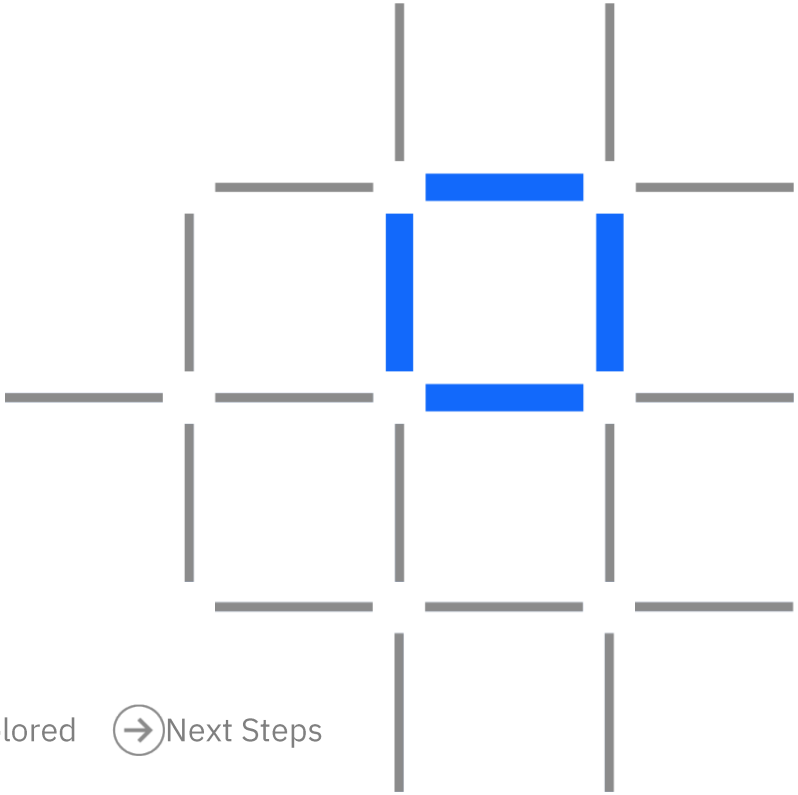
# Blockchain Solutions

*Use-Cases, References and How IBM Can Help*

IBM **Blockchain**



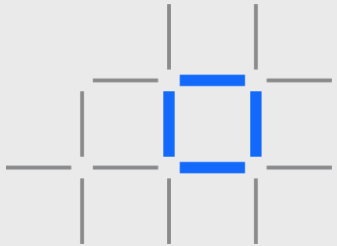
Blockchain education series

Explained | **Solutions** | Composed | Architected | Explored | Next Steps

V2.01, 25 September 2017

# Contents





# Good blockchain use-case or bad?

Dispute resolution

Holiday Tracking Tool

Know Your Customer

Food provenance

Track Your Child

Electronic Medical Records

# What makes a good blockchain use case?

- Identifying a good blockchain use-case is not always easy!
  - However there should always be:

1. A **business problem** to be solved
   - That cannot be 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?

# It is important to ideate potential use-cases

## Day 1

### [A] Use Case

| | |
|---|---|
| Blockchain Recap | 30 |
| Use Case Selection | 30 |
| Blockchain Fit | 20 |
| Business Network | 15 |

### [B] User

| | |
|---|---|
| Design Thinking | 30 |
| Empathy Mapping | 45 |
| As-is Experience | 45 |
| Explore Possibilities | 30 |
| Focus Outcomes | 15 |

## Day 2

### [C] Hills

| | |
|---|---|
| Formulating Hills | 60 |
| Playback Hills | 15 |
| Refine Hills & Check Fit | 35 |
| Prioritize Hills | 15 |

### [D] Going Agile

| | |
|---|---|
| Storyboarding | 45 |
| First Project Method | 30 |
| Sprint Zero | 20 |
| Non-functional Details | 15 |
| Action Plan | 20 |

# 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!**

# Template – example only (Cross Border Supply Chain)

IBM Blockchain

| | |
|---|---|
| Problem | 90% of goods in global trade are carried by the ocean shipping industry each year. Costs associated with trade documentation processing and administration are estimated to be up to 20% the actual physical transportation costs. |
| Solution | Manage and track the paper trail of tens of millions of shipping containers across the world by digitizing the supply chain process |
| Participants | Supplier, couriers (*2), customs (*2) , ports (*2), shipper and retailer .... |
| Asset & Trust | Need for trust around paperwork associated with a container |
| Transactions | Supplier prepares to ship, release container to courier, load to ship, clear customs, retailer receipt |

Pain Points

- Transport remains highly dependant on a flood of paper that is never digitised
- Shipping information must pass through many hands, increasing potential for delays in transport.
- One shipment can require sign-off from 30 unique organizations and up to 200 communications.
- One lost form or late approval could leave the container stuck in port
- The entire process can take more than one month..
- Fraudulent changes may be made to the Bill of Lading

| Benefits benchmarks<br>- Value Tree<br>KPI's (e.g.) | | Baseline | Phase 1 | Phase 2-3 | Blockchain : Design Points | References |
|---|---|---|---|---|---|---|
| New revenue | # new value propositions | - | - | 1 to 3 | • Find new value propositions to exploit the network effect between members | |
| Improve client experience | Increase in customer satisfaction | - | 5% | 10% | • Securely and transparently trace the container's path through the supply chain on the blockchain<br>• Add trust (Immutability and Provenance) around the Bill of Lading and other container paperwork<br>• Automate the transit and shipping process with Smart Contracts reducing cycle times and delays<br>• No reconciliation or matching of documentation with near instant updates - eliminates the need for audit and verification<br>• Removes paper and intermediaries | MAERSK<br>ANO -1<br>ANO -2 |
| | Increase in trade volumes | - | +5% | +15% | | |
| | Cycle times (transit & shipping) | 30 days | 25 days | 10 days | | |
| Reduce transport costs | Waste as % of total shipped | 6% | 5% | 1% | | |
| | Fraud and errors as % of total costs | 5% | 4% | 0.5% | | |
| | Documentation admin. as % of total costs | 20% | 15% | 5% | | |

# Contents

What makes a good blockchain solution?

Examples of good blockchain solutions

How can IBM help?

# Trade Finance for Small and Medium Enterprises

## What?

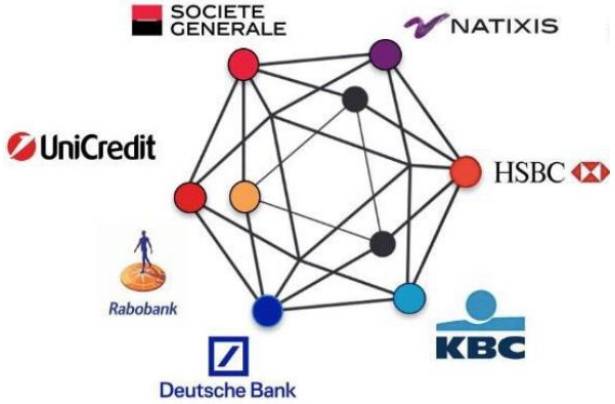
- **Small and medium enterprises** (SMEs) are a traditionally underserved segment in the market, often without access to finance options. According to the World Bank, **50 percent** of SMEs don't have access to formal credit.

## How?

- **Digital Trade Chain (DTC) Consortium** consisting of: Deutsche Bank, HSBC, KBC, Natixis, Rabobank, Societe Generale and Unicredit, have selected IBM to build a **new blockchain network** designed to simplify and facilitate domestic and cross-border trade for SMEs in Europe.

## Benefits

- Simplify trade finance by managing, tracking and securing international trade transactions.
- Gain access to capital
- Increase overall trade transaction transparency
- Reduce risk




# 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.

# Financial Audit and Compliance Ledger

## What?

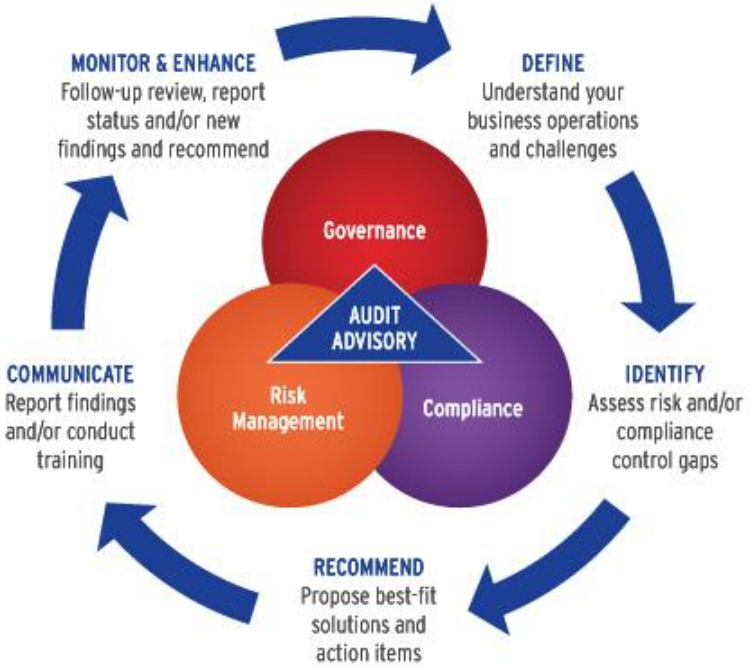
- Reimagine current expensive audit process requiring integrating data – often inconsistent and outdated - from various sources on the blockchain

## How?

- Shared replicated ledger serves as single point of truth
- Auditors are guaranteed that no one has tampered the data via immutability of blockchain

## Benefits

1. Clients, bank and regulators all see single version of truth
2. No data inconsistencies => clear audit trail
3. Enables efficient lower-cost Asset Quality Reviews (AQR)



everledger

# 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?

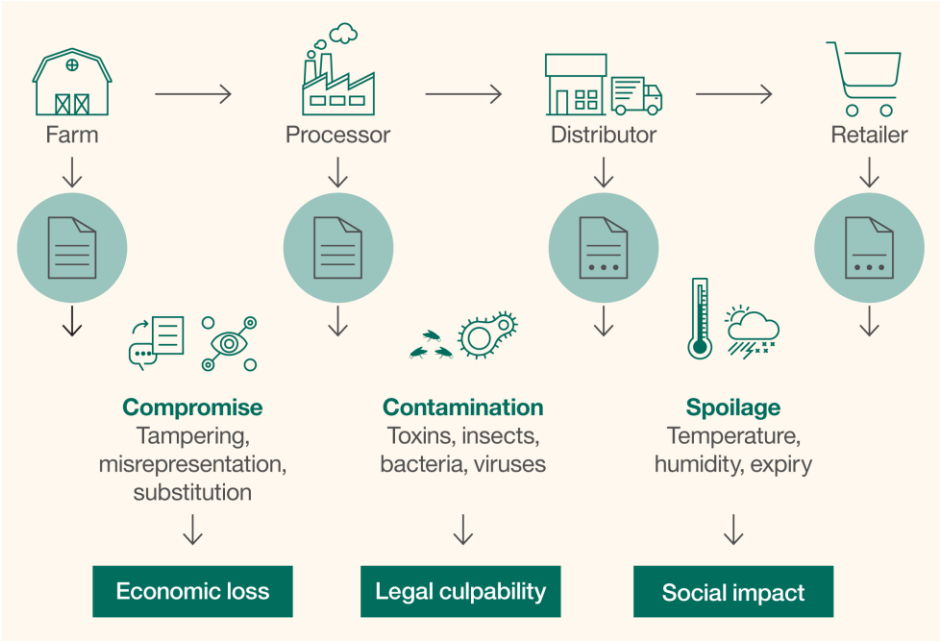
- Traceability of food from “farm to fork”

## 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



# Global Financing: Dispute Resolution

## What?

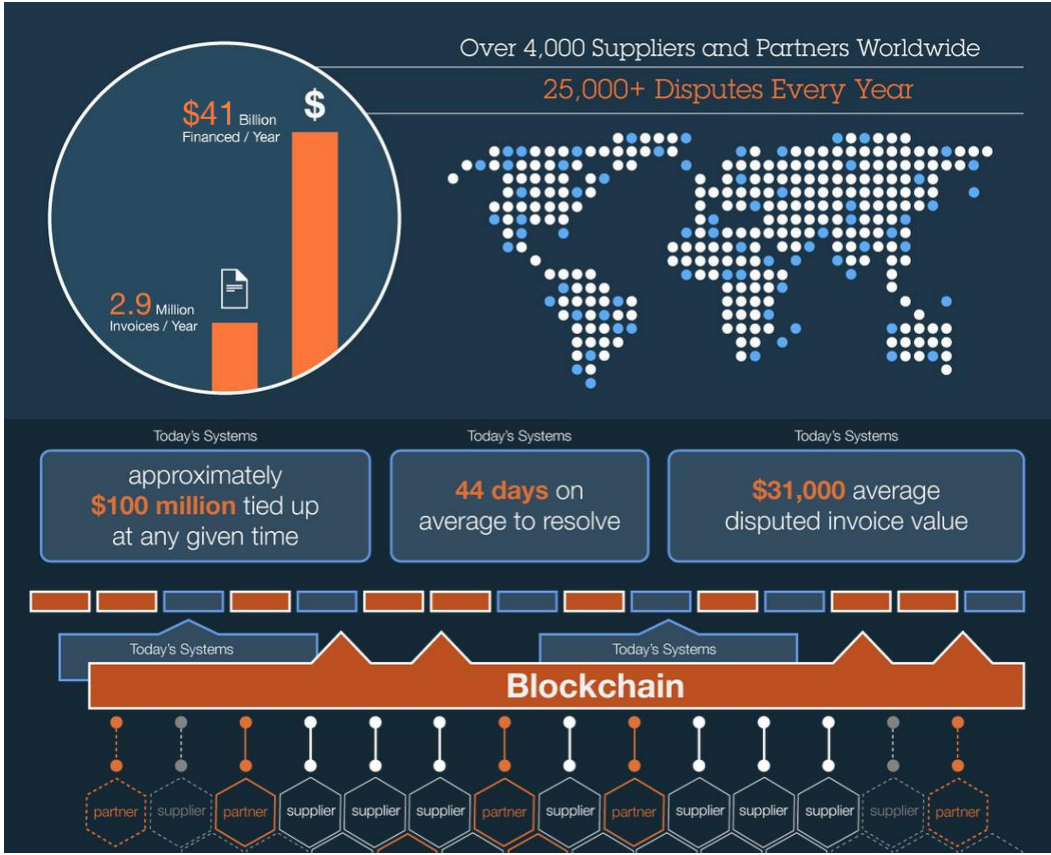
- IBM Global Finance provides a $41bn channel financing per year. There are a number of disputes that take time to resolve and can lock up transactions costing time and money

## 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



# 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.

# Private Equity Administration

## What?

- Infrastructure supporting private equity has seen little innovation in recent years at a time when investors are seeking greater transparency, security and efficiency.

## How?

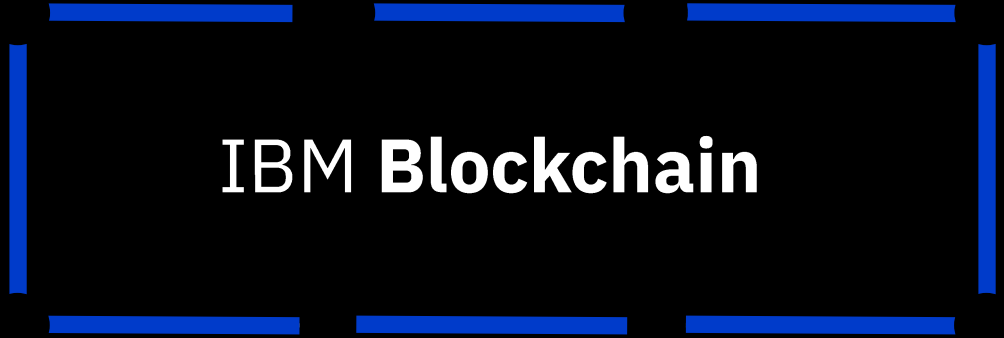
- Creation of an innovative private equity ecosystem designed to deliver increased efficiency, security and transparency.

## Benefits

1. Provides real-time insight and transparency to all parties, including the fund managers and investors.
2. Designed to allow regulatory access as required.
3. Support compliance of local regulations.
4. In production.

# Contents

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




## 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**

# 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 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! Leverage 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 Kubernettes; free and fee options

# 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

### Lifecycle Management

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

### Hardened security stack

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

### 24/7 Technical Support

integrated into the portal for problem resolution

# IBM Blockchain Platform membership plans

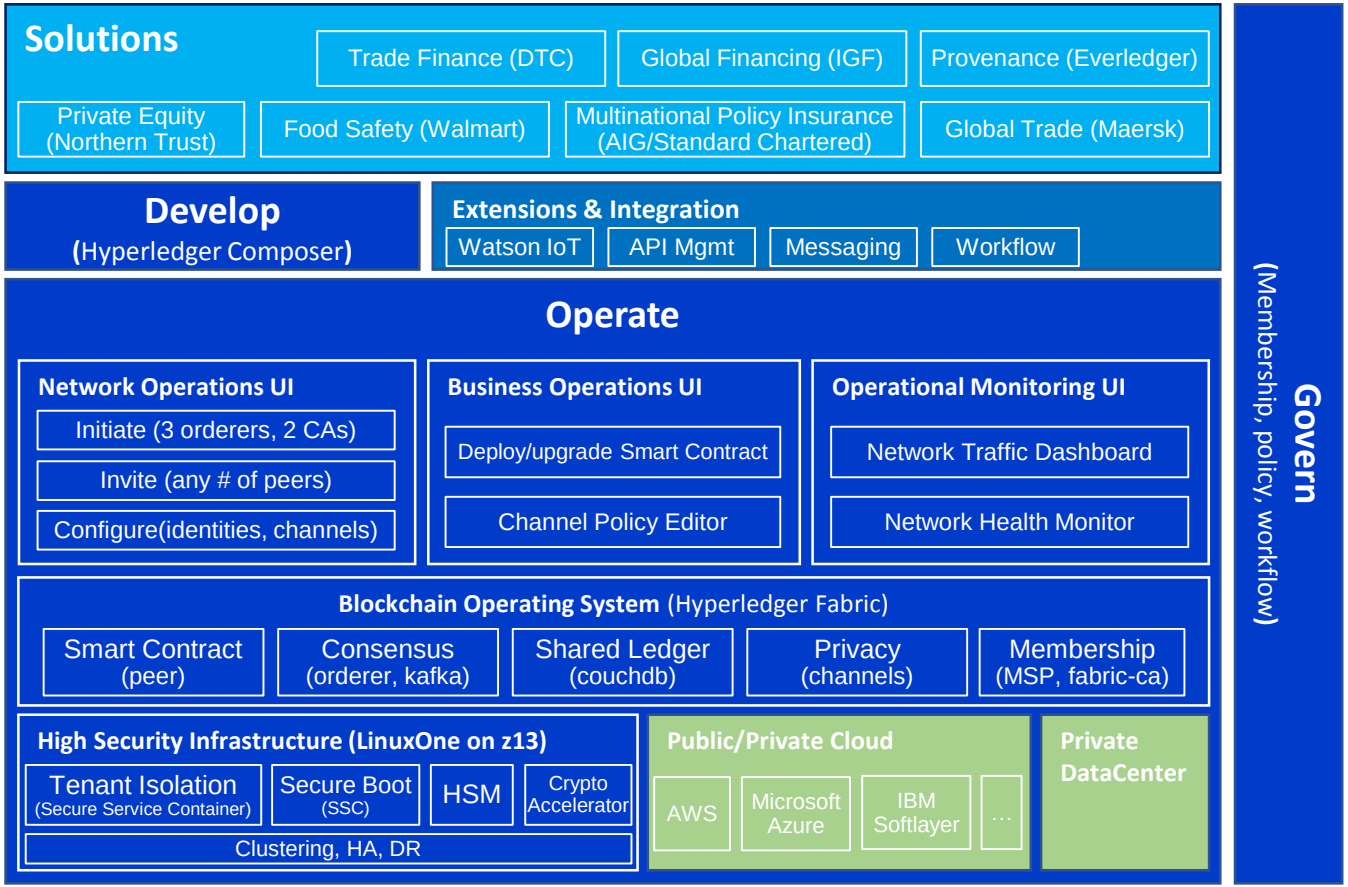
| Plans | Key Features | Availability |
|---|---|---|
| Entry | Hourly charges w/basic services levels | Coming soon |
| **Enterprise** | **Monthly subscription with advanced service levels** | **Available Now** |
| Enterprise Plus | Monthly subscription with the highest performance and isolation for 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 | 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




Included in IBM Blockchain Platform

Supported via IBM Certified Docker Images

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

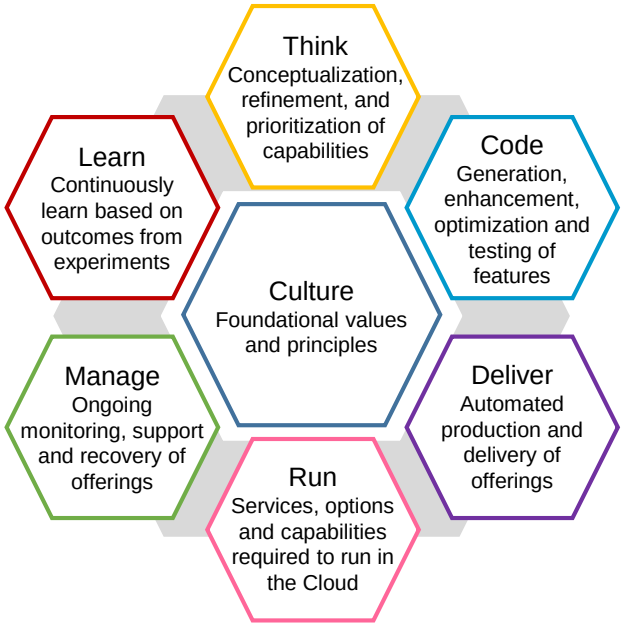
## Culture

- 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

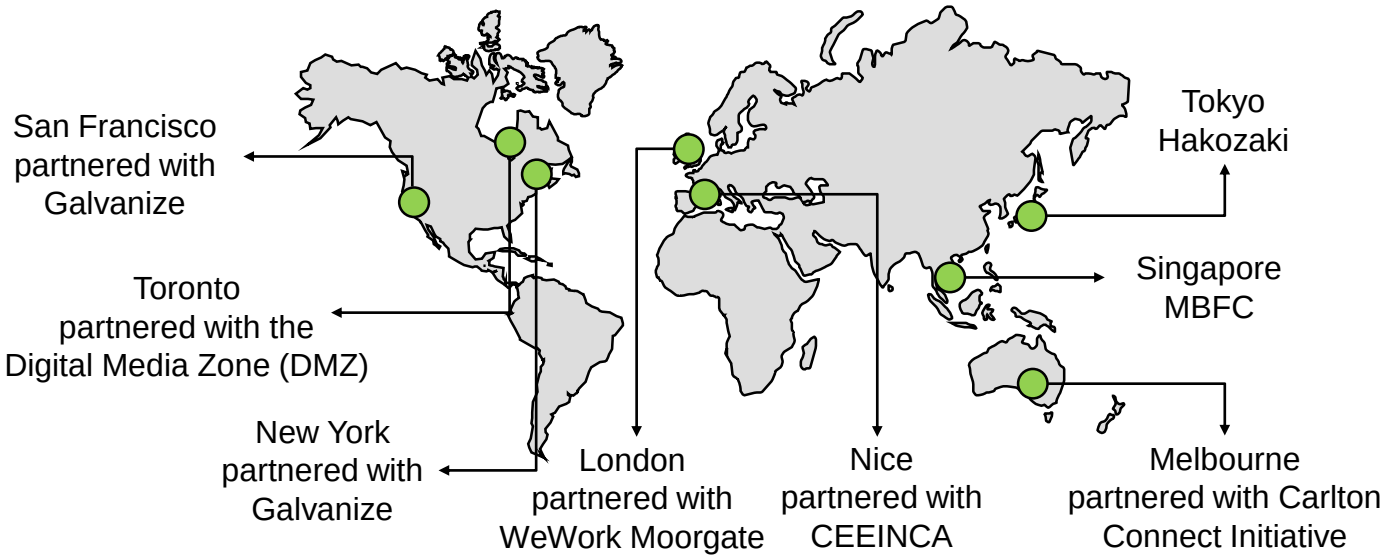
- Business
- Design
- Development
- Deployment

## Technology

IBM Bluemix enables the rapid composition of web and mobile applications with your choice of:

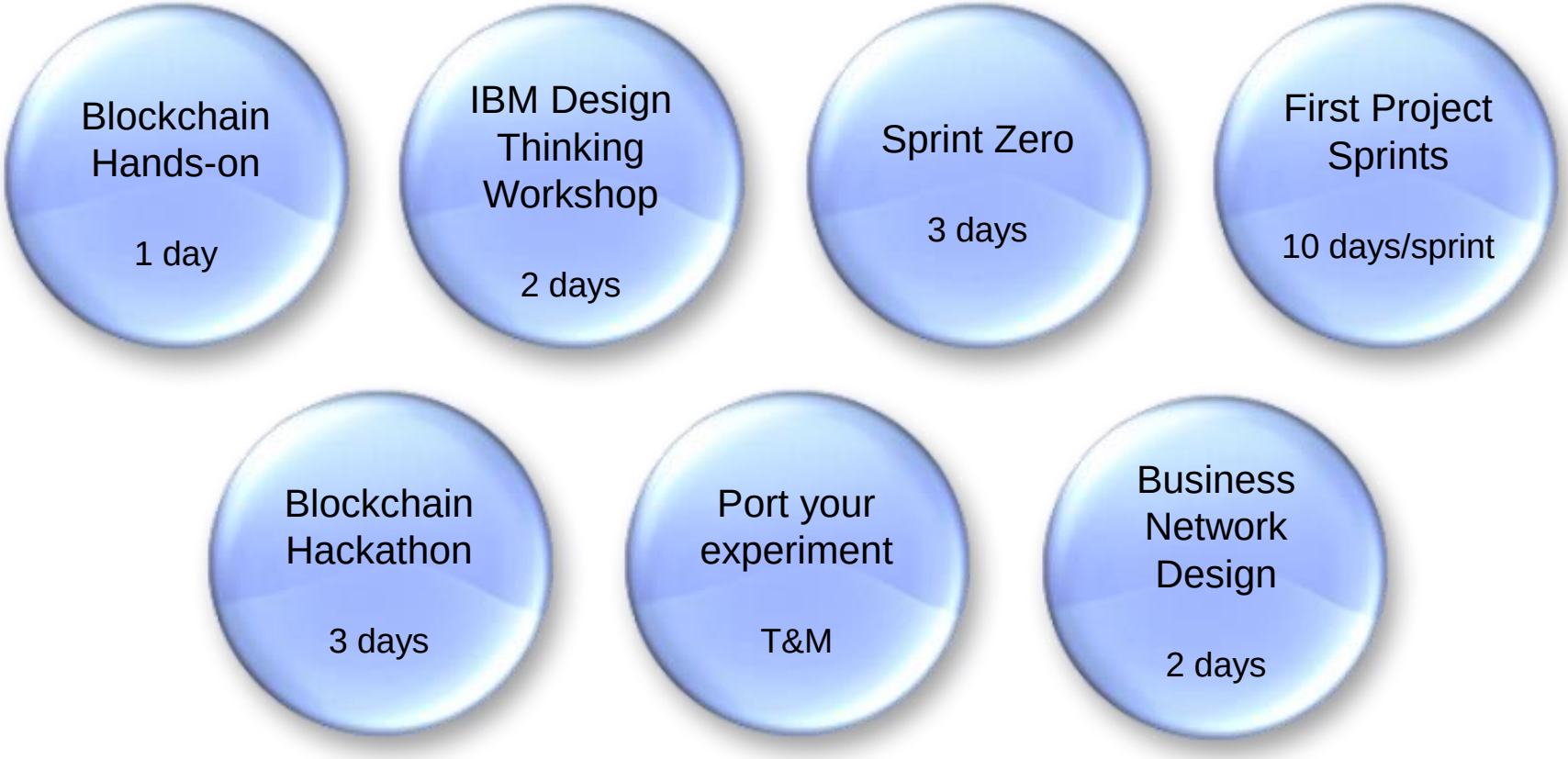
- Compute: Cloud Foundry, Docker, SoftLayer
- Development services
- Tooling
- Integration with your systems

# Where are the garages located?




Or we bring a pop-up garage to you

# IBM Garage: Many Possibilities



# Why 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.

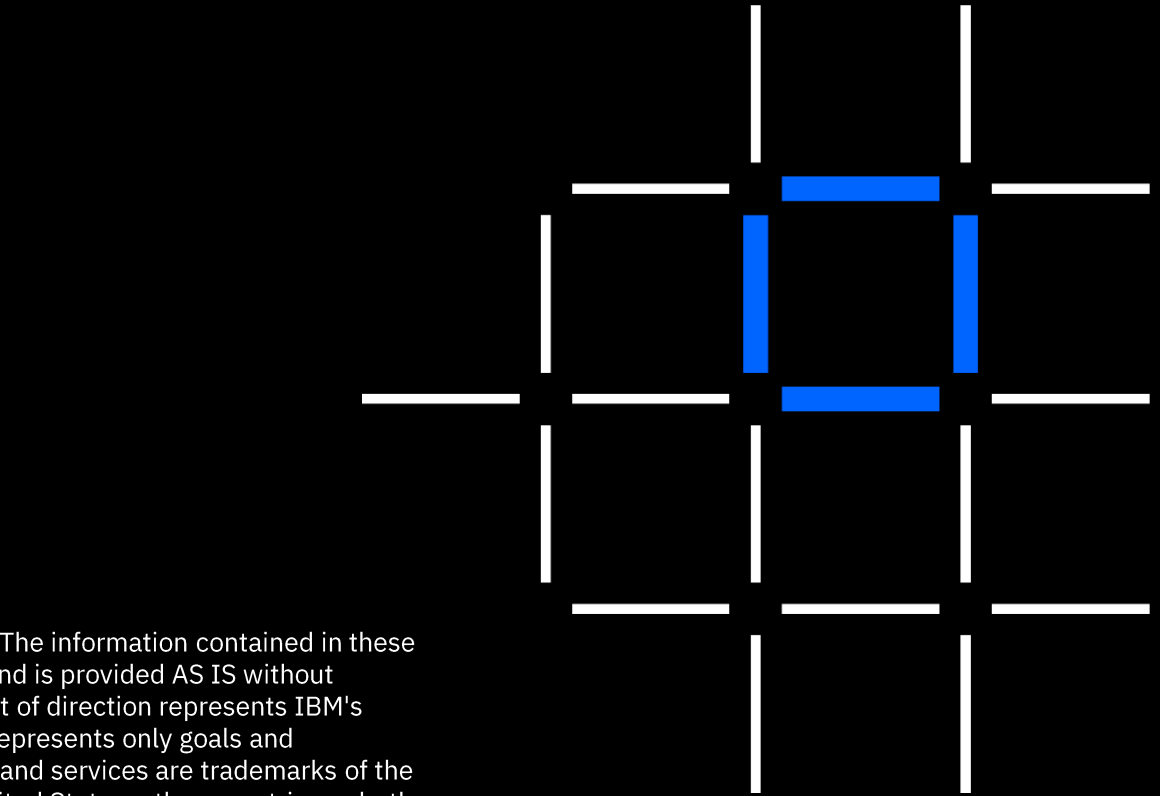
## Modularity and flexibility
Choice of consensus algorithms and programming languages

# Why IBM?

| | |
|---|---|
| Industry Expert | • Hundreds of experienced consultants, researchers and developers<br>• Deep systems integration and middleware experience |
| Secure by Design | • IBM Blockchain High Security Business Network<br>• Dedicated compute, cryptography hardware, tamper-resistant container. |
| Open By Design | • Linux Foundation Hyperledger founding member<br>• Ongoing donation of code, developers and intellectual property to Hyperledger |
| Fast Start | • 400+ clients in engagement pipeline in 2016<br>• IBM Blockchain Garage engagement model to implement MVP rapidly |
| Hyper Scale | • Choice of deployment including on-prem, off-prem, self-managed or *aaS<br>• Supports rapid expansion of initial solution. |

# Thank you

IBM **Blockchain**



www.ibm.com/blockchain

developer.ibm.com/blockchain

www.hyperledger.org



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