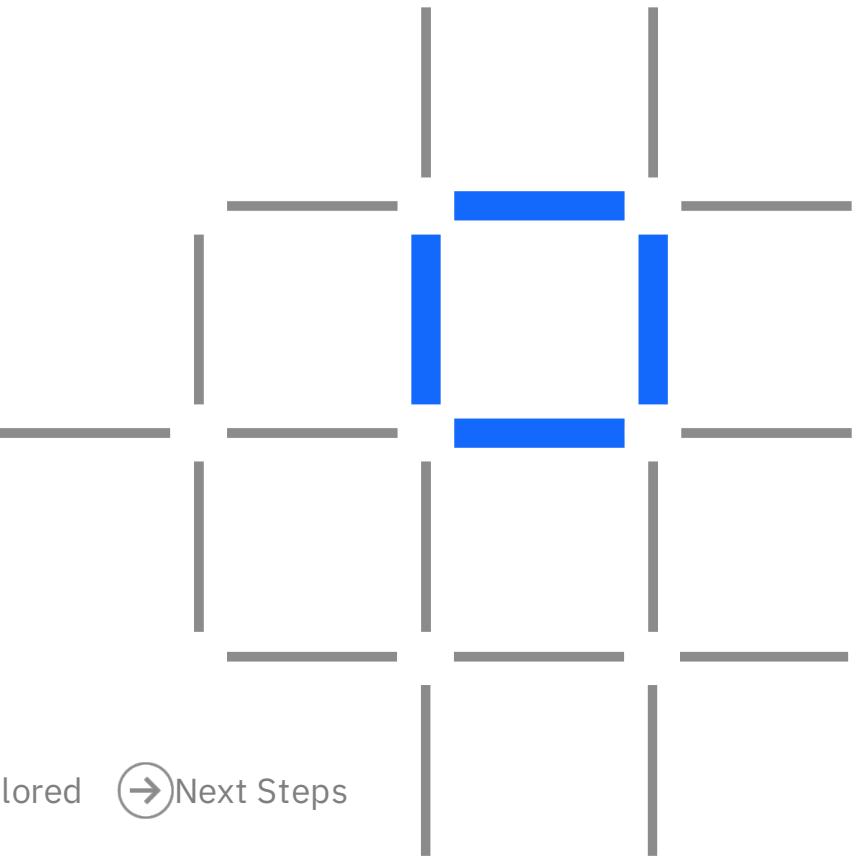


Blockchain Solutions

Use-Cases, References and How IBM Can Help

IBM Blockchain



Blockchain education series

Explained

Solutions



Composed



Architected



Explored



Next Steps

V2.02, 6 October 2017

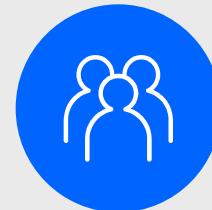
© 2017 IBM Corporation



Contents



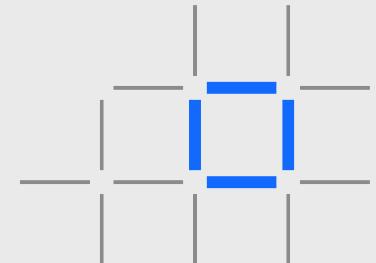
What makes a good
blockchain solution?



Examples of good
blockchain solutions



How can IBM help?



Blockchain Explained

Business Network

Customers, suppliers, banks, partners, government institutions. Cross geography & regulatory boundary
 Wealth is generated by the flow of goods & services across business network
 Creating Markets; Public (fruit market, car auction) or Private (supply chain financing, bonds)

Digital Assets

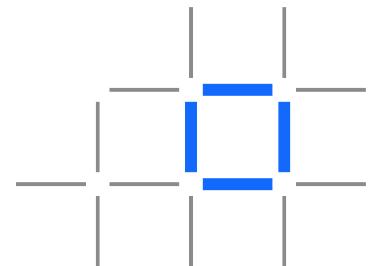
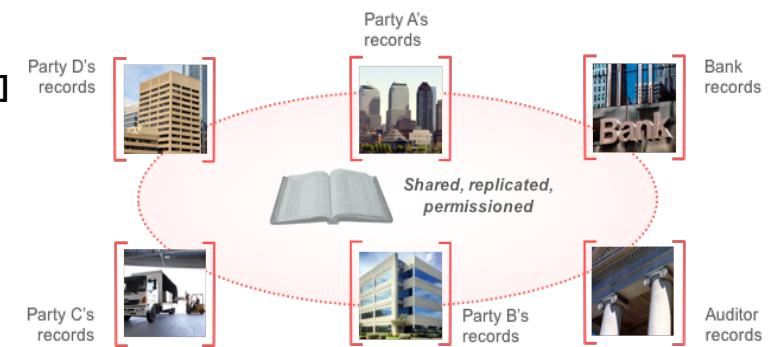
Anything that is capable of being owned or controlled to produce value
 Tangible, e.g. a diamond, car, house
 Intangible, bond [Financial], patent [Intellectual], music [Digital]

Ledger

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

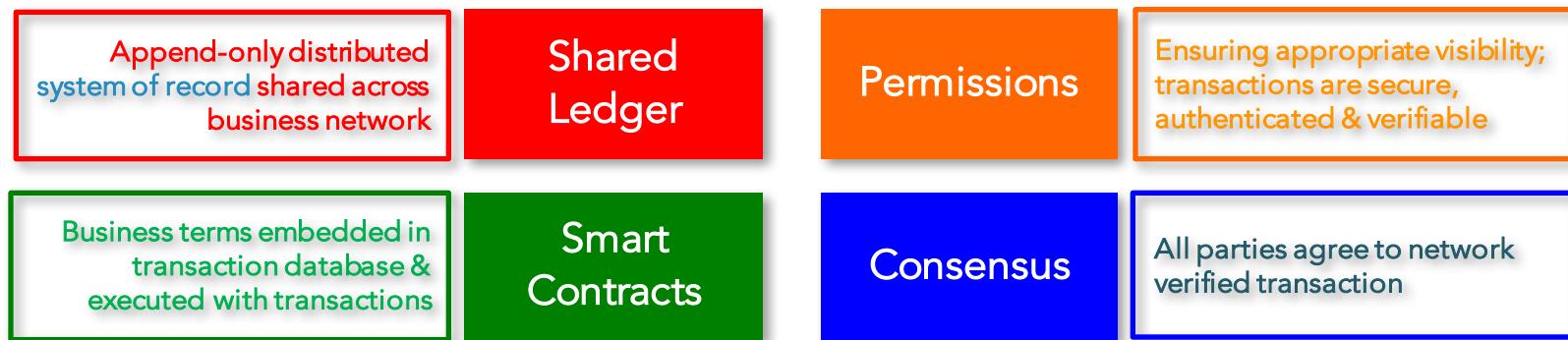
Blockchain

... Consensus, provenance, immutability, finality

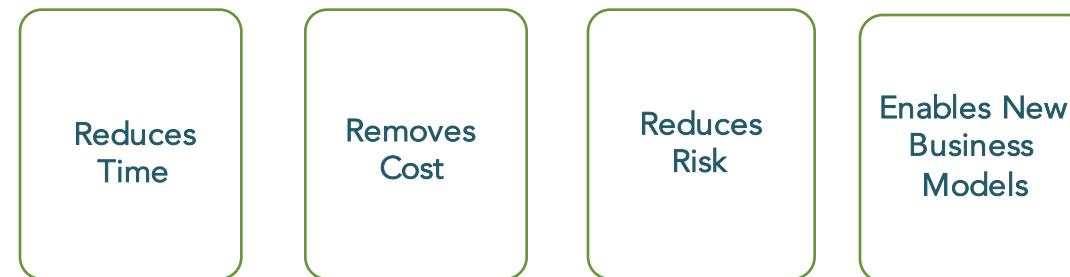


Blockchain for Business

Key Concepts:



Benefits:

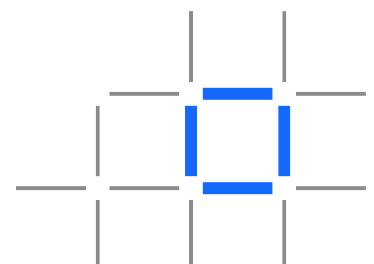


Transaction time from days to near instantaneous

Overheads and cost intermediaries

Tampering, fraud & cyber crime

IoT Integration into supply chain



Good blockchain use-case or bad?



What makes a good blockchain use case?

- Identifying a good blockchain use-case is not always easy!
 - However there should always be:
 1. A **business problem** to be solved
 - That cannot be solved with more mature technologies
 2. An identifiable **business network**
 - With Participants, Assets and Transactions
 3. A need for **trust**
 - Consensus, Immutability, Finality or Provenance

What makes a good first blockchain use case?

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

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

Start small, succeed and grow fast!

Ten questions to ask for the selected use case:

Understanding the business problem

1. What is the specific business problem / challenge that the first project will address?
 - Scope the business challenge up front
2. What is the current way of solving this business problem?
 - Understand current systems and areas for improvement
3. Assuming the business problem is large, what specific aspects of this business problem will be addressed by the first project?

Ten questions to ask for the selected use case:

Understanding the participants

4. Who are the business network participants (organizations) involved and what are their roles?
 - If there is no business network involved, then this is not a good use case.

5. Who are the specific people within the organization and what are their job roles?
 - Understand the key users in a business network.

Ten questions to ask for the selected use case:

Understanding the assets and transactions

6. What assets are involved and what is the key information associated with the assets?
7. What are the transactions involved, between whom, and what assets are associated with transactions?
 - Understand under what business or contractual conditions assets are under as they transfer from one owner to another.

Ten questions to ask for the selected use case:

Additional points of understanding

8. What are the main steps in the current workflow and how are these executed by the business network participants?

9. What is the expected benefit of applying blockchain technology to the business problem for each of the network participants?

10. What legacy systems are involved? What degree of integration with the legacy systems is needed?

Assessing Business Value

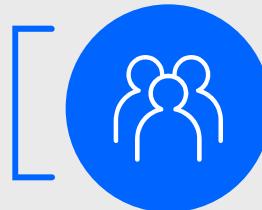
- It can be difficult to accurately quantify investment case for blockchain
- Things to consider:
 - Existing Pain Points
 - Scope – participants, assets, transactions
 - Benefits: baseline, minimum viable ecosystem (MVE) & mature network
 - Blockchain Design Points
 - References

Design Thinking Workshop will help elaborate these items!

Contents



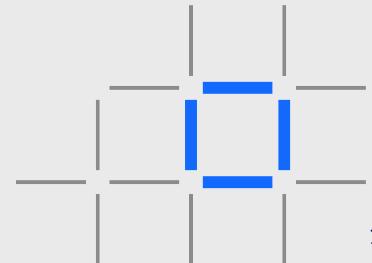
What makes a good
blockchain solution?



Examples of good
blockchain solutions



How can IBM help?



Common KYC Data

What?

- View of customer identity to enable compliance with Know Your Customer (KYC)

How?

- A complete view of customers' documents across a distributed network



Benefits

1. Creation of a single but cross-businesses KYC platform to inform all of the banks processes.
2. Crédit Mutuel Arkéa could enable its customers to deliver proof of their identity to third-parties such as local utilities, retailers or regulated service providers.



Legitimize Diamonds and Reduce Fraud

What?

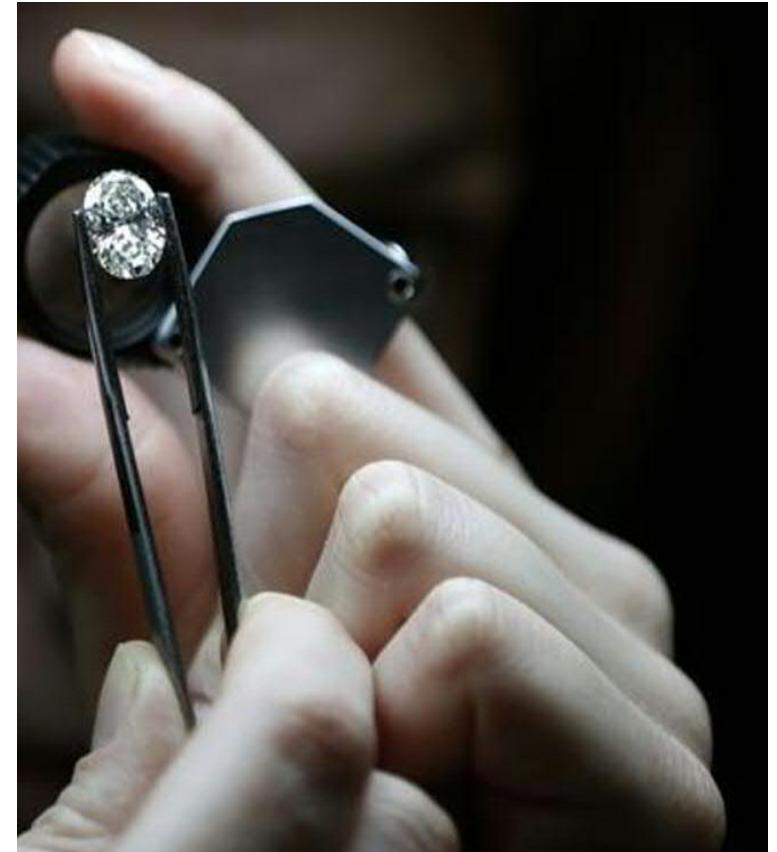
- Track diamonds across supply chain from mine to retail

How?

- Shared ledger for storing digital certification with supporting material

Benefits

1. Protect against the occurrence of fraud, theft, trafficking and black markets
2. Assist in the identification and reduction of synthetic stones being labelled as authentic
3. Increase speed of transparency for cross border transactions for insurance companies, banks and claimants



Walmart Food Traceability in China

What?

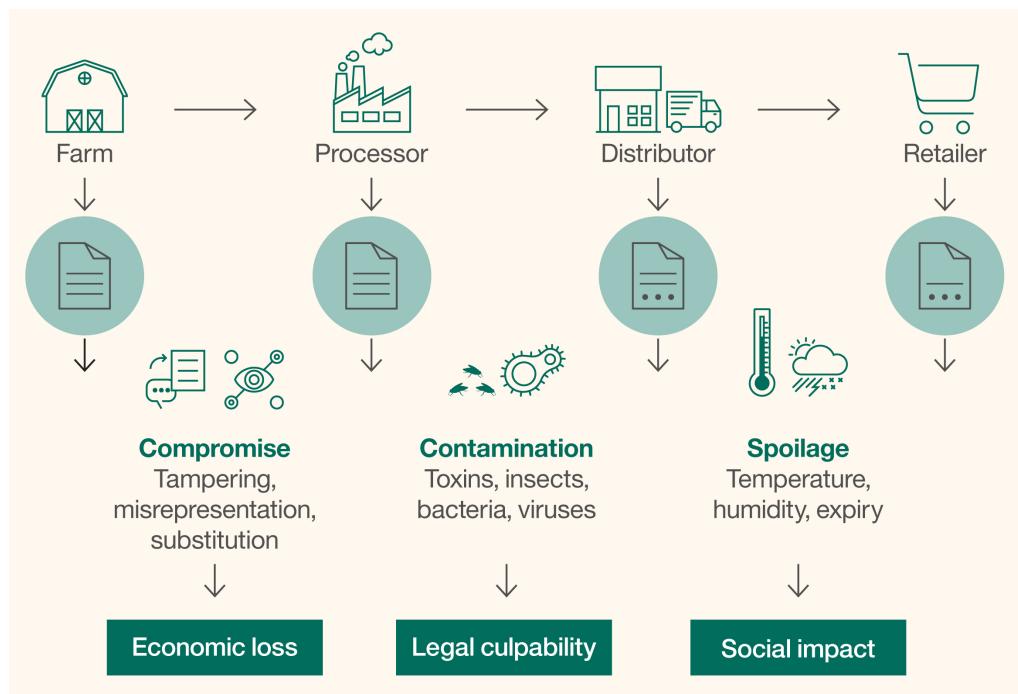
- Traceability of food from “farm to fork”

How?

- Blockchain holds history of food items processed through entire supply chain

Benefits

1. Increased trust – multiplied by each participant in food supply chain
2. Pinpoint source of compromised food, reducing the unnecessarily broad recall
3. Improved co-ordination in food supply chain



IBM Global Financing: Dispute Resolution

What?

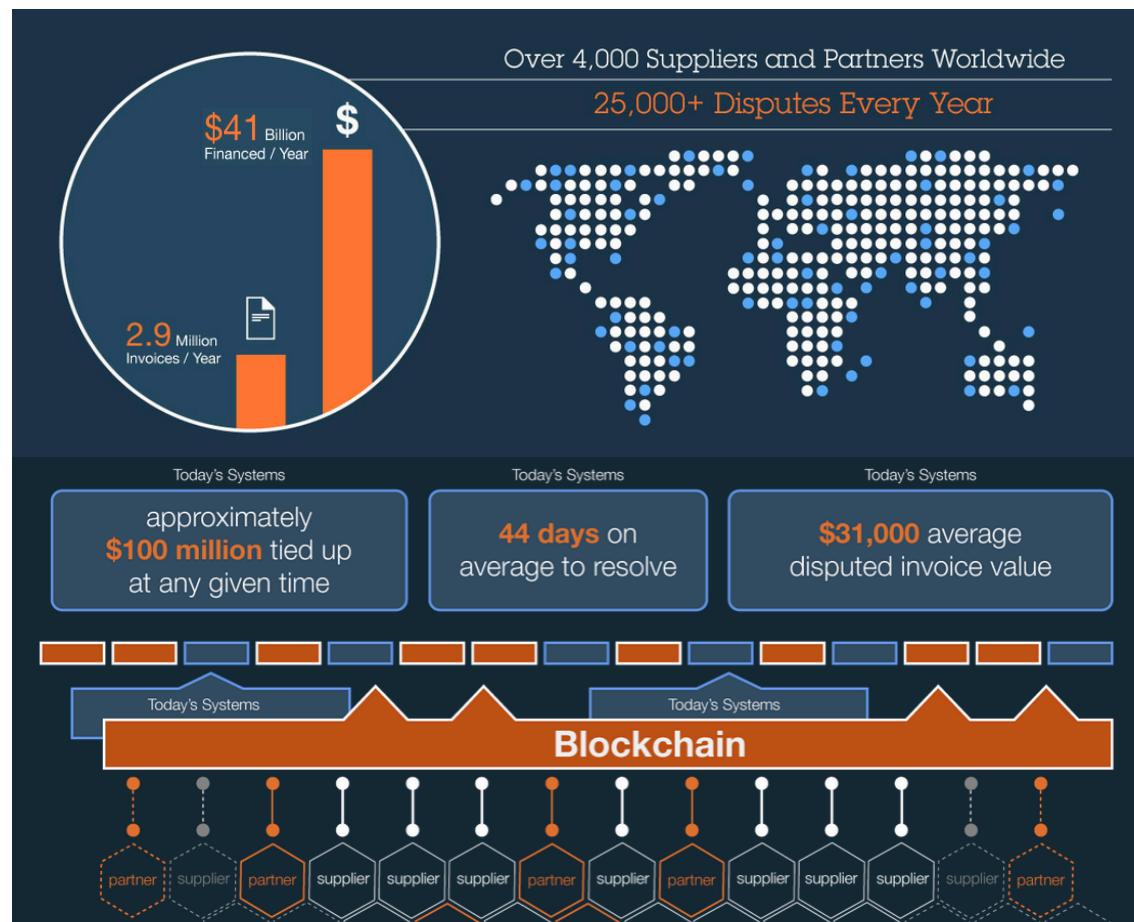
- IBM Global Finance provides a \$41bn channel financing per year. There are a number of disputes that take time to resolve and can lock up transactions costing time and money

How?

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

Benefits

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





MAERSK

Cross Border Supply Chain

What?

- Ninety percent 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 one-fifth the actual physical transportation costs.

How?

- A new blockchain solution from IBM and Maersk will help manage and track the paper trail of tens of millions of shipping containers across the world by digitizing the supply chain process.

Benefits

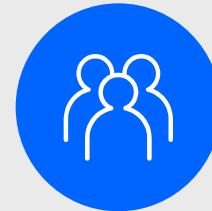
1. Enhance transparency and the highly secure sharing of information among trading partners and customs officials.
2. Reduce fraud and errors, reduce the time products spend in the transit and shipping process, improve inventory management and ultimately reduce waste.
3. Potential to save the industry billions of dollars.



Contents



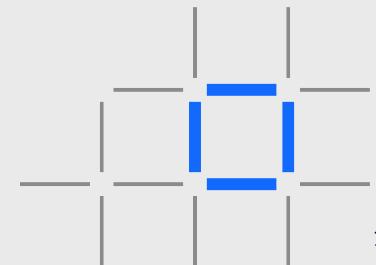
What makes a good
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How can IBM help?



IBM endeavors to bring together the world's most advanced expertise, technology and ecosystem to transform industries

IBM Blockchain

Experts

Collaborate with comprehensive services teams from ideation all the way to production

Solutions

Solve critical industry challenges by building and joining new business networks

Platform

Develop, govern and operate enterprise blockchain networks with speed and security

HYPERLEDGER

As a founding and premier member of Hyperledger, we're **committed to open source, standards and governance**

Why Hyperledger Fabric?



Open Governance
Anyone can join or contribute



Built from the ground up for enterprise
With a maturity model to help companies move to production



Performance
Supports up to 1000 tps*



Confidentiality and privacy
Built-in channels for isolation and membership services for signing and encryption. Supports IBM High Security Business Network.



Modularity and flexibility
Choice of consensus algorithms and programming languages

Develop Blockchain Apps for free with Hyperledger technologies

Turn any programmer into a blockchain developer.

- Align business and development to reduce development from months to days
- Quickly build blockchain skills by leveraging today's popular open source tools and languages
- Learn and develop in your preferred environment with an open and modern toolset
- Deploy to production in IBM Cloud when you're ready!



Free cloud sandbox and interactive playground to convert business design into code

Try
online

Zero install!
exLeverage
Hyperledger
Composer's web
playground

Install on
Laptop

Develop and test with
complete local dev
environment including
Hyperledger Fabric and
Hyperledger Composer

Share on
Cloud

Collaborate, share code
of your running
blockchain network
including with Docker and
Kubernetes; free and fee
options

Introducing the IBM Blockchain Platform

The only fully integrated enterprise-ready blockchain platform designed to accelerate the development, governance, and operation of a multi-institution business network.

- Based on Hyperledger Fabric V1 runtime optimized for enterprise requirements
- Specialized compute for security, performance and resilience
- Delivered via the IBM Cloud on a global footprint with 24x7 Integrated Support
- Full lifecycle tooling to speed activation and management of your network

Develop

Explore and accelerate development leveraging Hyperledger technologies with cloud sandbox and inter-active playground

Govern

Create and govern blockchain consortium for democratic, multi-party management and tooling

Operate

Deploy and operate always-on networks with enterprise and production-ready performance and security

Govern the network with democratic management tools

Accelerate the initiation and activation of new blockchain networks.

- Collectively manage rules and policies for network by preventing any one member exclusive control
- Grow elastically as new smart contracts, network members and transaction channels evolve
- Pre-built, native tools and policies enable faster onboarding, customization and activation



Integrated tools to enforce change management of the network with customizable democratic policies

Policy Editor

Define flexible, democratic policies to govern changes to the network

Multi-party workflow tool

Leverage member activities panel, integrated notifications and secure signature collection for policy voting

Operate the network with production-ready enterprise service

Deploy and grow your blockchain network with the necessary security and performance.

- Start small and scale network elastically as membership and transaction volumes increase
- Ultra high security environment with IBM exclusive hardware, firmware, and software features
- Always-on operations and disaster recovery solutions keep the network running during upgrades without disruption
- Optimized for performance running on the world's fastest Linux compute

Integrated features

Hyperledger Fabric V1.0

runtime optimized for enterprise requirements

Network Dashboards

for monitoring and managing the resources on the network

Hardened security stack

with 100% encryption, no privileged access, malware and tamper resistant keys

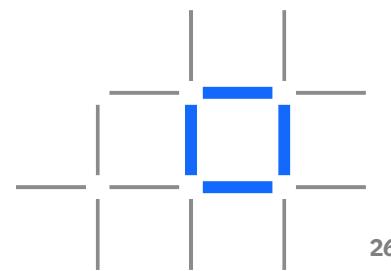
Lifecycle Management

with seamless upgrades of the full code stack without pausing the network.

24/7 Technical Support

integrated into the portal for problem resolution

A quick show and tell!





Create Network

- Let's Get Started
- Invite Members
- Define Governance Rules
- Configure Certificates
- Configure Resources
- Review Summary

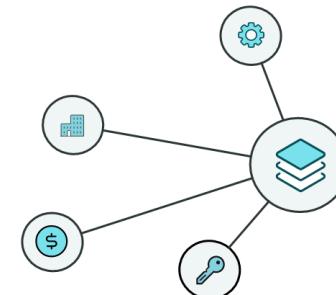
[? Need Help?](#)

Let's Get Started i

This Quick Start will help guide you through the network creation process. This includes inviting other Member Organizations to join, setting rules, and provisioning network resources.

Looking for additional helpful information?

[Documentation](#)



Start by giving your network a name

* Required field

More details on creating a network

At the end, your network resources will become live. Other members will come online once they complete the on-boarding process. From there use the network monitor to manage resources, create channels, install chaincode applications, and view transactions.

[Previous](#) [Next](#)



Create Network

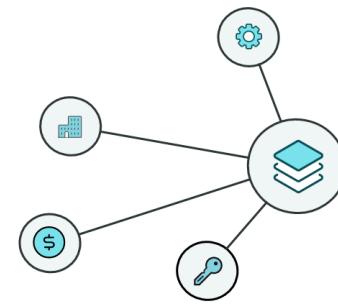
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Start by giving your network a name

MyRCNetwork

More details on creating a network

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?

Need Help?

[Previous](#)

[Next](#)



Create Network

- Let's Get Started
- Invite Members**
- Define Governance Rules
- Configure Certificates
- Configure Resources
- Review Summary

Invite Members i

Add member organizations to join your business network. During the beta period you can add up to 5 members.

Organization**Contact's e-mail****Add Member****ORGANIZATION****ROLE****ACTION****Need Help?****Previous****Next**



Create Network

- Let's Get Started
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- Review Summary

[Need Help?](#)

Invite Members i

Add member organizations to join your business network. During the beta period you can add up to 5 members.

Organization

MyRCOneOrganization

Contact's e-mail

myemail@email.com

Add Member**ORGANIZATION****ROLE****ACTION**[Previous](#)[Next](#)



Create Network

- Let's Get Started
- Invite Members**
- Define Governance Rules
- Configure Certificates
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- Review Summary

Invite Members i

Add member organizations to join your business network. During the beta period you can add up to 5 members.

Organization**Contact's e-mail****Add Member**

ORGANIZATION	ROLE	ACTION
MemberOne rhartley@us.ibm.com	Admin	
Membertwo bobinuk2004@yahoo.com	Admin	

? Need Help?**Previous****Next**



Create Network

- Let's Get Started
- Invite Members
- Define Governance Rules
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- Review Summary

Define Governance Rules i

Below is a list of enforced policies for governing the network. During the beta period, all invited members can make changes to the network.

Network Policies

NAME	ACTION
Network Member Policy Members can add other members	

Channel Creation Policy

Members can create channels

Policy Editor Coming Soon

Chaincode Policy

Members can instantiate chaincode

[Need Help?](#)

[Previous](#) [Next](#)



Create Network

- Let's Get Started
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[Need Help?](#)

Configure Certificates i

Select an option below for generating member certificates. Certificates provide cryptographic identity that ties each Member to the network.

Company Name

* Required field

Root Certificate Options

NAME

Auto Generated

Certificate authority allows your clients and peers to transact on behalf of your organization and ensures that others on the network cannot impersonate you.

Upload Certificate

(Coming soon)

[Previous](#)[Next](#)



Create Network

- Let's Get Started
- Invite Members
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[Need Help?](#)

Configure Resources i

First you will add your peers, then add members who can administrate or interface with peers for your organization.

Add Resource

Quantity of Peers

Choose... ▾

Peer Size

Choose... ▾

Add to Order

* Different peer sizes coming soon

[Previous](#) [Next](#)



Create Network

- Let's Get Started
- Invite Members
- Define Governance Rules
- Configure Certificates
- Configure Resources
- Review Summary

Configure Resources i

First you will add your peers, then add members who can administrate or interface with peers for your organization.

Add Resource

Quantity of Peers

2

Peer Size

Medium

Add to Order

* Different peer sizes coming soon

Resources to be Ordered

Peers	Size	Remove
2	Medium	⊗

[Need Help?](#)[Previous](#) [Next](#)



Create Network

- Let's Get Started
- Invite Members
- Define Governance Rules
- Configure Certificates
- Configure Resources
- Review Summary

Review Summary

Summary of your network.

Network

[Edit](#)**Network Name**

MyRCNetwork

Default Location

Frankfurt

Members

[Edit](#)**Organization**

MemberOne

Membertwo

Contact's e-mail

rhartley@us.ibm.com

bobinuk2004@yahoo.com

Governance Rules

[Edit](#)**Policy Rules**

During the limited beta period, only default policies are enabled.

Certificate Authority

[Edit](#)

Resources

Peers	Size
2	Medium

[Need Help?](#)[Previous](#)[Done](#)

IBM Blockchain Platform membership plans

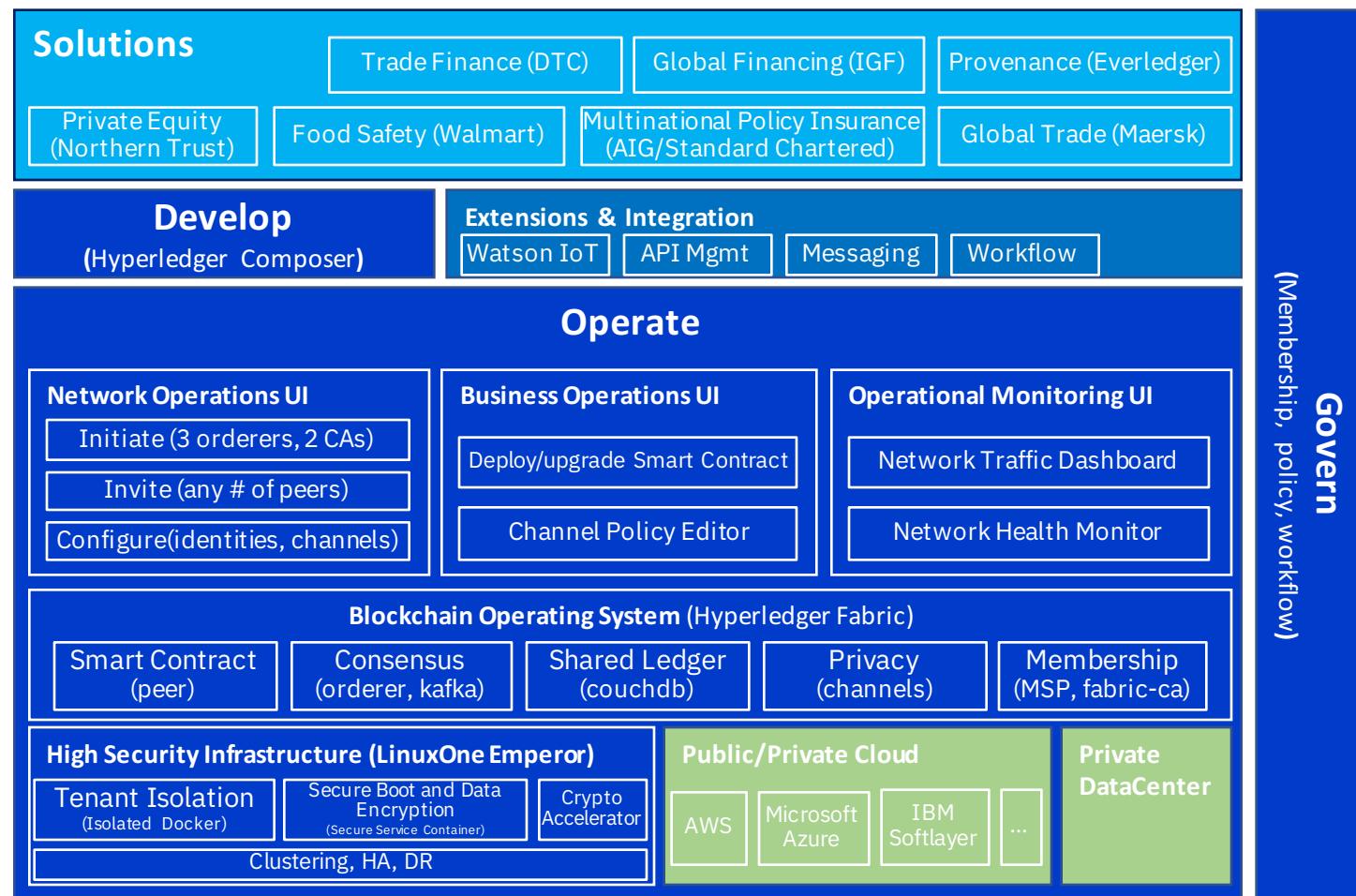
Plans	Key Features	Availability
Entry	Hourly charges w/basic services levels	Coming soon
Enterprise	Monthly subscription with advanced service levels	Available Now
Enterprise Plus	Monthly subscription with the highest performance and isolation for even the most demanding use cases and regulated industries	Coming soon
Self Managed	Signed and certified images of Hyperledger Fabric you can install in a location of your own choosing; at your site or in your cloud and connect it to a network running in the IBM Blockchain Platform.	Coming soon

Each membership plan includes all the platform tools to develop and govern a complete blockchain network and the tools to operate 1 blockchain peer.

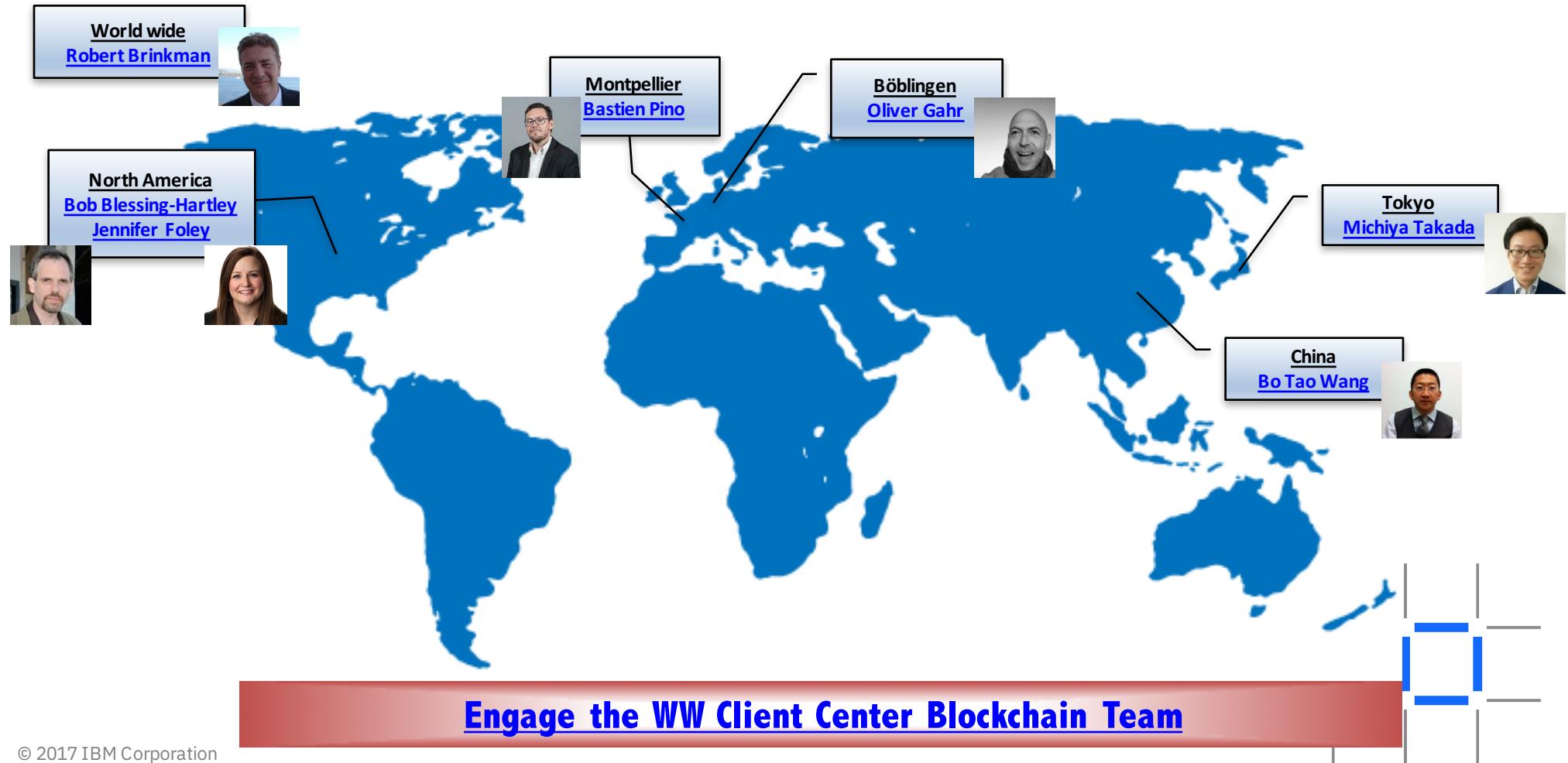
Only the IBM Blockchain Platform provides must-have features for production distributed business networks

	MUST HAVE	IBM Blockchain Platform	Microsoft Azure	SAP	Amazon Web Services
Enterprise ready	Security	✓ Integrated HSM with highest FIPS level compliance*	✗ Lack of dedicated blockchain security	✗ Lack of dedicated blockchain security	✗ Lack of dedicated blockchain security
	Scalability	✓ Fastest Linux compute and high speed network	✗ Cannot scale beyond basic test network	✗ No production offering	✗ No production offering
	Support	✓ 24x7x365 support coverage backed by deep Fabric expertise	✗ No dedicated Fabric support	✗ No dedicated Fabric support	✗ No dedicated Fabric support
Trusted	Transformation expertise	✓ Services and infrastructure support for new distributed business networks	✗ No transformation services	✗ No transformation services	✗ No transformation services
	Industry focus	✓ Active networks for key industries (Retail, Supply Chain, FSS, etc.)	✗ Limited to no active networks	✗ No industry focus	✗ No industry focus
	Tools and management	✓ Network governance and development tools	✓ Development tools, limited interoperability	✗ No tooling	✗ No tooling
Open	Open governance	✓ Fabric governed by enterprise-focused Hyperledger Project	✗ Only supports EEA	✓ Supports Hyperledger project	✗ No governance support
	Ecosystem	✓ 25+ organizations contributed to Hyperledger Fabric v1.0	✓ Support from Ethereum ecosystem	✗ No ecosystem support	✗ No ecosystem support
	Licensing	✓ Apache 2 and MIT licensing make using and contributing to code easier	✗ Ethereum GPL/LGPL licensing	✗ No licensing support	✗ No licensing support

IBM Blockchain Platform Architecture



Worldwide Client Center Blockchain Team



The Bluemix Garage Method combines industry best practices for building and delivering cloud-native solutions.



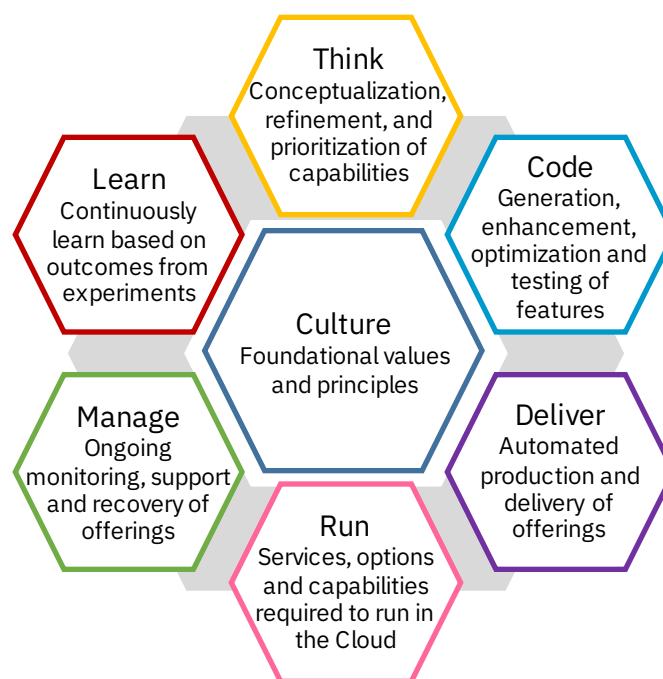
Culture

- Couple business, technology and process innovation
- Experiment; learn fast
- Small, autonomous, flexible teams
- Co-location with client
- Focus on communications and transparency
- Deliver business outcomes fast



Techniques

- A proven, transformational methodology based on:
- Lean startup
 - IBM Design Thinking
 - eXtreme Programming
 - Solution architecture



Expertise

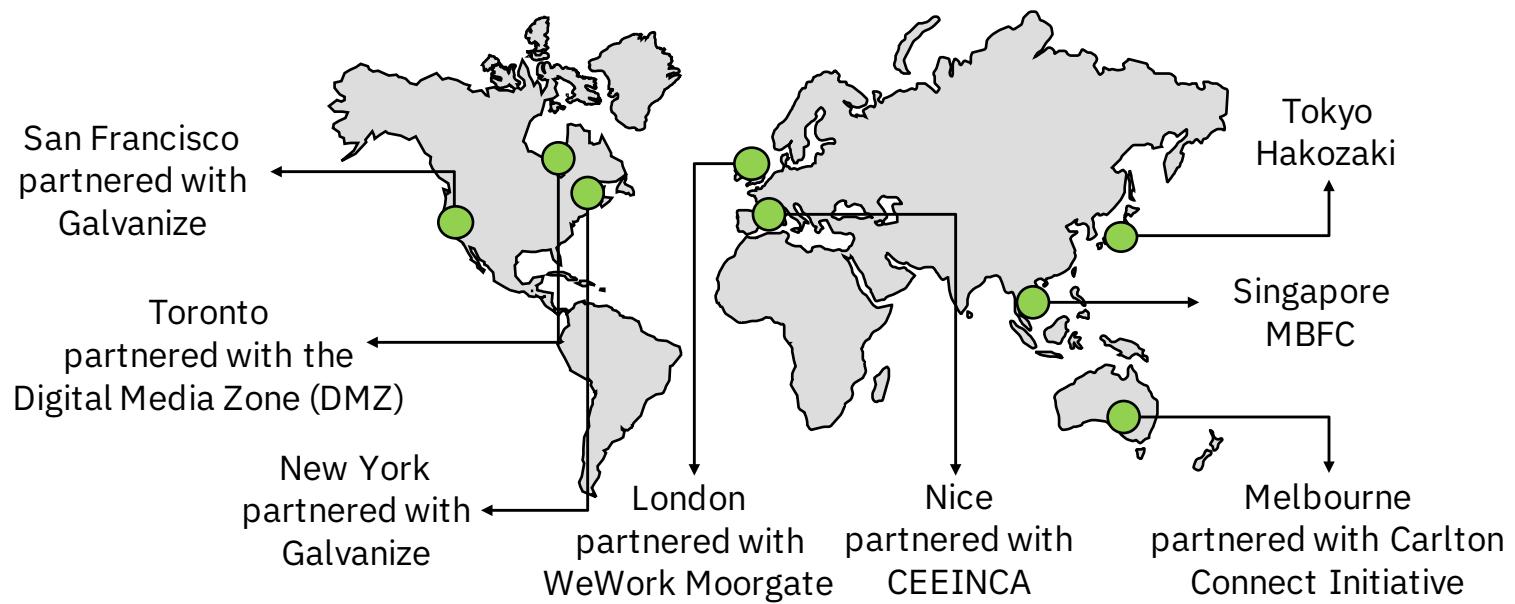
- Business
- Design
- Development
- Deployment



Technology

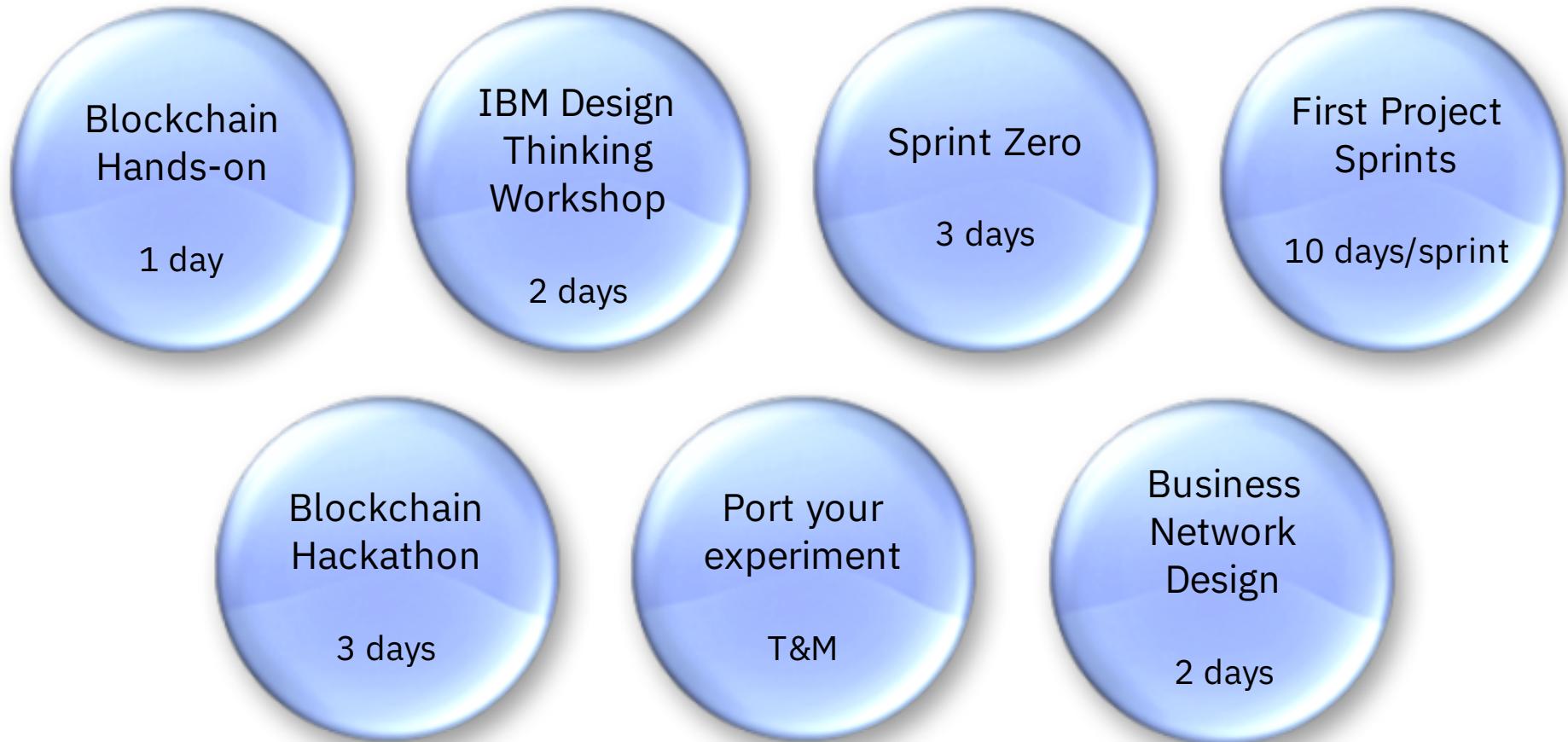
- IBM Bluemix enables the rapid composition of web and mobile applications with your choice of:
- Compute: Cloud Foundry, Docker, SoftLayer
 - Development services
 - Tooling
 - Integration with your systems

Where are the garages located?



Or we bring a pop-up garage to you

IBM Garage: Many Possibilities



Why IBM?



- | | | |
|--|-------------------------|--|
|  | Industry Expert | <ul style="list-style-type: none">• Hundreds of experienced consultants, researchers and developers• Deep systems integration and middleware experience |
|  | Secure by Design | <ul style="list-style-type: none">• IBM Blockchain High Security Business Network• Dedicated compute, cryptography hardware, tamper-resistant container. |
|  | Open By Design | <ul style="list-style-type: none">• Linux Foundation Hyperledger founding member• Ongoing donation of code, developers and intellectual property to Hyperledger |
|  | Fast Start | <ul style="list-style-type: none">• 400+ clients in engagement pipeline in 2016• IBM Blockchain Garage engagement model to implement MVP rapidly |
|  | Hyper Scale | <ul style="list-style-type: none">• Choice of deployment including on-prem, off-prem, self-managed or *aaS• Supports rapid expansion of initial solution. |

Thank you

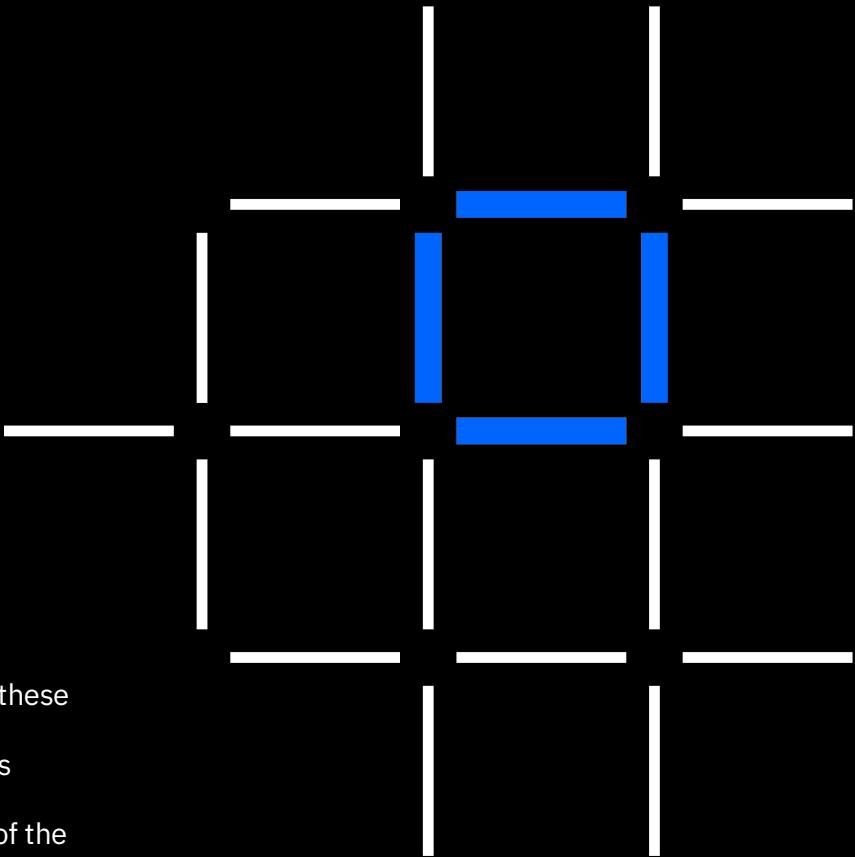
Jennifer Foley
Integration Architect
Worldwide Client Center for Systems Innovation
foleyje@us.ibm.com

IBM Blockchain

www.ibm.com/blockchain

developer.ibm.com/blockchain

www.hyperledger.org



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IBM

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