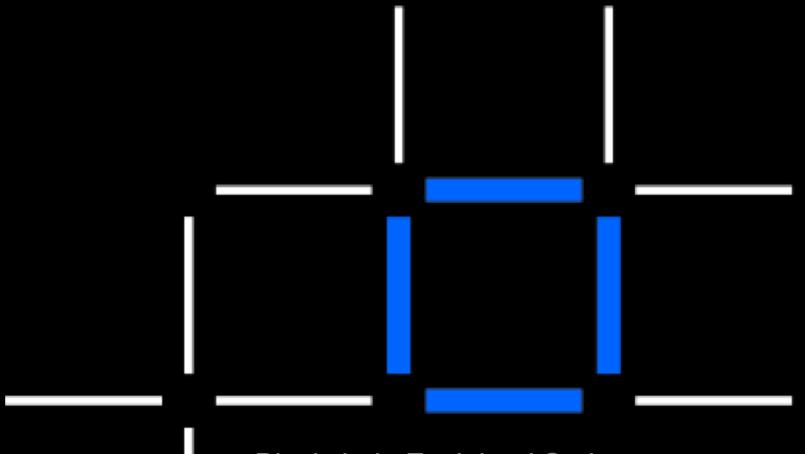


IBM Blockchain Platform Explained

An Introduction to the IBM Blockchain Platform

Austin Grice: Austin.grice@ibm.com
Jin VanStee: jinxiong@us.ibm.com



Blockchain Explained Series

… Blockchain Explained

IBM Blockchain Platform Explained

✓ Solutions Explained

House Garage Explained

🔍 What's New

➔ Next Steps





IBM Blockchain Platform Overview

What you need to know



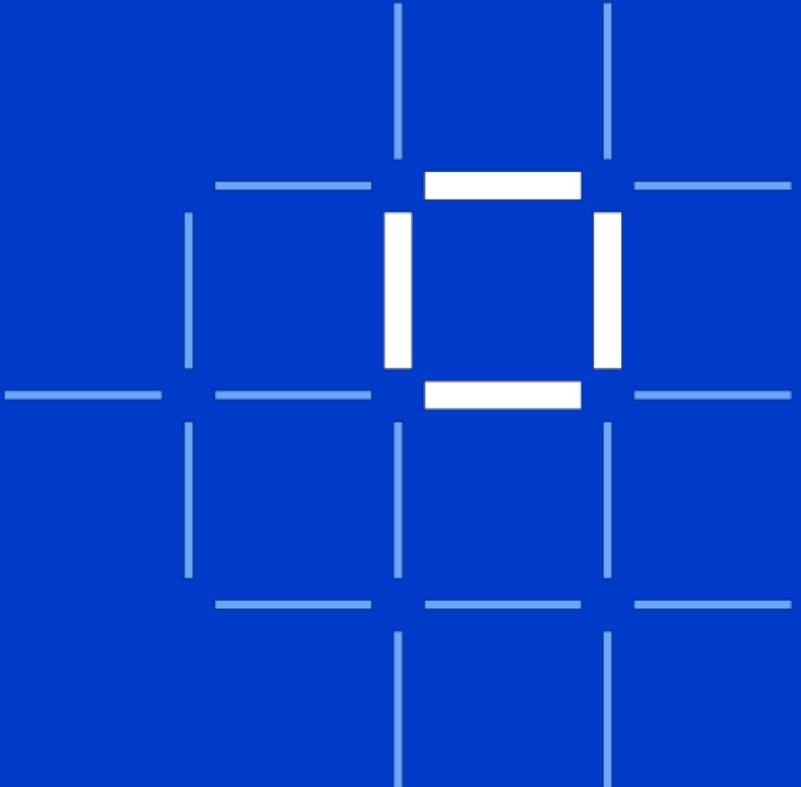
IBM Blockchain Platform for ICP

Flexible deployment options to meet today's needs



Additional Details

The architecture behind IBM Blockchain Platform



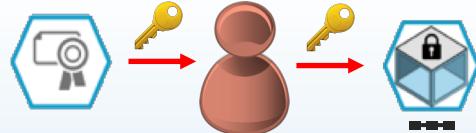
Blockchain Conceptual Recap



Peers are the networked services that maintain ledger state and run smart contracts



Channels are defined subsets of the peer network that share a single ledger



Certificate authorities provide identity services to participants on the network



Smart contracts constitute the transaction logic whose output is agreed by the peer network



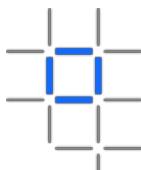
Consensus is the process by which agreement is obtained on the peer network



The **Ordering Service** agrees transaction sequence and distributes blocks to peers

IBM is investing heavily in blockchain

"IBM is clearly regarded as having the strongest credentials in the blockchain sector, well ahead of competitor" – Juniper Research



Our People

24,000+

People enabled through IBM blockchain training

~6000

Practitioners trained at IBM

~3000

Consultants

~2500

Developers

700+

SME's in hiring pipeline

Our Experience

500+

Blockchain Engagements to learn from

35

IBM enabled active business networks

#1

Blockchain Expert (Juniper and HFS)

100+

Years of being a safe and reliable brand

3

Years supporting world's largest networks e.g. LSE

9000+

Patents in 2017

27

Patents in 2017 for BC

IBM Blockchain Strategy

Drive the development of **applications** for specific business use-cases, to be deployed to active **blockchain networks**



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



Platform

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



HYPERLEDGER

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

End-to-end lifecycle coverage



Develop

- Accelerated creation of blockchain applications
- No-charge development and test tools hosted on IBM Cloud
- Based on popular Hyperledger Fabric

Govern

- Activate, customize and change complete blockchain business networks
- Secure democratic governance across organizations
- Implement rules for authorizing network updates

Operate

- Connect, deploy and manage blockchain peers with flexible deployment options
- Production ready, secure and scalable
- Based on Linux Foundation Hyperledger Fabric V1

HACERA's Unbounded Registry

The screenshot shows the Unbounded Registry interface. On the left is a sidebar with icons for navigation, search, filters, and a rocket ship. The main area displays three network cards:

- TRADE LENS**: Powered by HACERA. Description: tradelens. TradeLens is an open and neutral industry platform underpinned by Blockchain technology, supported by... Category: Transportation and Warehousing.
- we-trade**: A blockchain-based trade platform for commercial clients and their banks.
- IBM Food Trust**: From farm to fork, join the food innovators and influencers working together to improve transparency... Category: Supply Chain Management.

The yellow pages for blockchain networks!

- IBM is a founding member of the Unbounded Registry
- Reserved naming for networks, applications and consortiums.
- The discoverability of blockchain networks and applications.
- A catalogue of domain-specific functions and services.
- An independent, open and shared blockchain backed platform to help us all with bootstrapping, launching and growing our communities.
- <https://unbounded.network>



ibmfoodtrust

Hyperledger Fabric

Supply Chain Management

DESCRIPTION

NEWS

IBM Food Trust™ is a collaborative network of growers, processors, wholesalers, distributors, manufacturers, retailers and others enhancing visibility and accountability in each step of the food supply. Powered by the IBM Blockchain Platform, IBM Food Trust directly connects participants through a permissioned, permanent and shared record of food origin details, processing data, shipping details and more.



Your
idea



The Business
Network



Build



Grow



Accelerate



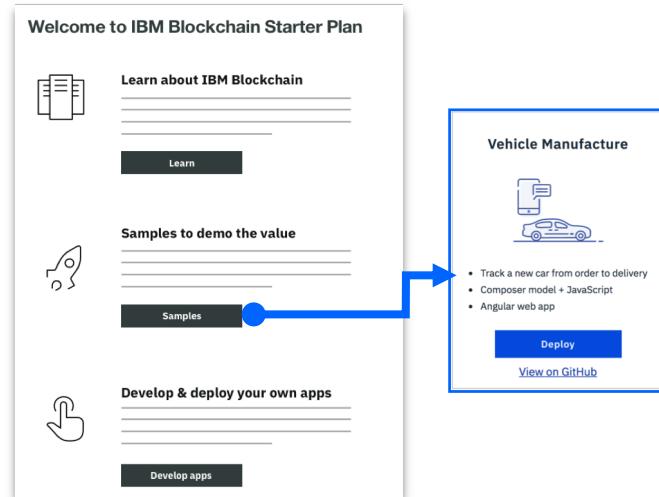
Flexible pricing plans

Plan	Key Features	Deployment
Starter	Easy on-ramp for blockchain-as-a-service	IBM Cloud
Enterprise	Production plan for industries comfortable with cloud	IBM Cloud
Enterprise +	Production plan for regulated industries, multi-region HA/DR and highest performance	IBM Cloud
IBP for ICP	Latest offering to provide IBP in a multi-cloud environment	IBM Cloud Private
Support-only	Supported instances of Hyperledger Fabric running outside IBM Cloud Platform	Docker

Starter Plan

- Get started with IBM Blockchain Platform with **one-click setup and a fully functional network**
 - One-click network configuration, code samples and support for Hyperledger Fabric 1.1
 - Environment enables iterative development prior to production deployment
 - Same experience as Enterprise
 - Uses SOLO ordering for simplified configuration, development and testing
- **Monthly charge of \$500** for two peers
 - \$250 membership fee per month, plus \$125 per peer
 - Receive \$500 in IBM Cloud credits on sign-up

Sign up at
www.ibm.com/blockchain



Enterprise Plan

- Everything in Starter, plus everything you need for a **full production** environment:
 - Fault-tolerant ordering service, added layers of security and premium support
 - Compliance certification: ISO27001, GDPR (coming soon), SOC 2 Type 2 (coming soon)
 - Single-zone HA/DR
- Monthly cost starts at **US\$3000 per organization per network**
 - Assumes two peers for high availability (\$1000 per peer plus \$1000 membership fee)
 - Includes basic blockchain support only; support for services on IBM Cloud is an additional 10%
 - Certificate authorities and access to the ordering service is not chargeable



Enterprise+ Plan

- Enterprise+ Plan is also intended for **production or near-production** scenarios
- Everything in Enterprise, plus:
 - Data isolation
 - Customized compute for scaling performance
 - Multi-zone HA/DR (coming soon)
 - Virtual circuits: VPN access from your data center
- Currently limited availability
 - Contact IBM for pricing information



IBM Blockchain Platform Membership Plans		Starter	Enterprise	Enterprise Plus	IBP for ICP
Suitability					
	MVP	✓	✓	✓	✓
	Pilot & PoC	✓	✓	✓	✓
	Pre-production & Staging	✓	✓	✓	✓
	Production		✓	✓	✓ (1Q19)
Features					
	Deploy and run chaincode	✓	✓	✓	✓
	Hyperledger Fabric features and capabilities	✓	✓	✓	✓
	Multiple org simulation	✓	✓	✓	✓
	Rolling migrations with no network outages	✓	✓	✓	✓
	Low-code interface	✓	✓	✓	✓
	Ability to scale	✓	✓	✓	✓
	Support options	✓	✓	✓	✓
	Fault tolerant ordering service		✓	✓	✓
	Cryptographic Acceleration		✓	✓	n/a
	HSM Available		✓	✓	TBD
	Advanced Secure container technology		✓	✓	n/a
	Isolated Compute Environment			✓	✓
	Multi-Geo/Site DR			✓	✓

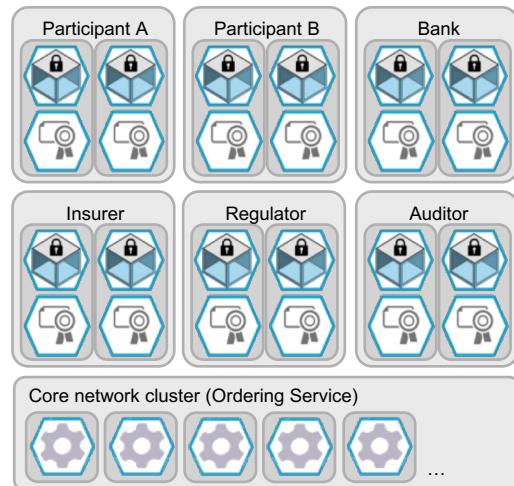
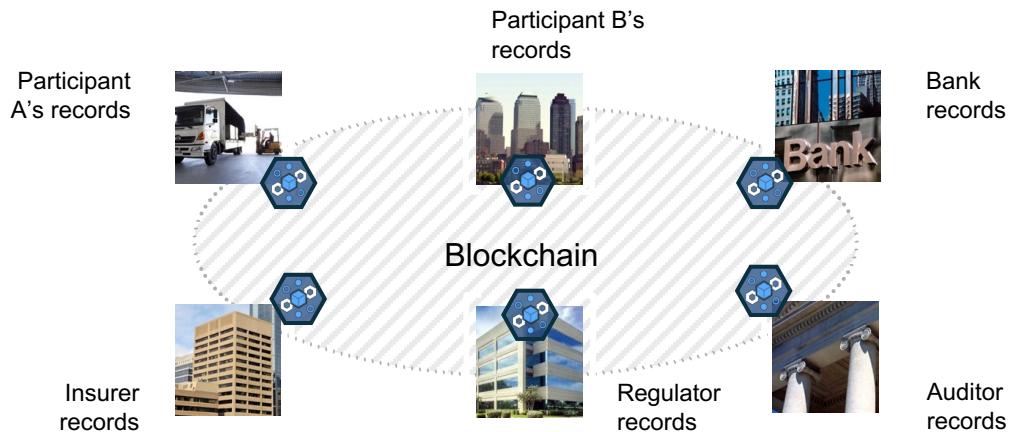
Support-only Plans

- Looking for **IBM support on Hyperledger Fabric?**
 - IBM produces signed Hyperledger Fabric images which can be supported for production usage outside of IBM Cloud
 - Available for LinuxONE (IBM Z), Power and x86 architectures
 - Subscription term one year
- **Elite tier (5737-E89/DV13ALL)**
 - Supported 24x7x365; response target within 2 business hours
 - Multiple technical contacts and developer assistance
 - Yearly cost \$24,000 per peer
- **Entry tier (5737-E90/DV13BLL)**
 - Support hours Monday – Friday 8am-5pm local time; response target within 8 business hours
 - Single technical contact
 - Yearly cost \$6,000 per peer

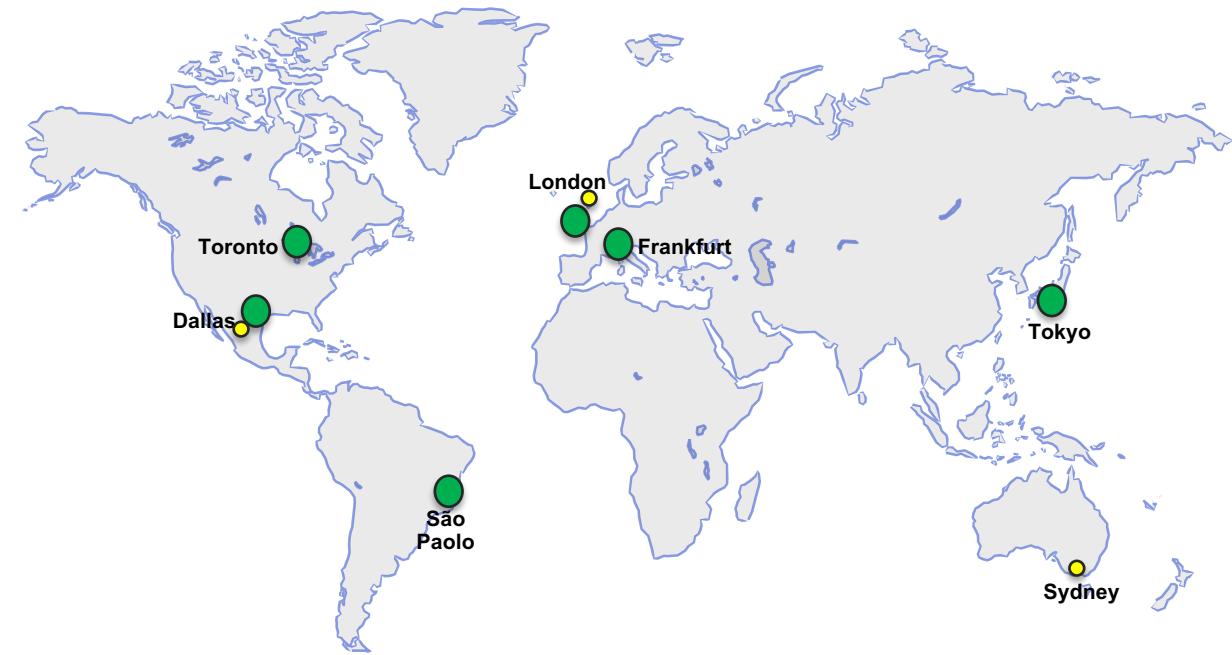


Example Network

- Consider an in-production blockchain business network comprising multiple organizations running Enterprise Plan on IBM Cloud
 - Each organization has two peers and two certificate authorities
 - Blockchain cost per organization (two peers + membership fee) = US\$3000 per month
 - Support for IBM Cloud services @10% = US\$300
 - Cost for one year per organization = $12 \times \text{US\$3300} = \text{US\$39600}$



IBM Blockchain Platform Sites



- IBM Blockchain Platform Enterprise plan is hosted in multiple sites to help you satisfy data residency requirements

- IBM Blockchain Platform Starter plan is also hosted worldwide, to get you going quickly

Complemented by a set of IBM Blockchain Garages for hands-on assistance getting started with IBM Blockchain Platform



IBM Blockchain Platform Overview

What you need to know



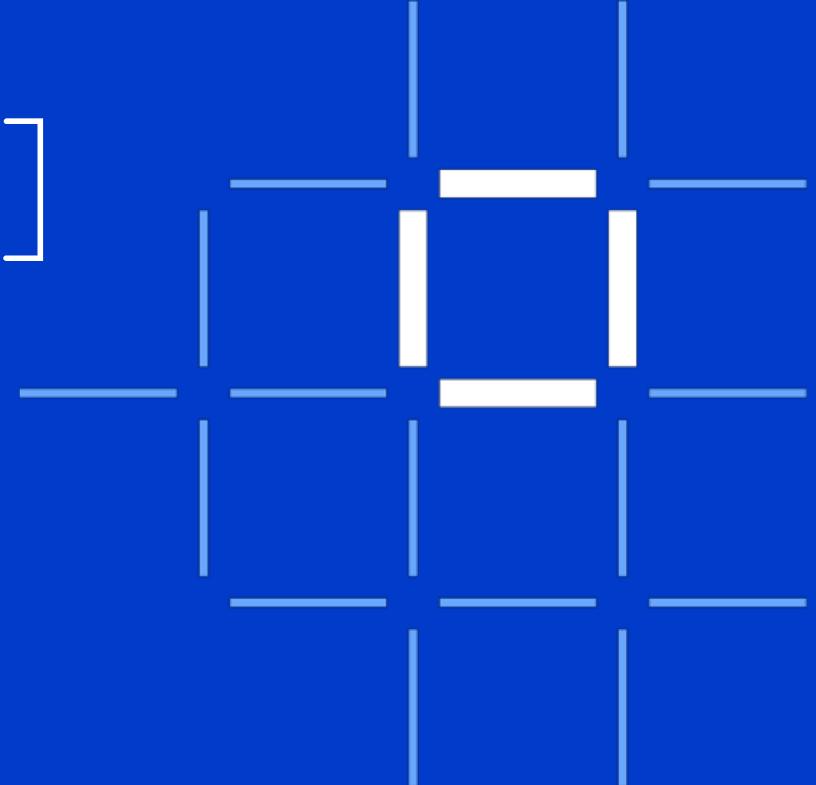
IBM Blockchain Platform for ICP

Flexible deployment options to meet today's needs



Additional Details

The architecture behind IBM Blockchain Platform



Blockchain technology adoption and IBM Blockchain Platform momentum continues

IBM were ranked as the go-to firm when it comes to blockchain deployment. 65 percent of respondents ranked them as the first choice for deploying a blockchain. Microsoft was second to IBM, with just 7 percent of the votes.

IBM has won the 2018 Blockchain Platform award at the Juniper Research blockchain awards event.

Source:<https://thenextweb.com/hardfork/2018/09/14/juniper-research-blockchain-deployment/>

74%
believe there is
a compelling
business case

68% said
they would lose
competitive
advantage if they
don't adopt

90% of NA
and EU banks are
exploring
blockchain

What do customers need to scale blockchain?

Choice & Control

It's a Multi-Cloud World

The multi-cloud era has arrived. Today, 8 out of 10 businesses rely on multiple clouds to meet their IT needs, with 71 percent using more than three

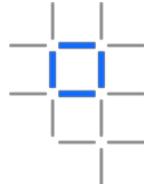
Data Control

Increasing regulations (e.g. GDPR) and privacy concerns impact how and where data is stored within a blockchain network

Blockchain = Distributed Ledger

Growing networks need to have the ability to address the data hosting requirements of their members in order to recruit and scale

Evolving our platform to provide all the flexibility needed to build, deploy, govern and grow networks



IBM Blockchain Platform

One Platform Experience

Cost varies

In an effort to simplify our offerings, all IBP plans will be consolidated into a single IBM Blockchain Platform offering, which clients can deploy on an environment of their choice as well as customize key features.

- IBM Blockchain Platform
- Ordering Service
- Certificate Authority
- IBM Cloud Deployment
- Choice of Deployment



SaaS

Full Network

Deployed on IBM Cloud



For clients without specific deployment requirements, our IBP offering deployed on the IBM Cloud.

Use: Dev/ Test and Production
Infrastructure: Pre-defined by IBM Cloud
Configuration: Default with optionality
Software lifecycle: IBM

Software - Multi Cloud

Distributed Peer

Peers Deployed on Choice Environment



For clients that require greater deployment flexibility, they can deploy peers on an environment of their choice, while deploying other components on the IBM Cloud.

Use: Dev/test and production
Infrastructure: on-premises, AWS;
IBP Infrastructure: IBM Cloud with custom options
Configuration: Default with optionality
Software lifecycle: IBM manages IBP & associated components, Client manages the Peer

Full Network

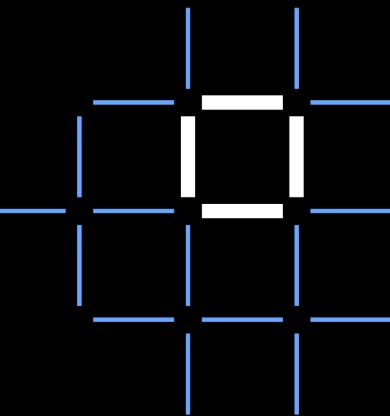
IBP & Components Deployed on Choice Environment



For clients that require the solution run entirely on their infrastructure, they can license the full IBM Blockchain Platform with each of the components.

Use: Dev/ test and production
Infrastructure: Client owned & managed
Configuration: Client managed
Software lifecycle: Client managed (compatibility guidelines apply)

You can now run
IBM Blockchain
Platform ***Anywhere***



Self—Managed

Private Cloud for on-premises and public cloud deployments of Hyperledger Fabric networks



Hybrid—Deployment

Deploy individual components (peers) locally within your own Private Cloud or directly through AWS and have the broader network hosted in IBM Cloud



IBM Managed

IBM hosts it for you through its IBM Cloud services



Starter Plan
Enterprise Plan

What is IBP for ICP?

The only Enterprise - grade multi-cloud blockchain platform with on - premises capabilities.
Available on the most securable, scalable, and reliable server hardware platform.

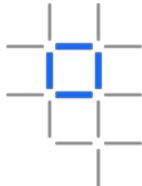
A detailed set of configuration patterns and documentation guidelines enabling a faster and easier deployment of Hyperledger Fabric on Kubernetes that can be deployed to any ICP supported environment including bare metal, on-premises virtualization and public cloud platforms.

Operational tools enabling administrators to manage, monitor and govern their nodes across any deployment.

Out-of-the box IBM Cloud Private capabilities including management console, logging and monitoring frameworks.

Dedicated support through IBM Blockchain experts. This support provides the opportunity to submit tickets for all severity levels, with Sev1 support 24x7x365.

One product... multiple deployment patterns



	SaaS + Distributed Peer	Full Fabric Network on ICP
Scope	Running a peer in a non-IBM Cloud environment that can connect back to an IBP network	Enables you to run Hyperledger Fabric components: the Ordering Service, Certificate Authority and Peer on Kubernetes through the deployment of Helm Charts for these components.
Component	Peer	Peer Ordering Service (Solo) CA (Single)
Infrastructure	IBM Cloud Private (Linux 64-bit & IBM Z/LinuxOne)	

Why ICP for ICP?

- **Data Residency & Privacy:** Enabling customers to store a copy of their ledger in their own infrastructure, behind their firewall, without leaving the country
- **Infrastructure Flexibility:** Enables organizations to work with their infrastructure of choice without being locked into a single vendor
- **Plan for Growth:** Attract and cater to new network members with flexible deployment options



IBM Blockchain Platform Overview

What you need to know



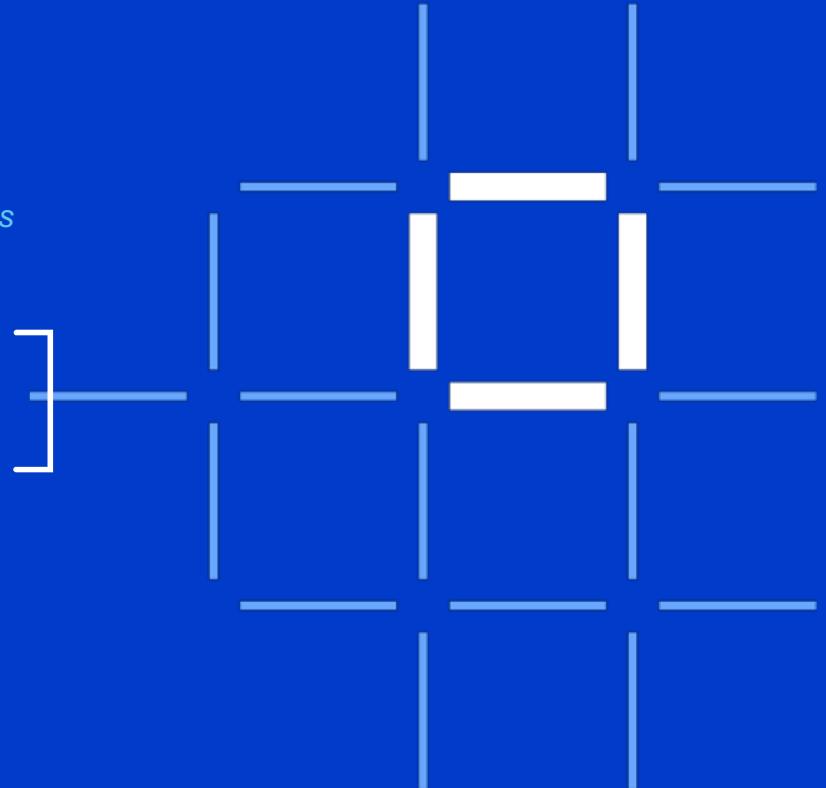
IBM Blockchain Platform for ICP

Flexible deployment options to meet today's needs

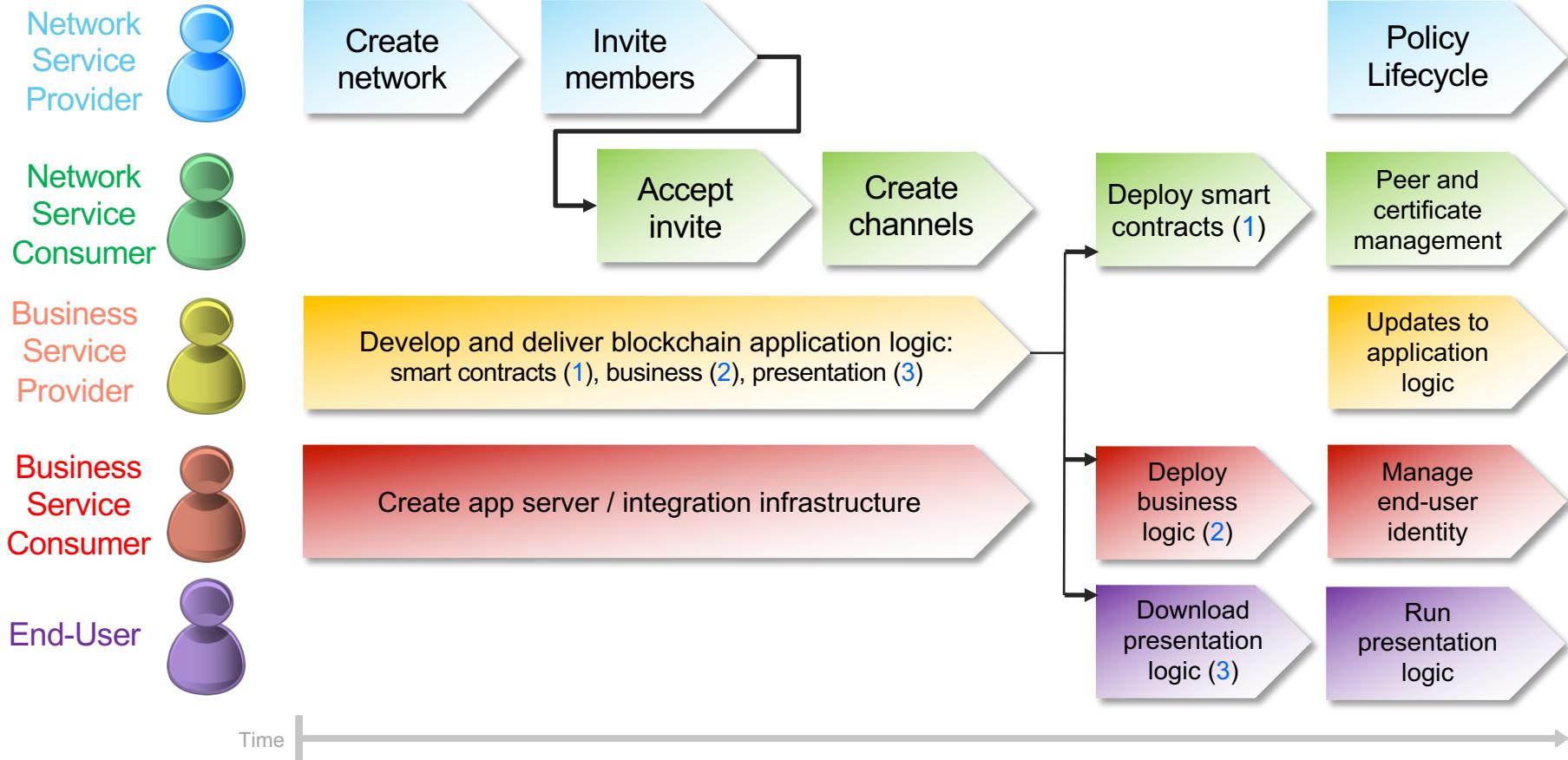


Additional Details

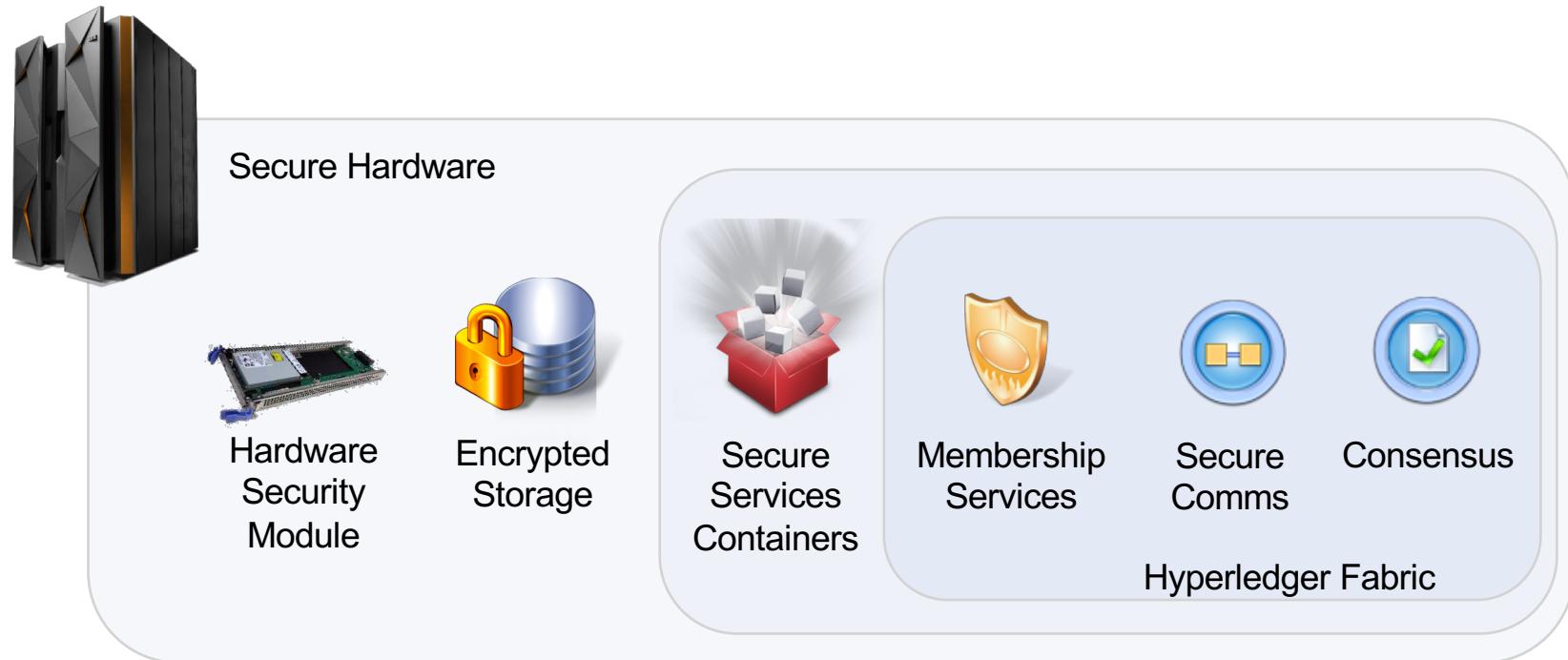
The architecture behind IBM Blockchain Platform



Workflow for Network Formation



Security is implemented at each layer of the architecture



Security is implemented at each layer of the architecture

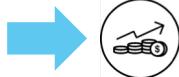
- Hyperledger Fabric
 - Membership Services: Organizations are invited to join and authenticated using an Enrollment Certificate
 - Transaction Consensus: Each transaction is endorsed and validated by multiple peers before committing to the ledger
 - Controlled Ledger Access: Channels restrict transactions to a set of organizations that are shared on the ledger
 - Secure Communications: Between the end-user application and smart contract is secure
 - Extensive security scans and audits performed by IBM, and independently by IBM and Linux Foundation sponsored 3rd-party penetration testing and code audits
- Secure Service Containers
 - Secure appliance framework providing infrastructure services encapsulating the Hyperledger Fabric
 - No root access: Access system and software only through API's; even trusted administrators
 - Impervious to the injection of malware: Installed from encrypted, signed boot image
 - Data Privacy: Encryption of data in flight and at rest on the ledger
- Secure Performant Hardware
 - Hardware Security Module (HSM) is certified to FIPS 140-2 level 4
 - Fastest cryptographic acceleration: used by block hashing and digital signatures

Continuing your blockchain journey...



Business Stakeholder

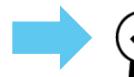
- Request a Blockchain Value Design from IBM
- Prove out technology with a first project



Blockchain BVD

Solution Architect

- Learn about blockchain use-cases and references
- Understand blockchain solution best practices



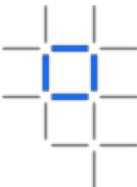
Solutions Explained

Developer

- Learn about IBM Blockchain Platform and Hyperledger
- Play with IBM Blockchain Platform Starter Edition



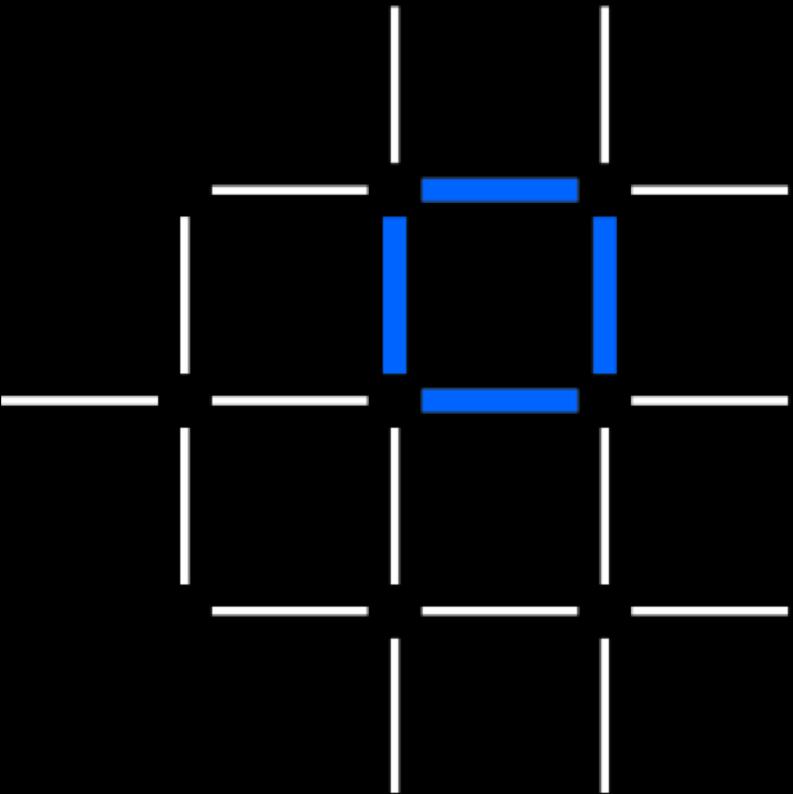
IBM Blockchain Platform Explored



Further information

- Platform Information
 - <https://www.ibm.com/blockchain/platform/>
- Technical Overview
 - https://www-01.ibm.com/marketing/iwm/dre/signup?source=urx-20950&S_PKG=ov61731
- Platform Service
 - <https://console.bluemix.net/catalog/services/blockchain>
- Platform Service Level Agreement
 - [http://www-03.ibm.com/software/sla/sladb.nsf/pdf/6605-12/\\$file/i126-6605-12_11-2017_en_US.pdf](http://www-03.ibm.com/software/sla/sladb.nsf/pdf/6605-12/$file/i126-6605-12_11-2017_en_US.pdf)
- ISO Certification
 - https://www-935.ibm.com/services/multimedia/saas_27k.pdf
 - https://www-935.ibm.com/services/us/en/it-services/pdf/ibmcloud_27017.pdf
 - https://www-935.ibm.com/services/multimedia/ibmcloud_27018.pdf

Thank you



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

 @IBMBlockchain

 IBM Blockchain

 IBM Blockchain



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