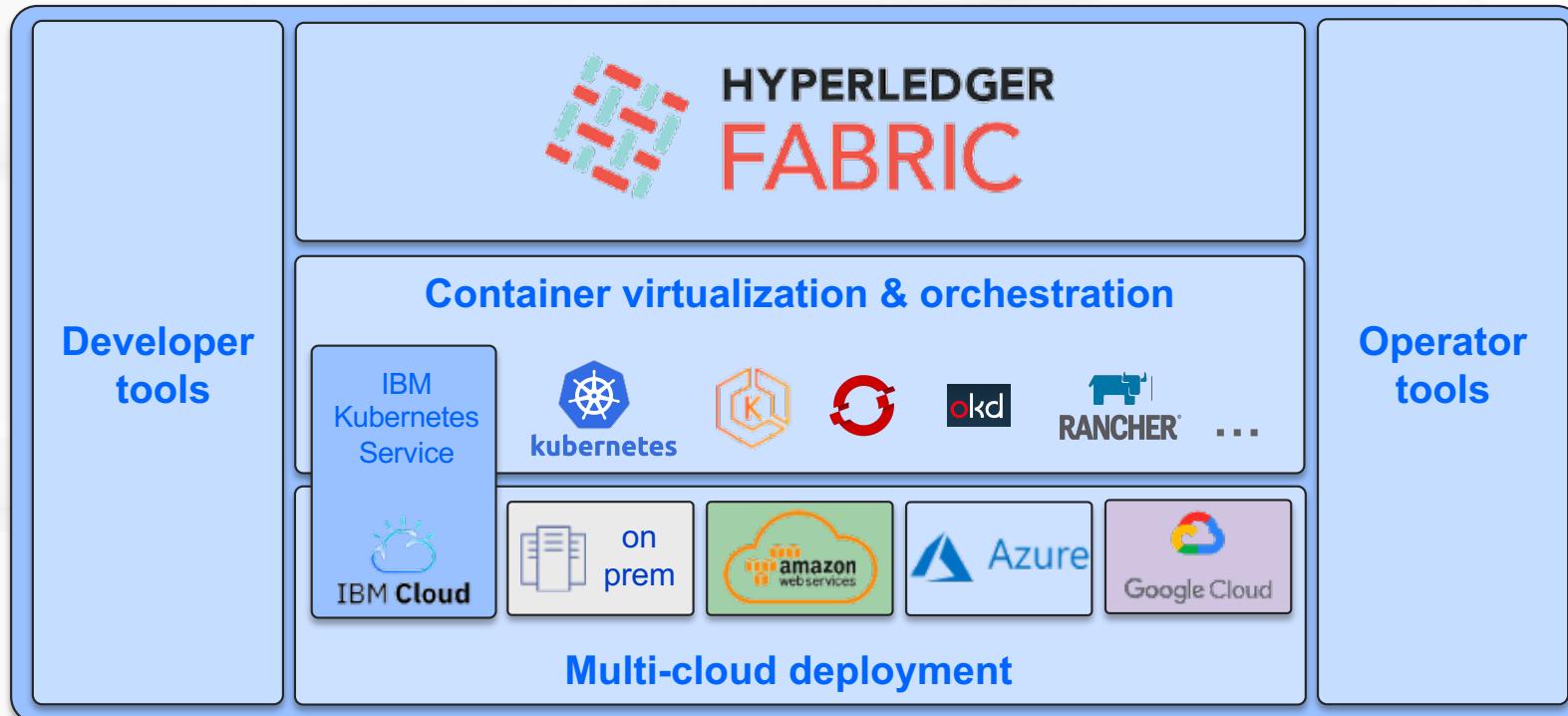
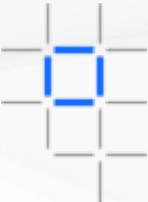


HYPERLEDGER

A founding, premier member of Hyperledger, IBM is committed to open source, standards & governance

# Introducing IBM Blockchain Platform

*Build and operate Hyperledger Fabric networks*



## Advanced tooling

Create & manage smart contracts,  
applications & networks

**IBM Blockchain**

## Open technology

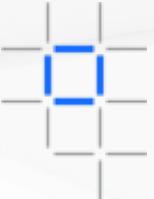
Hyperledger Fabric,  
Containers, Kubernetes

## Deploy anywhere

Comprehensive cloud &  
on-premises options

**IBM**

# Hyperledger: A Linux Foundation project



- IBM Blockchain Platform is underpinned by technology from the Hyperledger project
  - Hyperledger is a collaborative effort created to advance cross-industry blockchain technologies for business
  - Founded February 2016 and has since gathered significant cross-industry momentum
  - Open source  
Open standards  
*Open governance model*



## Associate



Academia Associate

Source: <https://www.hyperledger.org/members>

Updated: 25 June 2020

# IBM Blockchain





## Distributed ledger

A screenshot of a web browser displaying the Hyperledger Fabric project page. The URL is https://www.hyperledger.org/projects/fabric. The page is part of THE LINUX FOUNDATION PROJECTS section. The main header is "HYPERLEDGER" with "FABRIC" below it. Below the header is a large banner with the "HYPERLEDGER FABRIC" logo and two buttons: "GET THE CODE" and "BUILD YOUR FIRST NETWORK". The background of the banner features a blue network graph. At the bottom left, there is descriptive text: "Type: DLT, Smart Contract Engine" and "Status: Active". A small video thumbnail on the right says "Hyperledger Fabric Explainer".

- An implementation of blockchain technology that is a foundation for developing blockchain applications
- Emphasis on ledger, smart contracts, consensus, confidentiality, resiliency and scalability.
- V2.0 released January 2020
  - V1.4 Long Term Service production release with emphasis on operational and serviceability enhancements; new programming model abstractions for ease of development
  - V2.0 stream rolling out significant new features
- IBM is one of the many contributing organizations

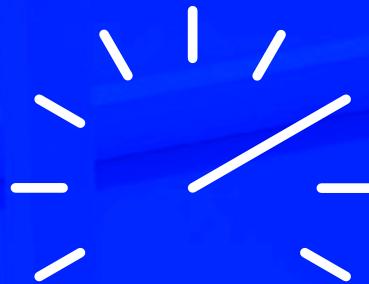
# Get started on your blockchain journey

## Start



Create or Join a network  
Prioritize the best use cases and networks for your business, and rapid development of a minimum viable network in 12 weeks or less.

## Accelerate



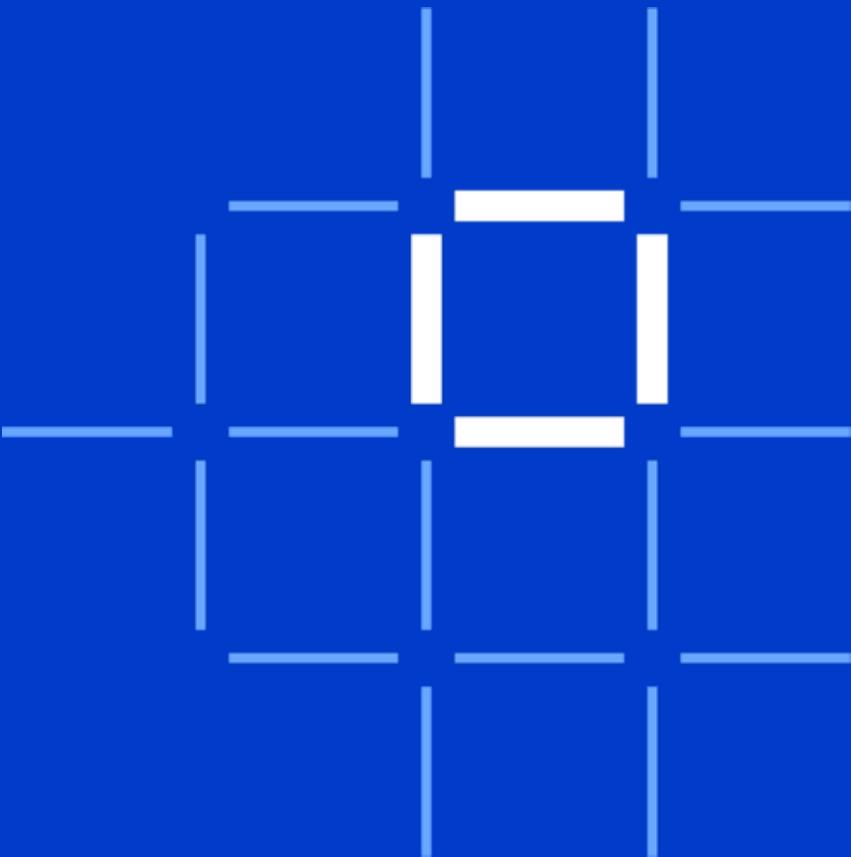
Commercialize your network  
Apply proven frameworks & expertise to address complex legal/ governance & operational challenges, & deliver a production network.

## Innovate



Extend a network  
Build business models & new applications through the integration with established networks & advanced technologies.

# Questions?



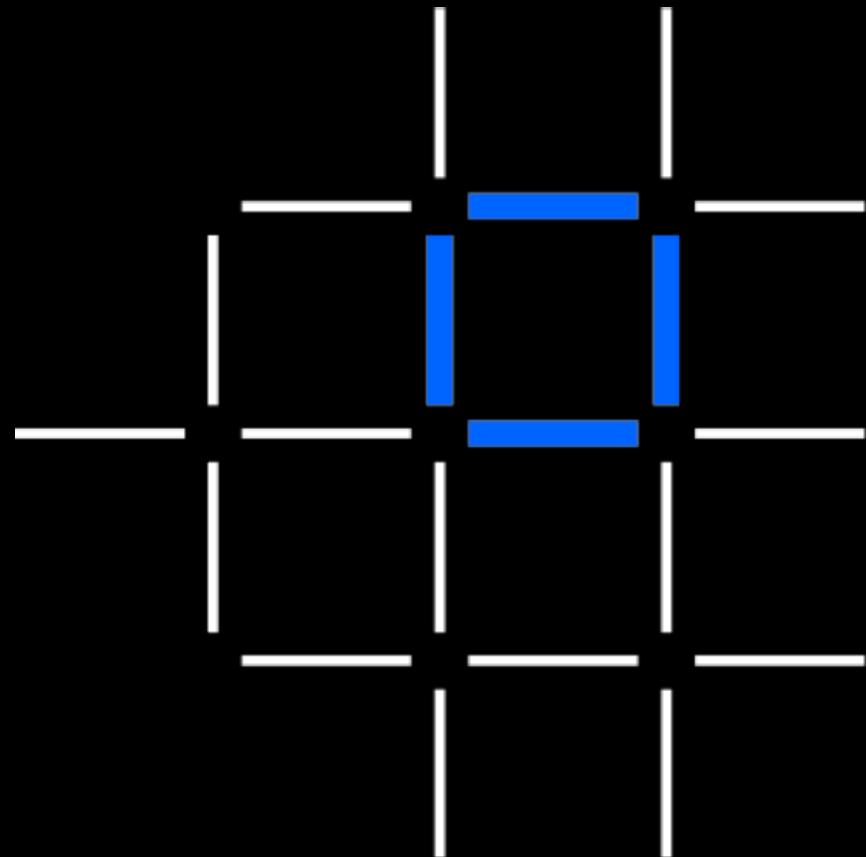
# Thank you

*Jeff Tennenbaum*  
Blockchain Solutions Architect  
[Tennenjl@us.ibm.com](mailto:Tennenjl@us.ibm.com)

Questions? Tweet us or  
go to [ibm.com/blockchain](http://ibm.com/blockchain)

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**IBM**



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