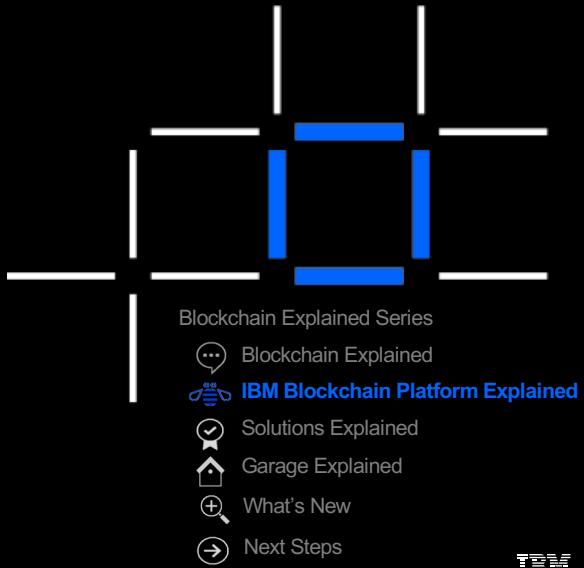


IBM Blockchain Platform Explained

An Introduction to the IBM Blockchain Platform

V1.18, 12 February 2019

IBM Blockchain



IBM Blockchain Platform 2.0 Overview

What you need to know



Getting Started

The tools to make your blockchain real



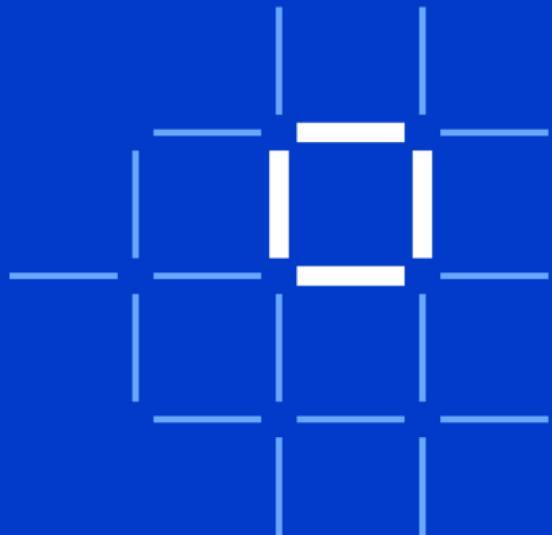
Roadmap

IBM's blockchain strategy and where the platform is going



Architecture

The architecture behind IBM Blockchain Platform



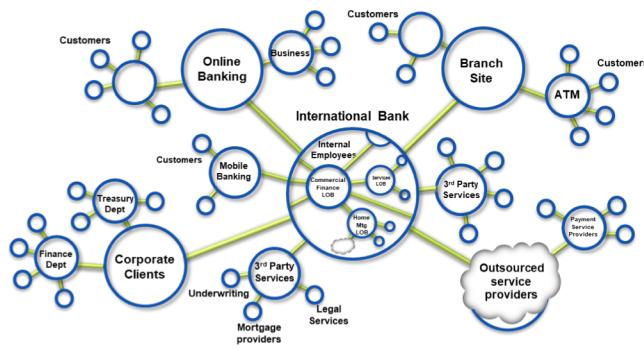
IBM Blockchain

IBM

Blockchain Recap

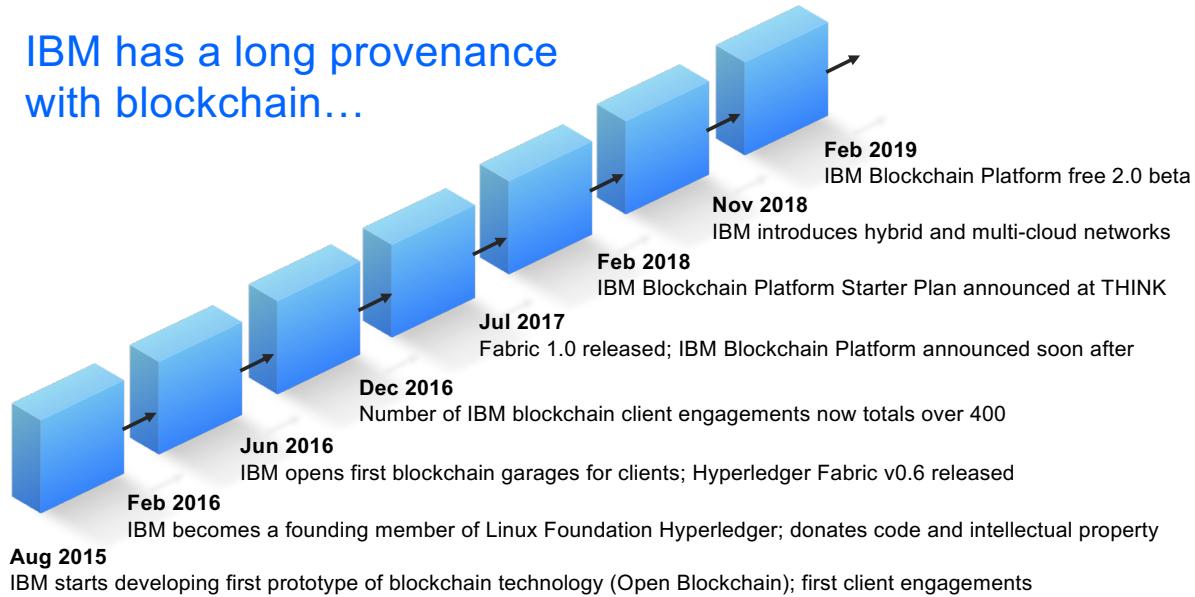
- **Blockchain** is a shared, replicated ledger
 - Permissioned blockchains bring trust to business networks through consensus, provenance, immutability and finality

- **Linux Foundation Hyperledger** is a collaborative effort created to advance cross-industry blockchain technologies for business
 - Hyperledger **Fabric** is a blockchain providing implementation of a ledger, smart contracts, privacy, consensus and a client side SDK



3

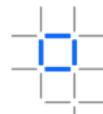
IBM has a long provenance with blockchain...



4

IBM is investing heavily in blockchain

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



Our People

Our Experience

Reducing Your Risk

60,000+

People enabled through IBM blockchain training

500+

Blockchain Engagements to learn from

#1

Analyst Research (Juniper and Everest)

~5,000

Trained Consultants

~3,000

Trained Developers

108

IBM enabled live consortiums

100+

Years of being a safe and reliable brand

700+

SME's in hiring pipeline

>\$30M

investment into community code development (\$10M per year)

9,000+

Patents in 2017

27

Patents in 2017 for BC

IBM Blockchain

IBM

5

IBM Blockchain Strategy

Drive the development of **applications** for specific business use-cases, to be deployed to active **hybrid multi-cloud 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 hybrid multi-cloud enterprise blockchain networks with speed and security



HYPERLEDGER

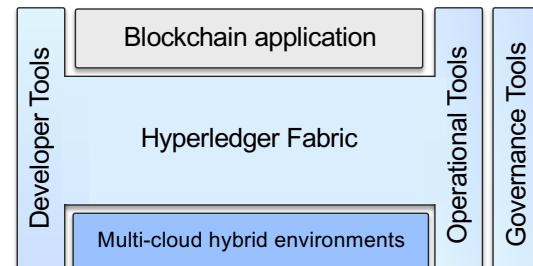
A founding, premier member of Hyperledger, IBM is committed to open source, standards & governance

6

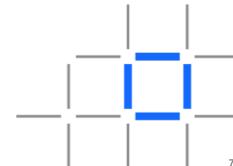
Introducing the IBM Blockchain Platform

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

- **Developer tools** that enable you 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 IBM Cloud Private (ICP), AWS and a highly secure and performant **IBM Cloud** environment



http://ibm.biz/Platform_Demo



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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

8

IBM Blockchain Platform Deployment Options

We enable businesses to create, run and manage multi-platform, multi-cloud blockchain networks at scale

SaaS
IBM-managed infrastructure that is the simplest way to build blockchain solutions without vendor lock-in where you only pay for what you use.

Software
Self-managed way for an organization to set up, operate and grow blockchain applications on their infrastructure of choice

IBM Blockchain

The evolution of the IBM Blockchain Platform

IBM Blockchain Platform v1

- Starter Plan (SaaS)
- Enterprise Plan (SaaS)
- Enterprise Plus (SaaS)

IBM Blockchain Platform v2

- IBM Blockchain Platform for Multi-cloud (Software)
- IBM Blockchain Platform for IBM Cloud Private
- IBM Blockchain Platform for AWS
- (New!) IBM Blockchain Platform free 2.0 Beta (SaaS)

IBM Blockchain

Why IBM Blockchain Platform 2.0?

IBP Anywhere! *The ultimate in choice & control for your blockchain network*

Build your network faster and easier within a seamless experience

- Smooth integration between smart contract development (VS Code) and network management
- Simplified DevOps allows you easily move from development to test to production from a single console
- Support for writing smart contracts in Javascript, Java, and Go languages

Operate and govern networks with total control

- Deploy only the blockchain components you need (Peer, Ordering Service, Certificate Authority)
- Redesigned console lets you manage network components in one place, no matter where they are deployed
- Maintain complete control of your identities, ledger, and smart contracts

Grow distributed networks with ease with newly enabled multi-cloud flexibility

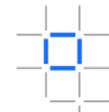
- Connect to nodes running in any environment (on-premises, public, hybrid clouds)
- Easily connect a single peer to multiple industry networks
- Start small, pay as you grow for what you use with no upfront investment and upgrade easily through Kubernetes

IBM Blockchain

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What's new?

More visual, more choice, & more flexibility with better tools and scalable pricing



Flexibility to do what you want, where you want

- Access UI via IBM Cloud or on-premises (ICP)
- Self- Managed: Private Cloud for on-premises and public cloud deployments of Hyperledger Fabric networks
- Hybrid Deployment: Deploy individual components within your own Private Cloud or AWS and have the network hosted in IBM Cloud
- IBM – Managed: IBM hosts for you through IBM Cloud services
- Your network component visualized

Performance and expertise to help you scale

- Non-disruptive Fabric upgrades
- 99.995% availability, designed for production
- Disaster Recovery
- Single and multi-zone HA
- IBM created and open-sourced Hyperledger Fabric
- The only formal commercial support offering for Hyperledger Fabric
- Hundreds of networks

Tools to help you get started and manage

- Simple SDK for smart contract and application development
- IBM Blockchain Platform IDE
- Management of Peers (Cloud, on-premises, multi-cloud), Ordering Service (Solo, Kafka, Raft), CA, Channels, Identity
- Node-level logs
- API access to UI capabilities
- Quick start template and samples for development
- Management & Governance tooling

IBM Blockchain

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IBM Blockchain Platform 2.0 (beta)

- Infrastructure is provisioned separately using Kubernetes
 - Scaling and flexibility
 - More availability zones and disaster recovery when using the IBM Kubernetes Service
 - Hybrid networks (post beta) using IBM Cloud Private (on-premises and other cloud providers)
 - New administration and governance UI
- New pricing structure (TBA)
- New IBM Blockchain Developer VSCode IDE
- Enterprise Grade:
 - Easy migration of networks from test to prod
 - Non-disruptive upgrades
 - 99.995% availability

The next generation

Provision the next generation of hybrid blockchain networks

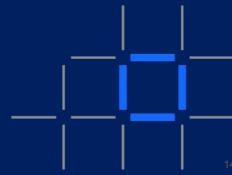


The easiest way to get started

13

IBM Blockchain Platform 2.0 capabilities checklist

- ✓ Easily create smart contracts and client applications using VSCode
- ✓ Console UI to create, manage and grow hybrid multi-cloud networks
- ✓ Customer is custodian of all private keys and certificates
- ✓ Support for rolling migrations
- ✓ Support for single and multi-zone HA
- ✓ 99.995% availability
- ✓ Integration with IBM Logging Service
- ✓ Integration with IBM Operational Metrics Service
- ✓ Governance using IBM Blockchain Platform Console UI
- ✓ Easy migration and management across dev, test and prod environments
- ✓ Support for advanced features such as: Service Discovery, Gossip and Private Data Collections
- ✓ Beta based on Fabric 1.4 LTS

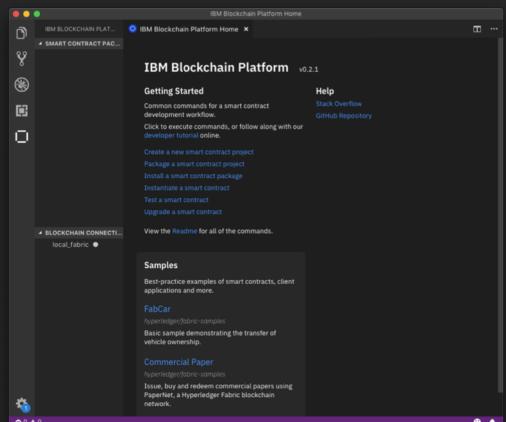


IBM Blockchain Platform VSCode Extension

- Free IBM Blockchain Platform Open-Sourced Extension built on Hyperledger Fabric
- Consumed through VSCode, an industry-leading source code editor
- What can a developer do with it?
 - Generate a skeleton smart contract
 - Develop smart contracts
 - Package up a smart contract
 - Connect to any Fabric runtime
 - Install and Instantiate smart contract packages
 - Test and debug smart contracts
 - Pull down and modify Fabric samples from Github
- Available from:
 - <https://marketplace.visualstudio.com/items?itemName=IBMBlockchain.ibm-blockchain-platform>

Develop

Provision the next generation developer tools



The easiest way to build

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Welcome to the new IBM Blockchain Platform Developer Experience!

The latest versions of the IBM Blockchain Platform and Hyperledger Fabric hail a new era of capabilities that bring simplicity, speed, and value to the blockchain developer community.

Hyperledger Fabric Features and Updates

Now Available in Fabric 1.4:

A simple SDK for smart contract and application development

- [FAB-11246](#) allows developers to focus on the smart contract logic that describes their business transactions.
- [FABN-692](#) delivers a new high-level API that cuts the amount of application code required to invoke a smart contract by 90%.
- [FAB-12071](#) enables developers to seamlessly discover and exploit ever-changing networks without application change, making them more responsive and easier to scale.

IBM Blockchain Platform Developer Tools

Now Available:

IBM Blockchain Platform IDE

- The IBM Blockchain Platform VSCode Extension enables you to discover, code, test, debug, package, deploy, and publish smart contracts and applications using a single tool.

Hyperledger Fabric and IBM Blockchain Platform Samples & Tutorials

Now Available:

Hyperledger Fabric Samples

- Fabcar
- Commercial Paper

IBM Blockchain Platform Tutorials and Patterns

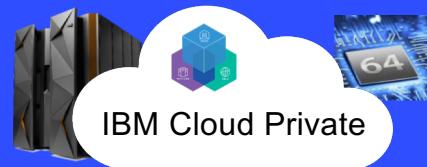
- Commercial paper with the IBM Blockchain VSCode extension
- Smart contract with the IBM Blockchain Platform VSCode extension
- Global finance blockchain application VS Code extension

IBM Blockchain Platform for IBM Cloud Private

- Deploy a distributed peer or the entire network to an environment of your choice
 - Supports **data residency, regulation** and **compliance** requirements
 - Currently includes single instances of orderers/CAs
- IBM Blockchain Platform distributed peers on IBM Cloud Private (ICP) leverage the ordering service and certificate authorities running on IBM Cloud
- Pricing is Virtual Processor Core (VPC) based
- Free-of-charge Community Edition version available for evaluation, includes forum based support.
- ICP info:
 - http://www-01.ibm.com/common/ssi>ShowDoc.wss?docURL=/common/ssi/repo_ca/1/897/ENUS218-441/index.html&request_locale=en
 - https://console.bluemix.net/docs/services/blockchain/howto/remote_peer.html

Self Managed

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



IBM Cloud Private

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.

IBM Blockchain Platform for AWS

- Deploy a distributed peer in 10-15 minutes using AWS quick start templates
 - Supports **data residency, regulation** and **compliance** requirements
- Distributed peers on AWS leverage the ordering service and certificate authorities running on IBM Cloud
- Offered as a free-of-charge non-production Community Edition. User pays only for the AWS resources utilized by the distributed peer and IBM Blockchain Platform (IBP) membership.
- Support provided by the IBP resource and support forums
- Available now!

<https://aws.amazon.com/quickstart/architecture/ibm-blockchain-platform/>

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



Running a peer in a non-IBM Cloud environment that can connect back to an IBP network

What makes IBM unique?



We pioneered blockchain for business

'We invented blockchain for business' and coded it from the ground up. We committed code which lead to HL Fabric and are continuing our contribution.

We offer a full and flexible stack

We are the only full stack player – investing in solutions, services (people), platform and open source. We remove cloud lock-in by enabling flexible deployment models.

We partner and learn from real use cases

We have 108 live consortia and each one informs others, as we build on our experience and drive innovation in our offerings.

We are the only provider offering a full built permissioned blockchain platform that can be deployed on premises with a strategy to supporting 3rd party clouds (i.e. AWS)

IBM Blockchain

IBM

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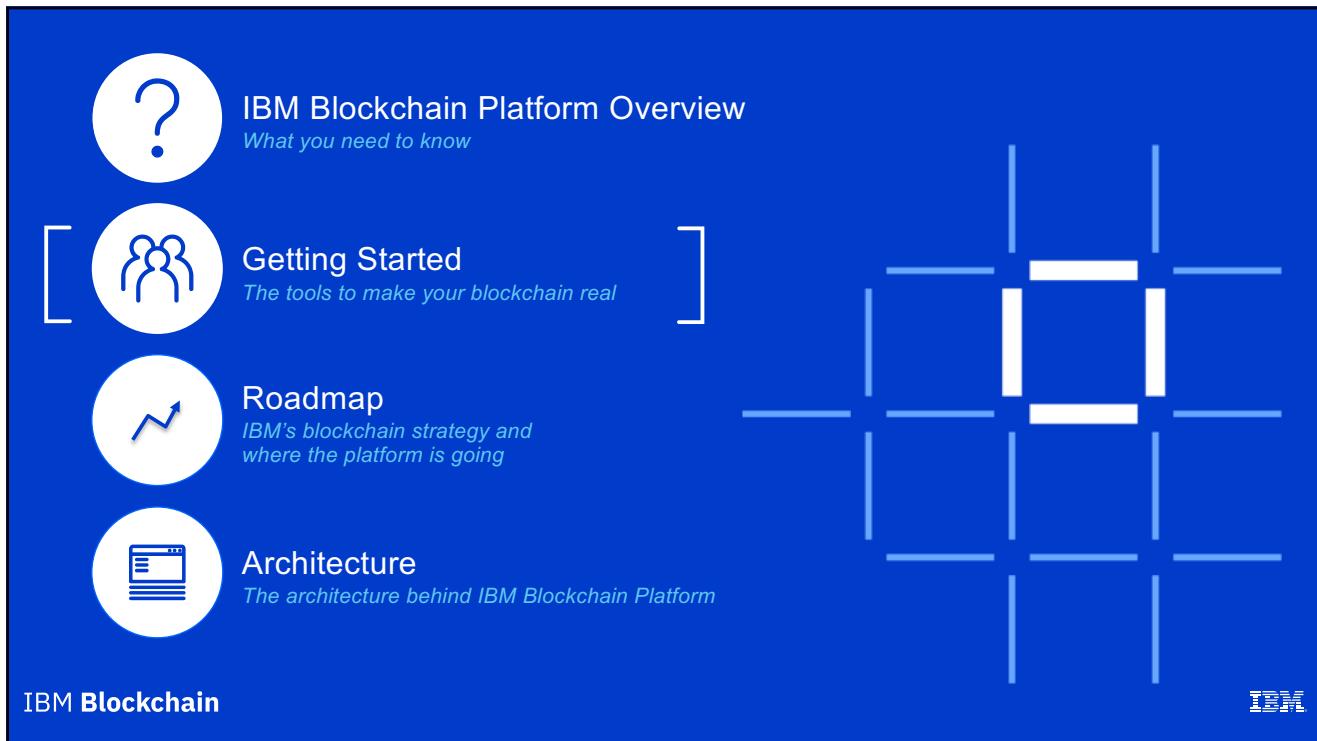
IBM can help you make your blockchain a success

Business Value Assessment			
Problem		Value Proposition	
Problem 90% of projects in general don't seem to be the answer to improving business value. Consider the following example: In the last year, the actual financial transaction volume increased by 20%.		Value Proposition Manage and track the payment of a sum of millions of shipping containers in a timely manner. This is a major challenge for shipping companies.	
Participants Supplier, shippers, P2P, customer, P2C, etc. Major role		Participants Supplier, shippers, P2P, customer, P2C, etc. Major role	
Asset & Trust Supplier projects in ship, release contracts to receive said trust, other customers, retailer, vendor		Asset & Trust Supplier projects in ship, release contracts to receive said trust, other customers, retailer, vendor	
Benefits benchmarks - value from			
KPI's (in \$) New revenue If new value propositions			
Baseline Project 1 Project 2 Project 3 Project 4			
Blockchain Design Points 1. Data flow and how it will be used in the current system 2. Data flow and how it will be used in the new system 3. Data flow and how it will be used in the new system 4. Data flow and how it will be used in the new system 5. Data flow and how it will be used in the new system 6. Data flow and how it will be used in the new system			
New revenue If new value propositions			
Increase in customer satisfaction - 5% 10% 15% 20%			
Improve customer experience Increase in trade volumes Cycle times (transit & shipping) 25 days 20 days 15 days 10 days			
Reduce transport costs Waste as % of total shipped Fraud and errors as % of Documentation fees as to credit costs			
6% 5% 4% 3.5% 25% 40% 35% 30%			

- Every business network is different!
- IBM can help you with all stages of your blockchain network, for example:
 - Hands-on workshops
 - Blockchain Value Design
 - First Projects
 - Architectural Review
 - Services and Support
- Make use of the expertise located in the Blockchain Garages and in other locations worldwide

Solutions Explained

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IBM Blockchain Platform Overview
What you need to know

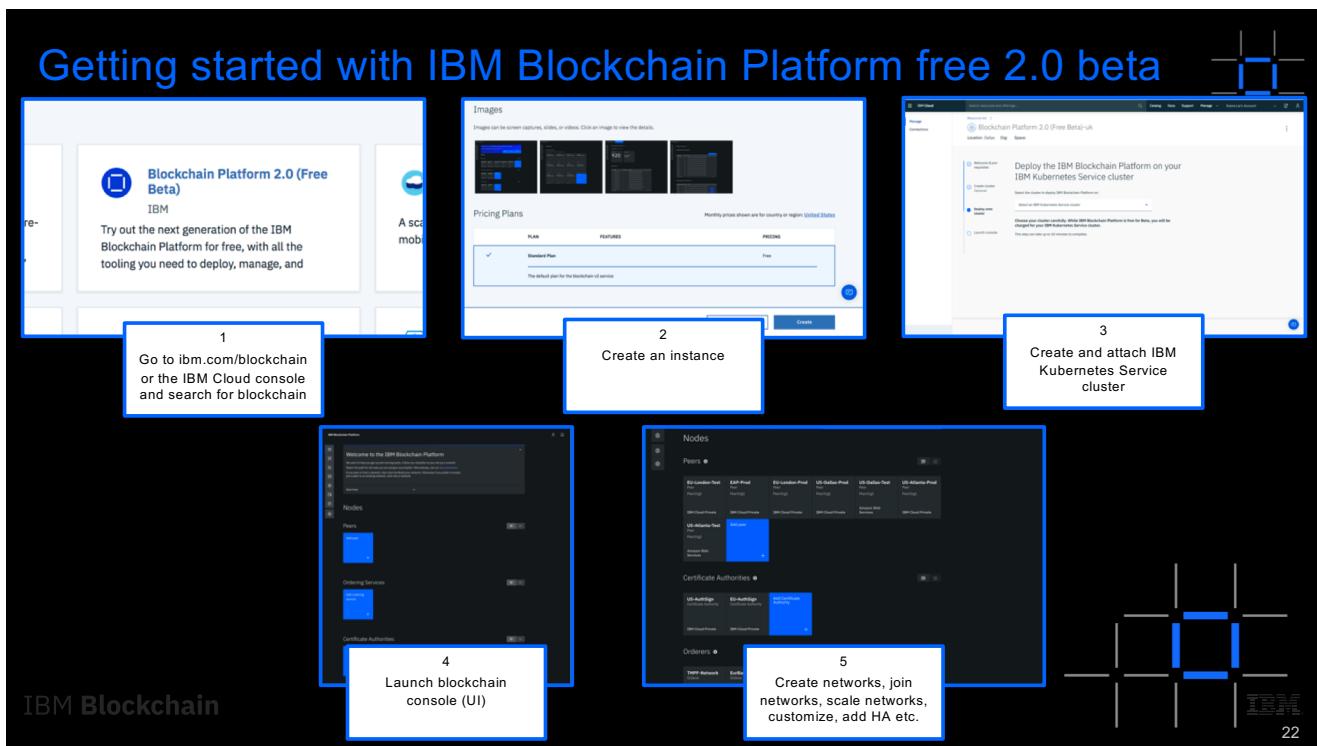
Getting Started
The tools to make your blockchain real

Roadmap
IBM's blockchain strategy and where the platform is going

Architecture
The architecture behind IBM Blockchain Platform

IBM Blockchain

IBM



Getting started with IBM Blockchain Platform free 2.0 beta

- 1 Go to ibm.com/blockchain or the IBM Cloud console and search for blockchain
- 2 Create an instance
- 3 Create and attach IBM Kubernetes Service cluster
- 4 Launch blockchain console (UI)
- 5 Create networks, join networks, scale networks, customize, add HA etc.

IBM Blockchain

IBM

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IBM Blockchain Platform

Welcome to the IBM Blockchain Platform console

You are able to monitor your Blockchain components across all deployments.
Start by adding a certificate authority or other network component.

[Learn more in our documentation](#) Do not show again

Add Certificate Authority Add peer Build a Smart Contract

Nodes

EU-London-Test	EAP-Prod	EU-London-Prod	US-Dallas-Prod	US-Dallas-Test	US-Atlanta-Prod
Peer PeerOrg1	Peer PeerOrg1	Peer PeerOrg1	Peer PeerOrg1	Peer PeerOrg1	Peer PeerOrg1
IBM Cloud Private	IBM Cloud Private	IBM Cloud Private	IBM Cloud Private	Amazon Web Services	IBM Cloud Private
US-Atlanta-Test	Add peer				
Peer PeerOrg1					
Amazon Web Services					

+ Add peer

Certificate Authorities

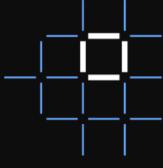
US-AuthSign	EU-AuthSign	Add Certificate Authority
Certificate Authority	Certificate Authority	
IBM Cloud Private	IBM Cloud Private	

+ Add Certificate Authority

Orderers

TMPF-Network	EurBankNet	Add orderer
Orderer	Orderer	

IBM Blockchain Platform



Welcome to the new IBM Blockchain Platform!

We give you the flexibility and control over all your network components

IBM Blockchain Platform

Smart Contracts

Installed Smart Contracts

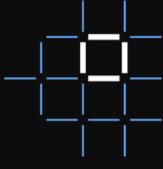
Contract name	Version	Peers
marbles	v0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	2.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	3.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	4.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	5.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles2	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles3	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles4	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles5	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test

1 - 10 of 13 items

Instantiated Smart Contracts

Contract name	Version	Channel	Peers
marbles	v0	varadchannel5	EU-London-Test, EAP-Prod, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	2.0.0	varadchannel1	EU-London-Test, EAP-Prod, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	2.0.0	varadchannel4	EU-London-Test, EAP-Prod, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marbles1	2.0.0	varadchannel5	EU-London-Test, EAP-Prod, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test

IBM Blockchain Platform



Manage Chaincode

Single view of all your smart contracts with option build in an IDE

Nodes

EUR-1 Anchor Peer IBM Cloud Private	EUR-2 Peer IBM Cloud Private	EUR-3 Peer IBM Cloud Private	HOU-1 Ordering Service IBM Cloud	Add node +
---	------------------------------------	------------------------------------	--	------------

Channel Members

Zion Finan... Admin	Capital AP Admin	Velvet CU Admin	Citizen Hol... Admin	Soul Credit... Admin	Value Banc... Admin	Private Hol... Admin
+ Add member						

Instantiated Smart Contracts

Contract name	Version	Peers
smart_contract_01	01	peer_01, peer_04, peer_05... +10

varadchannel1

Transaction overview

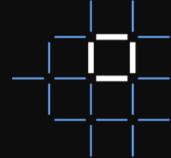
Block height: 92 | Last transaction: 15/01/2019 16:50:42 | Channel growth: 16%

Block history

ID	Created	Transactions	Block hash
91	15/01/2019, 16:50:42	1	LR0RgS8vXF6J8p63QQLMzAWRNJYfzgjFlc5MP/KV5sdM=
90	04/12/2018, 21:09:12	1	GnbZK2B3B/64+AVSL9kIdpc57BlbnqfIVS+U4yo=
89	03/12/2018, 20:19:10	1	prz7O9P9wqyia2ZTLuMeTQjPexhqdU97B0sc2/fic=
88	03/12/2018, 20:15:04	1	+veU27ymVQ3PQDv7O9nx4whsARu56CgpaA31TzEKLo=
87	03/12/2018, 20:14:23	1	1YNErMTeMvduOk3apWZ5TWehKoWdDzarFnsVJUr/4=
86	28/11/2018, 23:28:13	1	88Xsy+CLjWMeEmT6NKVf77jjeKVUdilLds5ytgrc8=
85	28/11/2018, 23:27:49	1	yNR0fetvWVnwMDfC5GOKWj0j0McEYe28XOCdjqCC=
84	28/11/2018, 23:27:25	1	Fcm6WGtpInxkaRoGGEfy/xYT74K194on3b7dx14=
83	28/11/2018, 23:27:09	1	bNWKNUyeuVjUTCPE8cGFGBqk+EQoWEVMyL71NBmgdM=
82	28/11/2018, 23:26:33	1	OvIQ92HETJwvFQ52eJ1QCVLulccjjMnlg@emz6ka4=

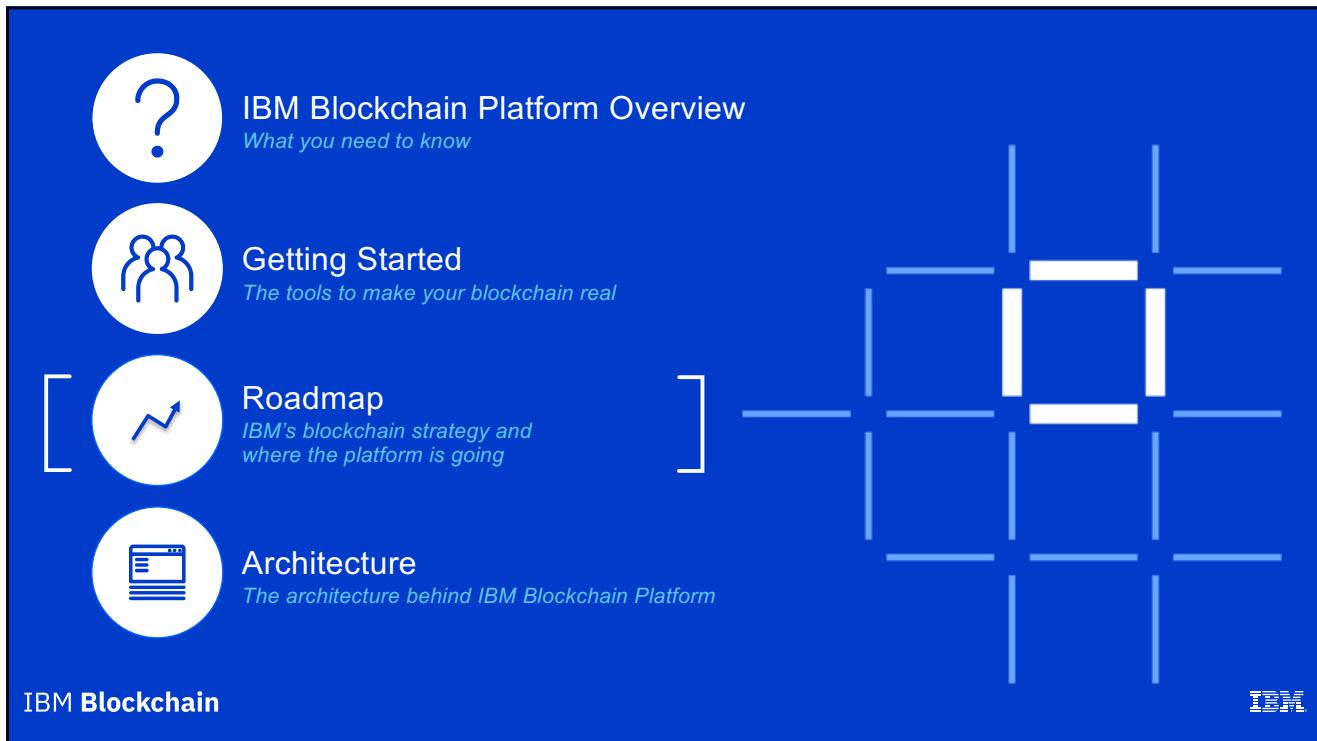
Data Sharing Made Visual

Single view of all data sharing relationships



See Your Network Grow

Single view of all block activity on the chain



IBM Blockchain Platform Overview
What you need to know

Getting Started
The tools to make your blockchain real

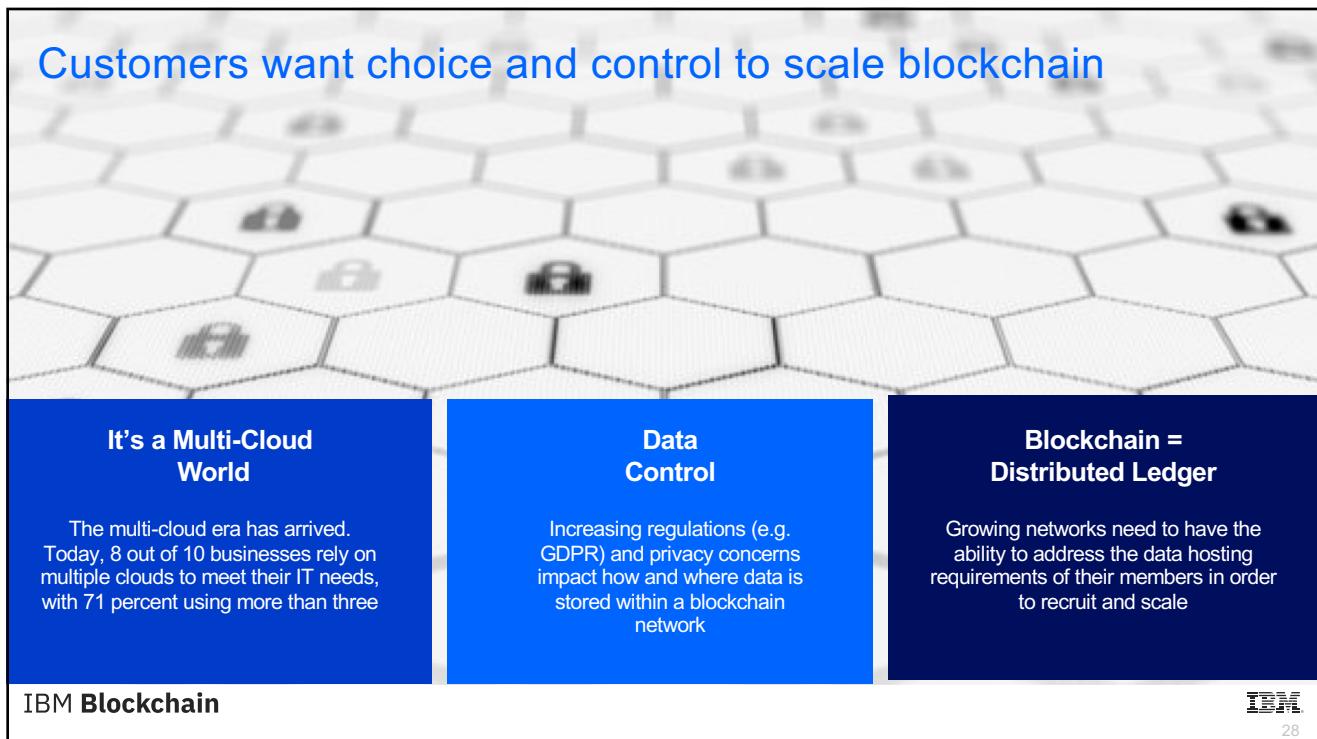
Roadmap
IBM's blockchain strategy and where the platform is going

Architecture
The architecture behind IBM Blockchain Platform

IBM Blockchain

IBM

A large white grid icon is positioned on the right side of the slide, consisting of a central square surrounded by a 3x3 grid of lines.



Customers want choice and control to scale blockchain

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

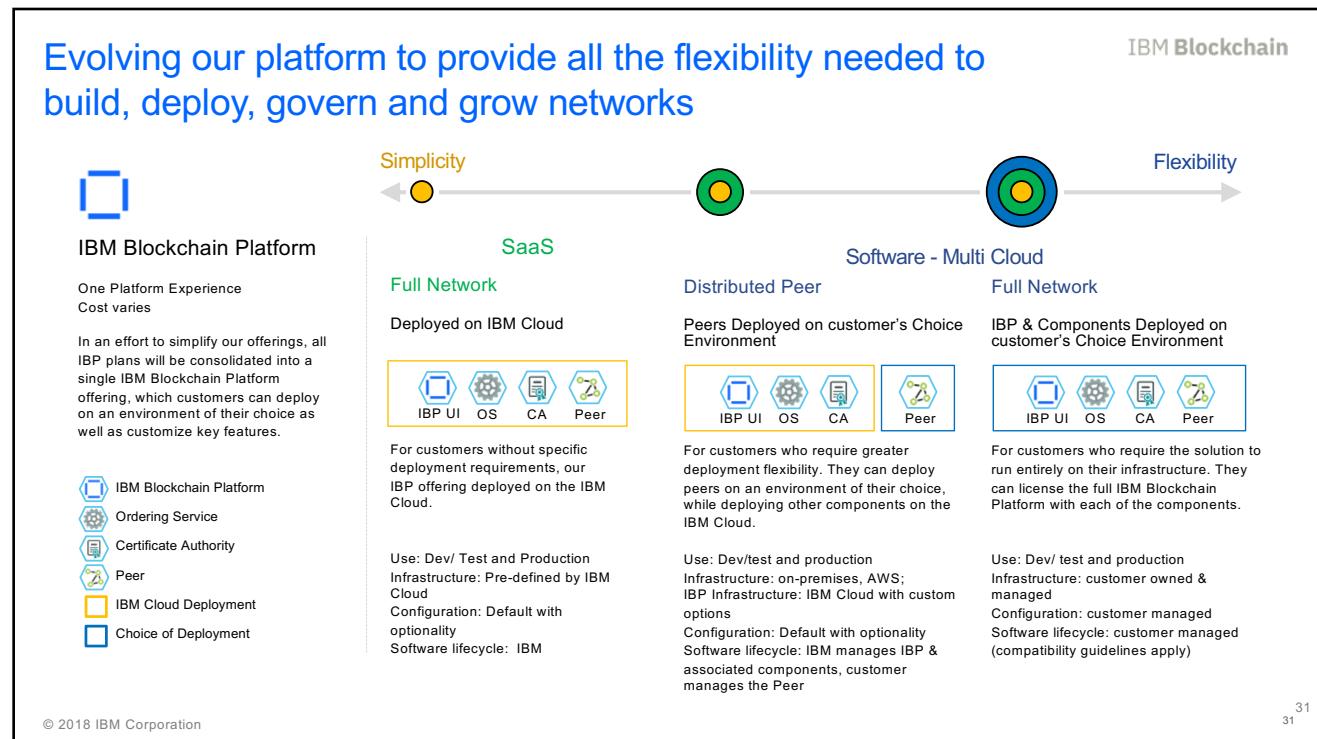
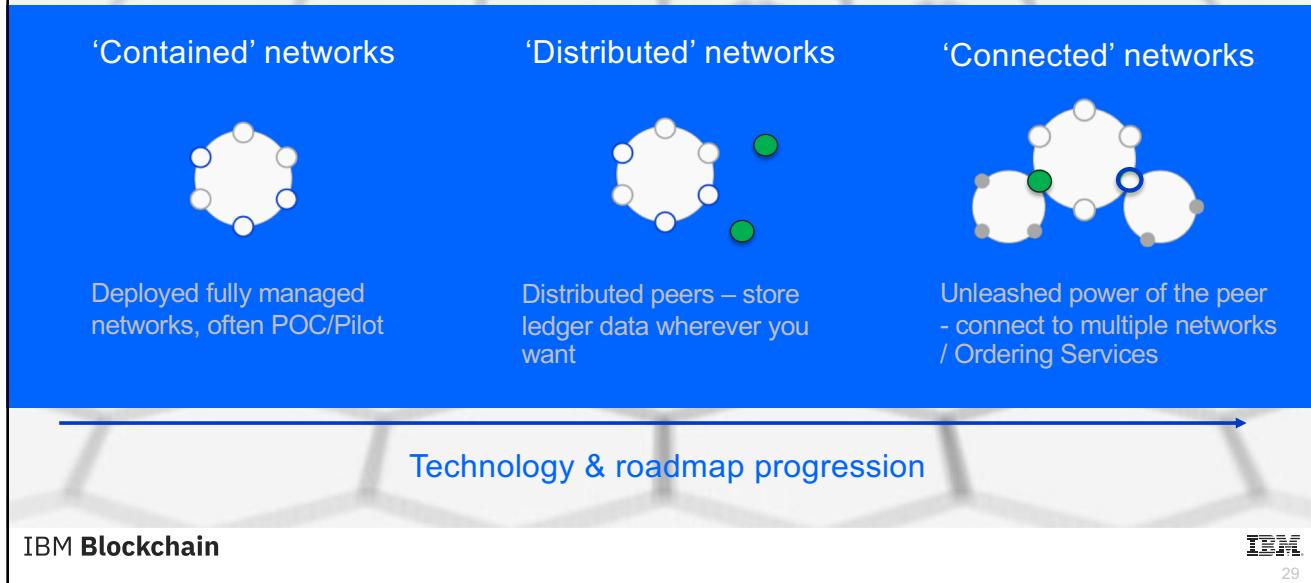
Growing networks need to have the ability to address the data hosting requirements of their members in order to recruit and scale

IBM Blockchain

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Blockchain 'Network' formation patterns emerging



Offering components



	GA IBP for ICP setup	Closed Beta Operational & Governance Tools	Open Beta Developer Tools
Description	Set up Fabric components as Helm Charts	Operational tools that make network management easier; connecting, deploying and managing blockchain peers Governance tools that simplify the management of the business network, including: Activating, customizing and changing networks (inviting new members/participants etc), implementation of policies that control how channels (subset of networks) get updated and simplifying the implementation of rules that authorize network updates	Enables you to quickly build your blockchain application including tutorials, a simplified programming model, and an extension to: 1) Write, test, and debug your smart contract 2) Test sample applications 3) Seamlessly deploy smart contracts into a production-ready blockchain environment
Offering	IBP for ICP	UI for IBP for ICP	IBP VS Code Extension
Available in first release	Yes	No	No
Screens	<ul style="list-style-type: none"> • ICP Catalog UI • IBP Helm Chart UI • ICP additional capabilities; monitoring, logging 	<ul style="list-style-type: none"> • Capabilities • Flows of key features (i.e. add peer to channel) 	<ul style="list-style-type: none"> • Azure discovery • Install steps • Editor/Explorer

IBM Blockchain

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Existing IBM Blockchain Platform offerings

Starter Plan

Enterprise Plan

Support only

IBM Blockchain

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IBM Blockchain Platform 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 1.2.1
 - 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
- Sign up at: www.ibm.com/blockchain

IBM Managed

IBM hosts it for you through its IBM Cloud services



SaaS offering that is the easiest way to get started with Blockchain

35

IBM Blockchain Platform 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

IBM Managed

IBM hosts it for you through its IBM Cloud services



SaaS offering that is the easiest way to get started with Blockchain

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<h2>Support-only Plans</h2> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Looking for IBM support on Hyperledger Fabric? <ul style="list-style-type: none"> – 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 <input checked="" type="checkbox"/> Elite tier (5737-E89/DV13ALL) <ul style="list-style-type: none"> – Supported 24x7x365; response target within 2 business hours – Multiple technical contacts and developer assistance – Yearly cost \$24,000 per peer <input checked="" type="checkbox"/> Entry tier (5737-E90/DV13BLL) <ul style="list-style-type: none"> – Support hours Monday – Friday 8am-5pm local time; response target within 8 business hours – Single technical contact – Yearly cost \$6,000 per peer <p>https://hub.docker.com/u/ibmblockchain/</p>	<h2>Self Managed</h2> <p>Deploy individual components of the blockchain network to the environment of your choice using IBM signed Docker images</p>  <p>Support-only option for running a Hyperledger Fabric blockchain network</p>
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IBM Blockchain Platform Overview

What you need to know



Getting Started

The tools to make your blockchain real



Roadmap

IBM's blockchain strategy and where the platform is going



Architecture

The architecture behind IBM Blockchain Platform





Blockchain Technical Concepts



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



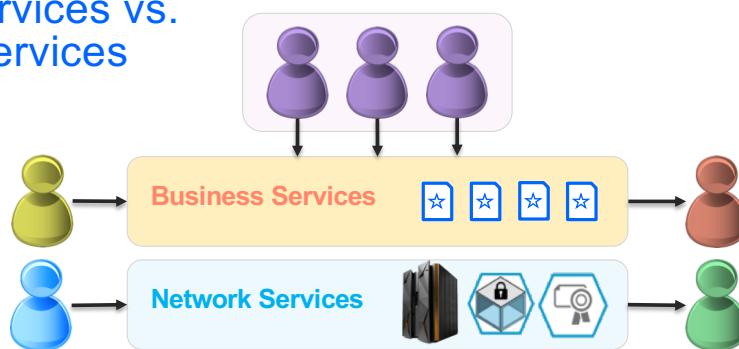
Consensus is the process by which agreement is obtained on the peer network



The Ordering Service agrees transaction sequence and distributes blocks to peers

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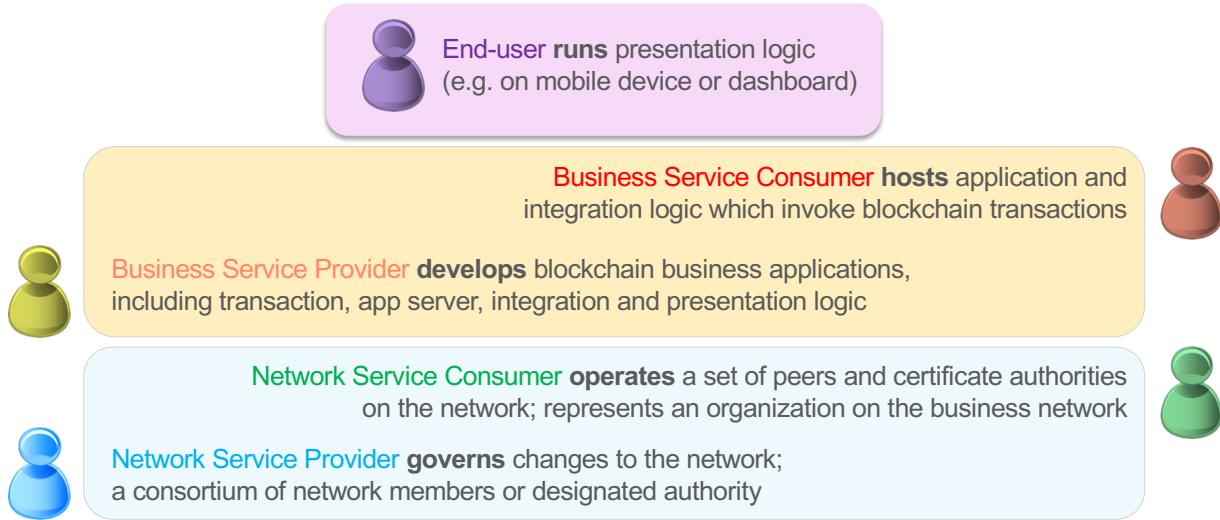
Network Services vs. Business Services



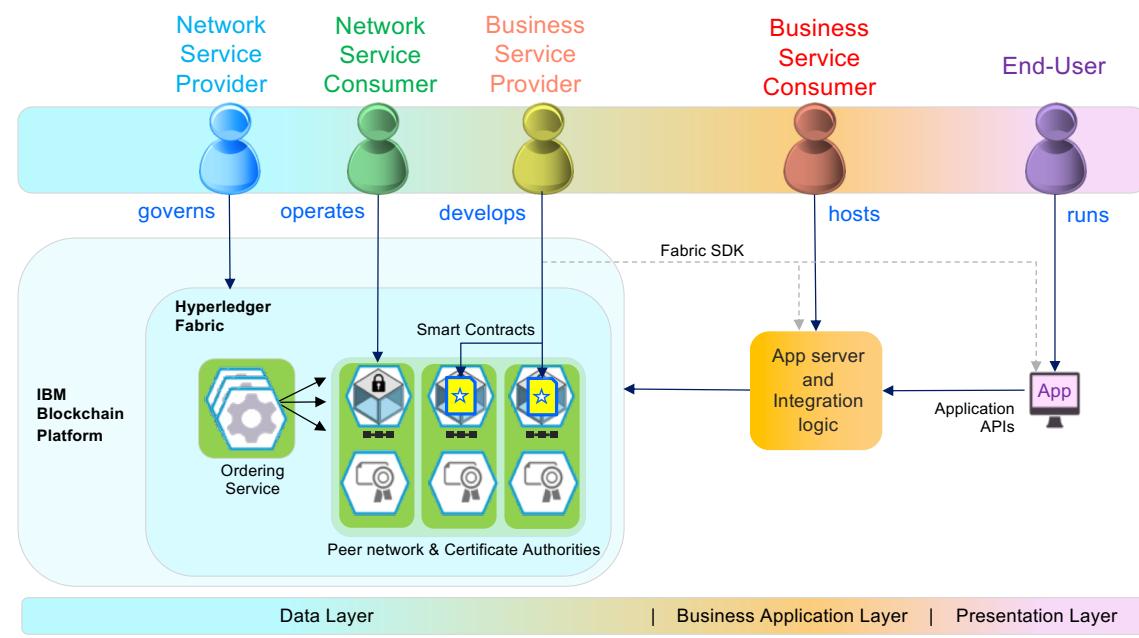
- A good enterprise architecture consists of **Network Services** and **Business Services**
 - Network Services provide a technical computing foundation
 - Business Services are an abstraction that provide meaningful business context
- A blockchain network also consists of Network Services and Business Services
 - Peers, Channels, Ordering Service, etc. are Network Services
 - Smart Contracts and the APIs that invoke them are Business Services
- Depending on their role, blockchain stakeholders each **provide** or **consume** these services...

Blockchain Participant Roles

(A single organization may play multiple roles!)



Network Architecture and Participant Roles



IBM Blockchain Platform for Network Service Providers

Governance of changes to the blockchain network



Welcome to the IBM Blockchain Platform console

To get up and running easily, click Start Here and follow one of our helpful checklists.

If you plan to host a network, click Build a network. If you prefer to join a peer to an existing network, click Join a network.

For a more in-depth tutorial, check out our documentation.

Start Here

Nodes

Peers

Add peer

+ Add Certificate Authority

A CA creates identities for the nodes that belong to your organization and its admins. Use the CA to create identities and a MSP definition of your organization before you deploy peers and orderers.

Create a new Certificate Authority

IBM Cloud

Import an existing Certificate Authority

- Network Service Providers play a vital role in a blockchain network
 - Initiating the network
 - Creating membership, channel and smart contract policies
- Typically covers **changes to the network**; common recurring tasks (e.g. certificate management) are managed by Network Service Consumers
- Either centralized (e.g. industry regulator) or decentralized (e.g. members of a consortium)

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IBM Blockchain Platform for Network Service Consumers

Operate a subset of peers in a blockchain network



IBM Blockchain Platform

Smart Contracts

Installed Smart Contracts

Contract name	Version	Peers
markets	v0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble1	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble1	2.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble1	3.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble1	4.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble1	5.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble2	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble3	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble4	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test
marble5	1.0.0	EAP-Prod, EU-London-Test, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test

1 - 50 of 13 Items

- Network Service Consumers operate an organization's peers and certificate authorities
 - Installing and instantiating smart contracts
 - Managing certificates for Business Service Consumers in their organization
 - Monitoring network resources
 - Creating channels (in accordance with defined policies)

No identities... yet?

Get started by creating a new identity using a Certificate Authority. You can then assign identities to nodes in your network; you can also re-import identities if you have changed browsers.

Add identity

No channels... yet?

You can create a channel using an orderer you have provisioned or imported, or you can join a channel if you have the relevant details.

Join channel

Create channel

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- All administrative tasks accessible through web UI
 - Covers members, channels, smart contracts...
 - Full access to APIs and logs for transparent problem determination

IBM Blockchain Platform for Business Service Providers

Develop blockchain applications

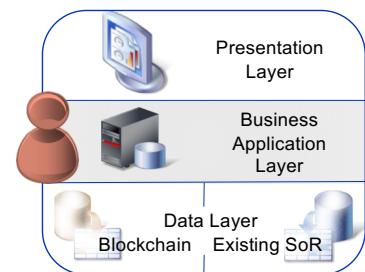


- A blockchain application consists of three components:
 - **Smart contracts**: transaction logic run on the distributed peer network
 - **Business logic**: business applications and integration services that invoke smart contracts
 - **Presentation logic**: client applications run by end-users of the system
- The role of Business Service Providers is to develop these components
 - Separation of concerns between business logic and blockchain network (the what and the where)
- **IBM Blockchain Platform** comprises a set of tools for rapid blockchain application development
 - Smart contracts: deployed to as chaincode
 - Business logic: deployed to application server/integration tier
 - Presentation logic: made available to end-users

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The role of Business Service Consumers

Host applications and integration services that invoke smart contracts



- Business Service Consumers are typically responsible for two things:
 - Hosting business logic that invokes smart contracts running on IBM Blockchain Platform
 - Managing End-User identity
- Business logic is **hosted on an application server**
 - Either off-premises (e.g. IBM Cloud) or on-premises
 - Typically connect via integration middleware (e.g. IBM Integration Bus)
- Invokes appropriate APIs to invoke smart contracts in the usual way
 - End-users authenticate and cause blockchain transactions to be invoked using a proxy identity provided by the Network Service Consumer's certificate authority
 - Multiple applications can interact with the same blockchain
- Consider implementing a **shadow chain** and running existing systems of record in parallel
 - Allows for staged onboarding of new members and mitigation of risk

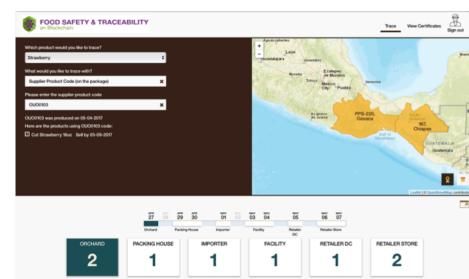
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How End-Users interact with the blockchain

Exchange trustworthy information

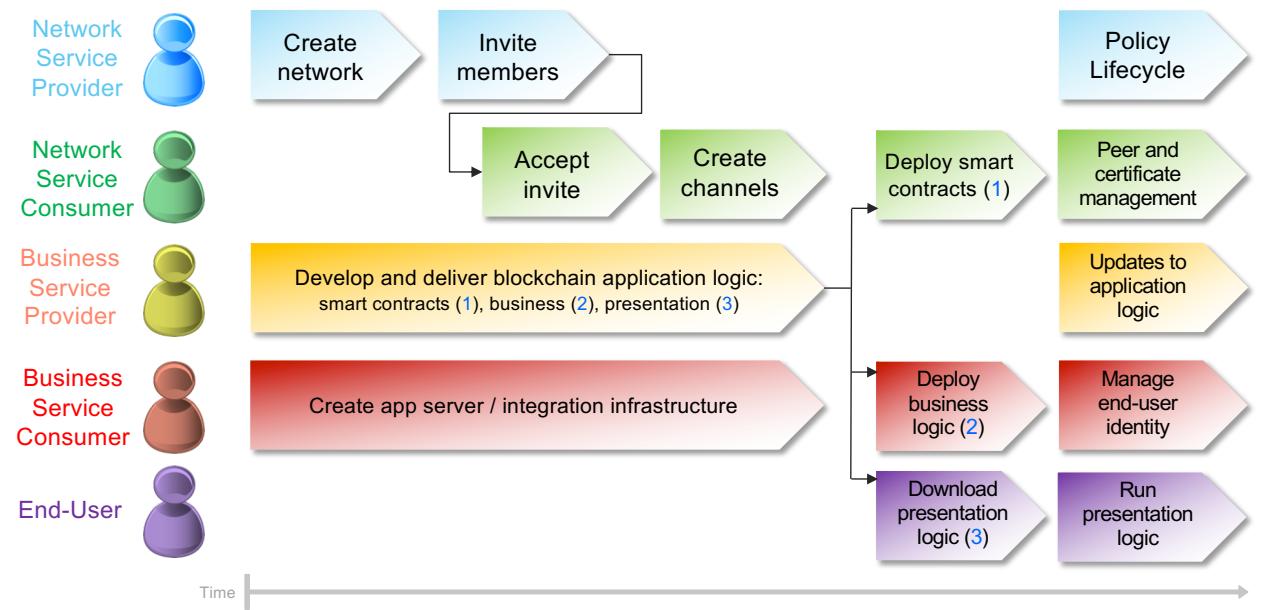


- End-users run presentation logic on an appropriate device
 - For example, mobile application or desktop dashboard
 - There may be multiple end-user applications (often one per organization or user role)
- The value proposition to end-users is that the information they see is **trustworthy**
 - Will probably be unaware of blockchain back-end
 - Uses an identity managed by the business application layer
- Many options for presentation logic implementation
 - IBM Blockchain Platform can integrate with end user applications via a REST server built using the Fabric SDK

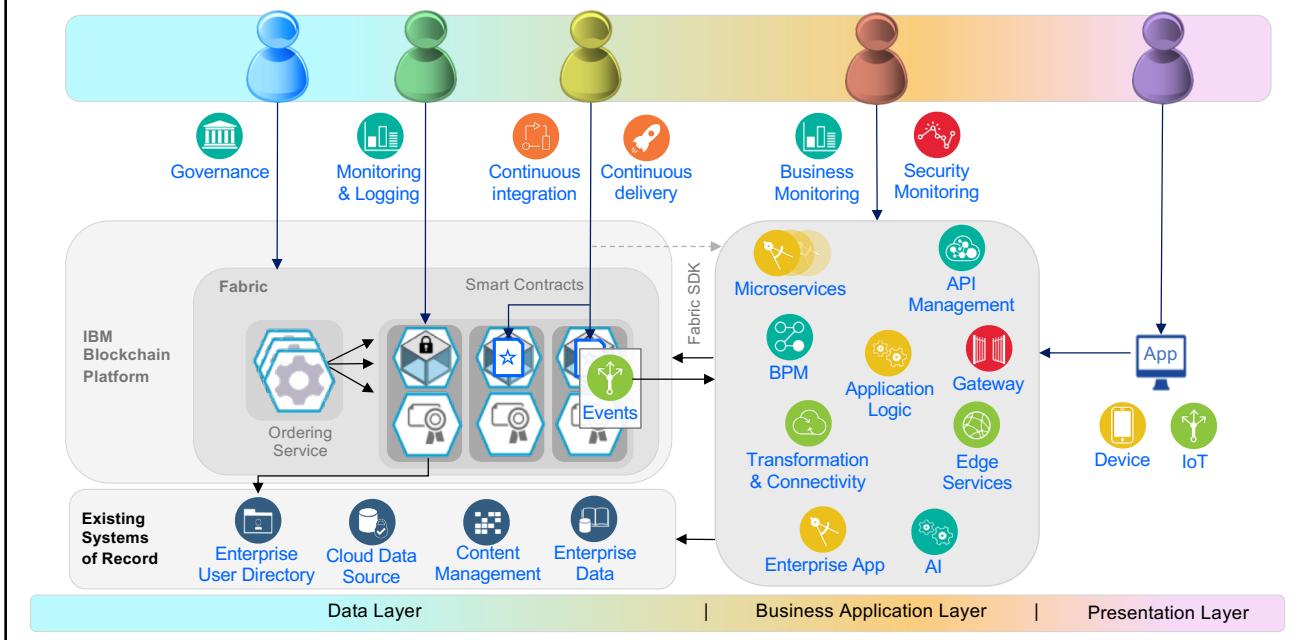


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Workflow for Network Formation



How the architecture fits with enterprise services and processes



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

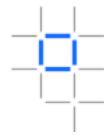
→ Solutions Explained

Developer

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

→ IBM Blockchain Platform Explored

Further information

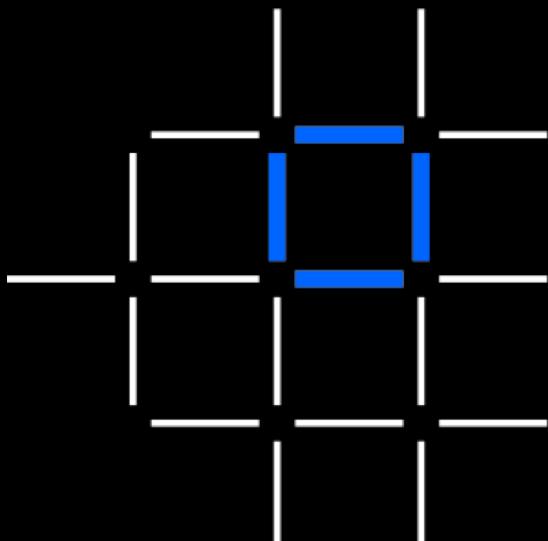


- Platform Information
 - <https://www.ibm.com/blockchain/platform/>
- Technical Overview
 - <https://www-01.ibm.com/common/ssi/cqi-bin/ssialias?htmlfid=KUW12555USEN&>
- Platform Service
 - <https://console.bluemix.net/catalog/services/blockchain>
- Platform Service Level Agreement
 - <https://www-03.ibm.com/software/sla/sladb.nsf/sla/bm-7836-03>
- 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
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IBM Blockchain

IBM
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Thank you



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