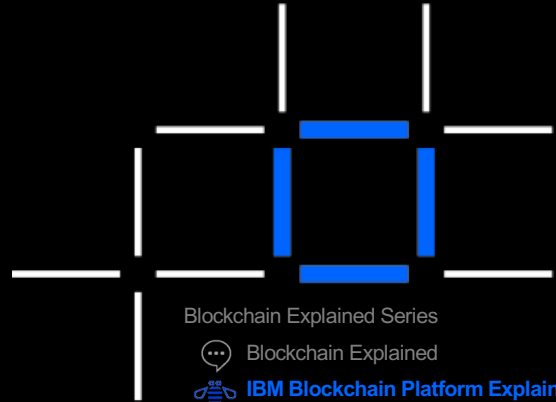


IBM Blockchain Platform Explained

An Introduction to the IBM Blockchain Platform



Blockchain Explained Series

- Blockchain Explained
- IBM Blockchain Platform Explained**
- Solutions Explained
- Garage Explained
- What's New
- Next Steps

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



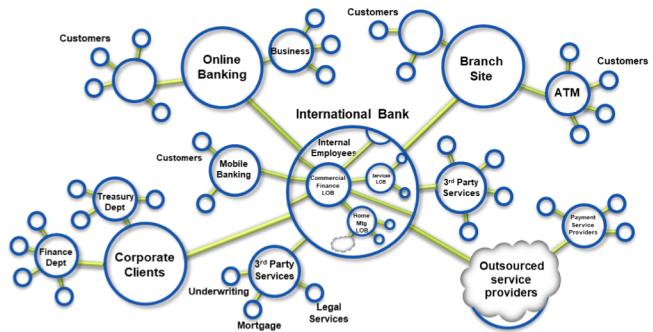
IBM Blockchain



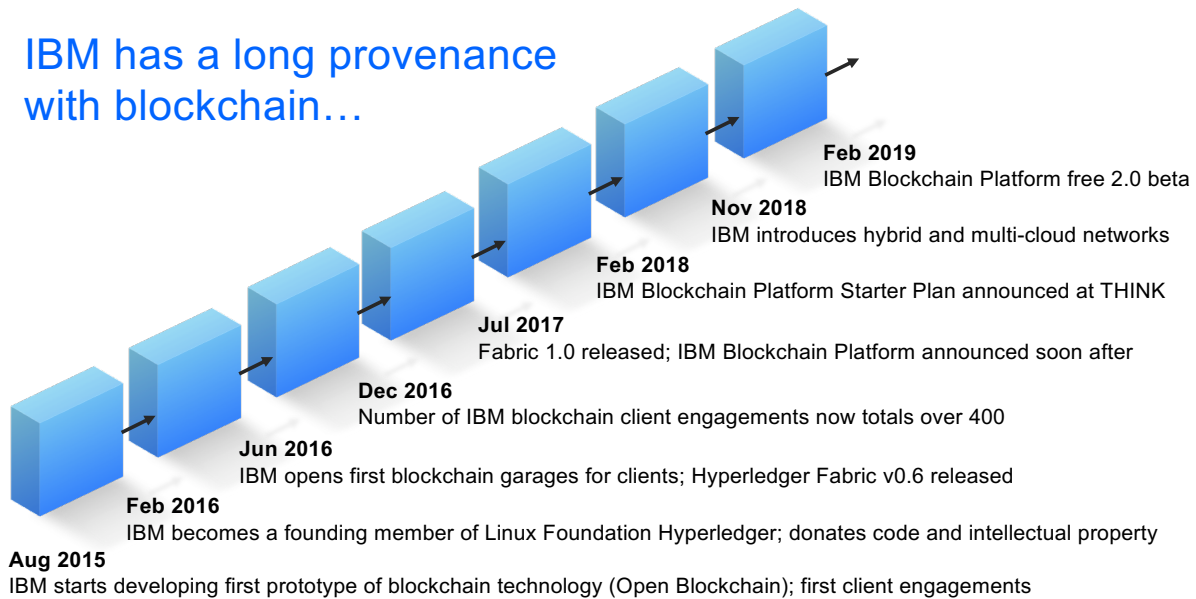
Blockchain Recap

- **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



IBM has a long provenance with blockchain...



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	
<p>60,000+</p> <p>People enabled through IBM blockchain training</p>		<p>500+</p> <p>Blockchain Engagements to learn from</p>	<p>#1</p> <p>Analyst Research (Juniper and Everest)</p>	
<p>~5,000</p> <p>Trained Consultants</p>	<p>~3,000</p> <p>Trained Developers</p>	<p>108</p> <p>IBM enabled live consortiums</p>	<p>100+</p> <p>Years of being a safe and reliable brand</p>	
<p>700+</p> <p>SME's in hiring pipeline</p>		<p>>\$30M</p> <p>investment into community code development (\$10M per year)</p>	<p>9,000+</p> <p>Patents in 2017</p>	<p>27</p> <p>Patents in 2017 for BC</p>

IBM **Blockchain**



5

IBM Blockchain Strategy

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

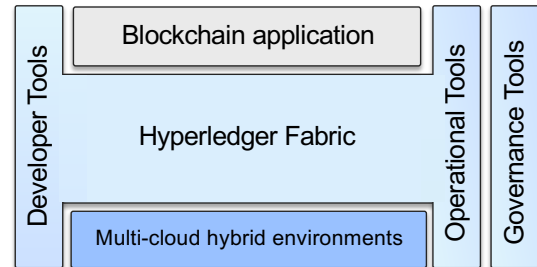
<p>Services</p> <p>Collaborate with services teams from ideation all the way to production</p>	<p>Ecosystem</p> <p>Tap into our diverse ecosystem to develop strategic partnerships and create your competitive advantage</p>
	<p>Solutions</p> <p>Solve critical industry challenges by building and joining new business networks and applications</p>
	<p>Platform</p> <p>Develop, govern and operate hybrid multi-cloud enterprise blockchain networks with speed and security</p>
	<p>HYPERLEDGER</p> <p>A founding, premier member of Hyperledger, IBM is committed to open source, standards & governance</p>

6

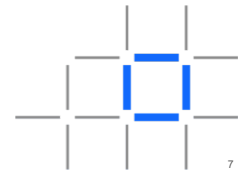
Introducing the IBM Blockchain Platform

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

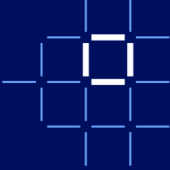
- Activate, customize and change complete blockchain business networks
- Secure democratic governance across organizations
- Implement rules for authorizing network updates



Operate

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

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IBM Blockchain Platform Deployment Options

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

IBM Blockchain

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

The evolution of the IBM Blockchain Platform

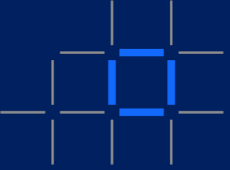
IBM Blockchain Platform v1

- 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

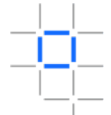
- Connect to nodes running in any environment (on-premises, public, hybrid clouds)
- Easily connect a single peer to multiple industry networks
- Start small, pay as you grow for what you use with no upfront investment and upgrade easily through Kubernetes

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**

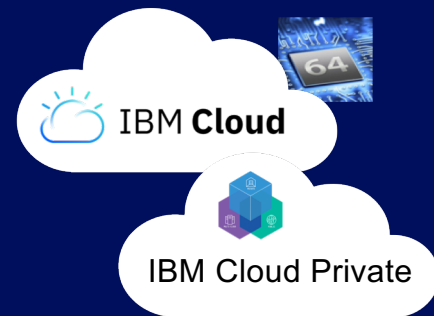
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IBM Blockchain Platform 2.0 (beta)

- ☑ 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



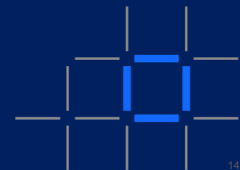
The easiest way to get started

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**



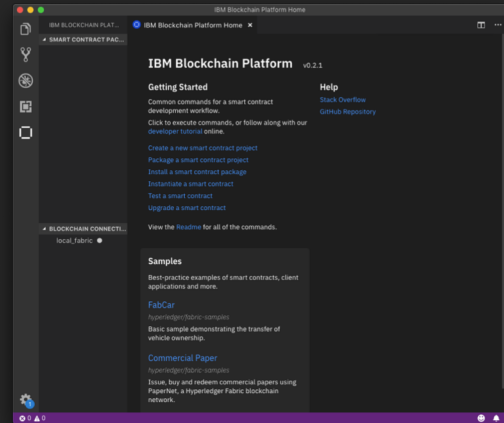
14

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

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

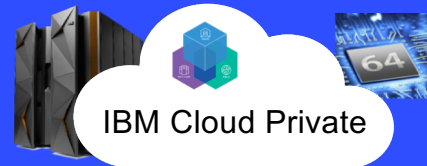
- Commercial paper with the IBM Blockchain VSCode extension
- Smart contract with the IBM Blockchain Platform VSCode extension
- Global finance blockchain application VS Code extension

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/rep_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



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/>

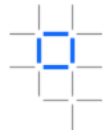
Hybrid Deployment

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

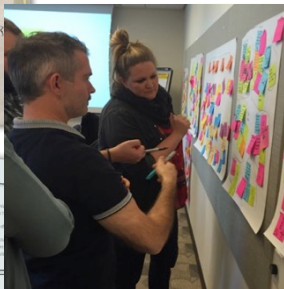
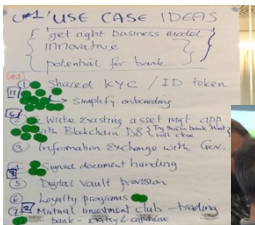
We have 108 live consortia and each one informs others, as we build on our experience and drive innovation in our offerings.

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 can help you make your blockchain a success



Business Value Assessment			
Problem	Set of process - driven value stream by the need during industry each year. Data associated with each transaction is stored in a central database and is used to create the actual physical transaction case.		
Solution	Design network for digital sharing of value of all existing contracts across the world by digitizing the entire value stream.		
Participants	Supplier, customer, P2P, customer P2P, vendor P2P, supplier and vendor.		
Asset & Trust	Need for trust around payment associated with a contract.		
Transactions	Supplier processes to the relation represented by invoice, order forms, other contracts, contract renewal.		
Benefits benchmarks	Value Type	Impact	Blockchain - Design Note
	NPV (\$/g)	ROI (%)	ROI (%)
Time	10-15 min per participant	10%	10%
Progress	Increase in customer satisfaction	10%	10%
Client experience	Decrease in time to market	10%	10%
	Reduce errors (input & output)	20-30%	20-30%
Product	Reduce the % of data entered	10%	10%
Support	Reduce and errors as % of total costs	10%	10%
Costs	Documentation admin. cost	20%	20%
	in digital space	10%	10%

- 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



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

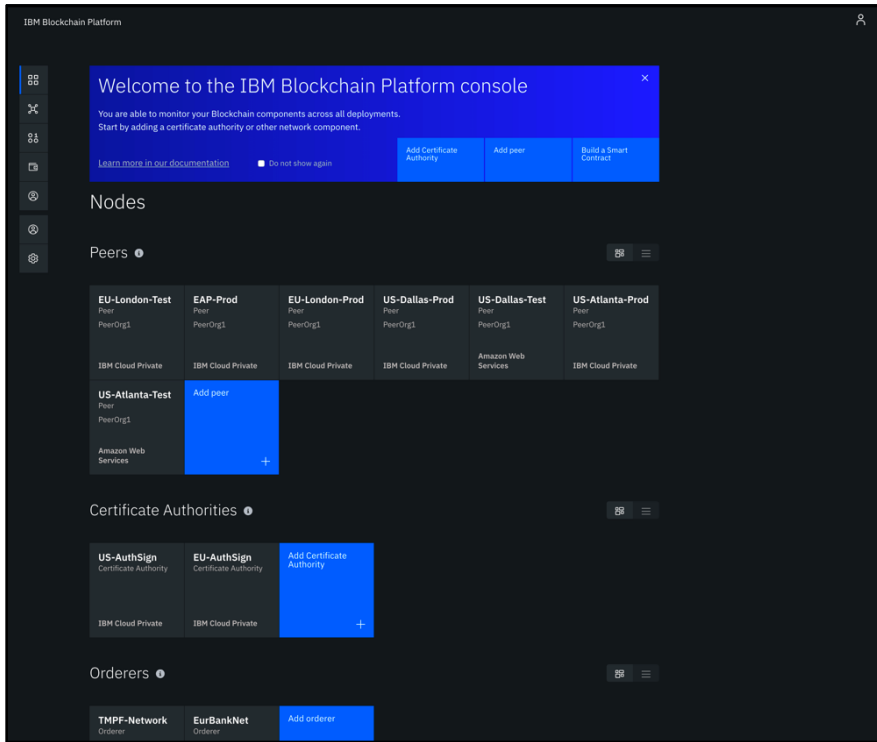
Architecture
The architecture behind IBM Blockchain Platform

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 22



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

Peers

Peer	PeerOrg1	PeerOrg1	PeerOrg1	PeerOrg1	PeerOrg1	PeerOrg1
EU-London-Test	EAP-Prod	EU-London-Prod	US-Dallas-Prod	US-Dallas-Test	US-Atlanta-Prod	
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						

Certificate Authorities

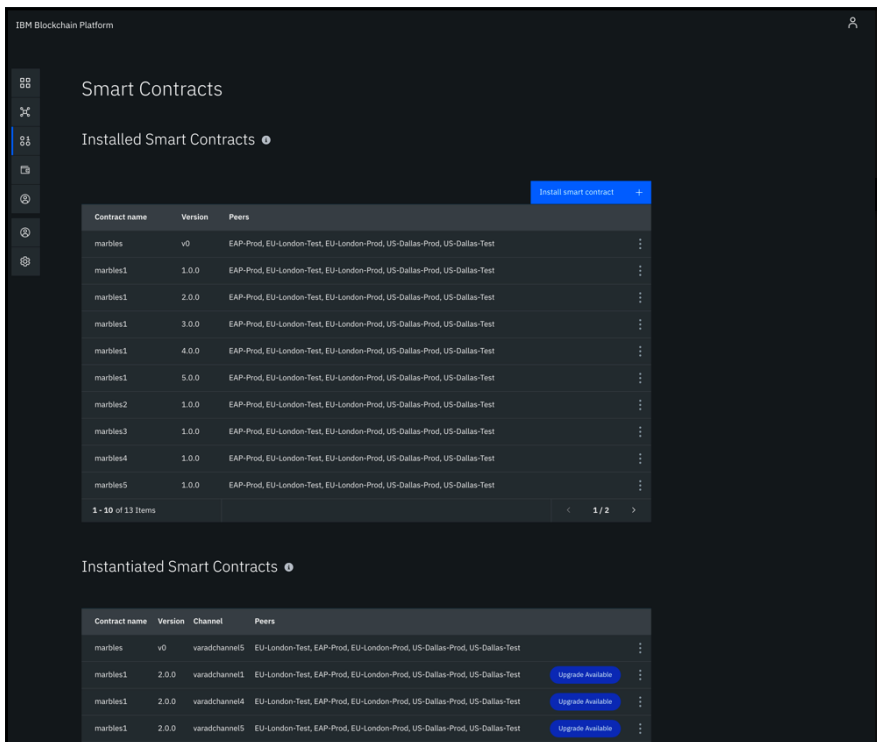
Certificate Authority	Certificate Authority	Add Certificate Authority
US-AuthSign	EU-AuthSign	
IBM Cloud Private	IBM Cloud Private	

Orders

Orderer	Orderer	Add orderer
TMPF-Network	EurBankNet	

Welcome to the new IBM Blockchain Platform!

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



Smart Contracts

Installed Smart Contracts

Contract name	Version	Peers	Install smart contract
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	Upgrade Available
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	Upgrade Available
marbles1	2.0.0	varadchannel4	EU-London-Test, EAP-Prod, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test	Upgrade Available
marbles1	2.0.0	varadchannel5	EU-London-Test, EAP-Prod, EU-London-Prod, US-Dallas-Prod, US-Dallas-Test	Upgrade Available

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
------------------------	---------------------	--------------------	-------------------------	-------------------------	------------------------	-------------------------

Instantiated Smart Contracts

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

Data Sharing Made Visual

Single view of all data sharing relationships

IBM Blockchain Platform **varadchannel1**

Transaction overview Channel details

Block height 92

Last transaction 15/01/2019 16:50:42

Channel growth 16% ↑

- Members 17%
- Instantiations 4%
- Transactions (per day) 9%

Block history

ID	Created	Transactions	Block hash
91	15/01/2019, 16:50:42	1	LRpRgSbvtF63bp63DQMLzAWRN2YtgFkc5MPYkV55Dm+
90	04/12/2018, 21:09:12	1	GzbZK2B3B/84+AVSL9kldjpc5yTBbnqIFV5-U84Yo+
89	03/12/2018, 20:19:10	1	prZGkPHvqyazZTLaMeTQpexHq6Uj9780sc2/fkc+
88	03/12/2018, 20:15:04	1	+eUj27ymV3PQDv09n4dhsARd56CgAD11TeKLE+
87	03/12/2018, 20:14:23	1	1YNE8mTemVusOk3agWZ5TWerKowWdtzafmVuUR/4+
86	28/11/2018, 23:28:13	1	88Xs++CLWMEtT6NNKv777jkkVUGLdsc5yngkr8=
85	28/11/2018, 23:27:49	1	yNRQm9+WyneMDFC5GDKW3QMcRVEy28LXOCJQDC+
84	28/11/2018, 23:27:25	1	Fcm6WgVpVn4kaRoaGGrElyx1Y74K194ox3b7d4814+
83	28/11/2018, 23:27:09	1	bWKKWJyevVJITCFBcGF0obk+EQ0WEVWYL71NBMgDM+
82	28/11/2018, 23:26:33	1	OvVQ92RE3TWF05267JOCVclczkijpMt8/em6sK4+

1 - 10 of 92 items

See Your Network Grow

Single view of all block activity on the chain

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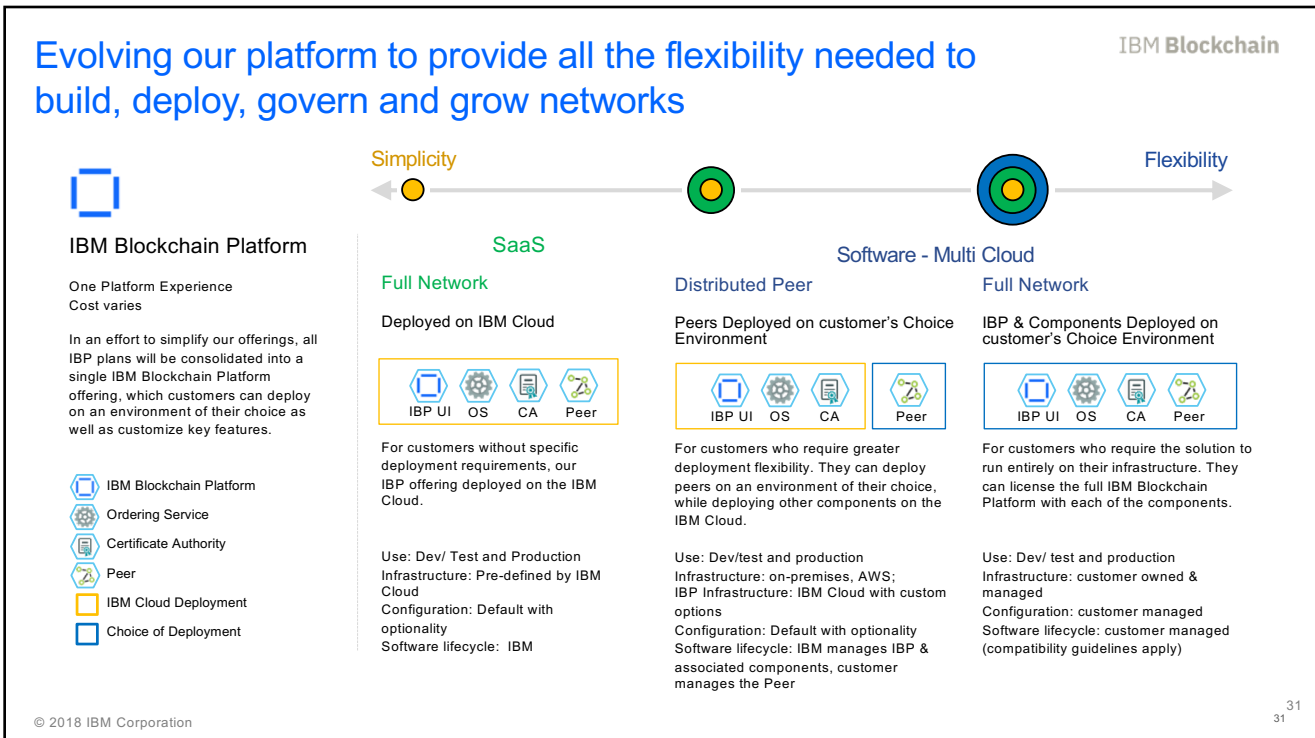
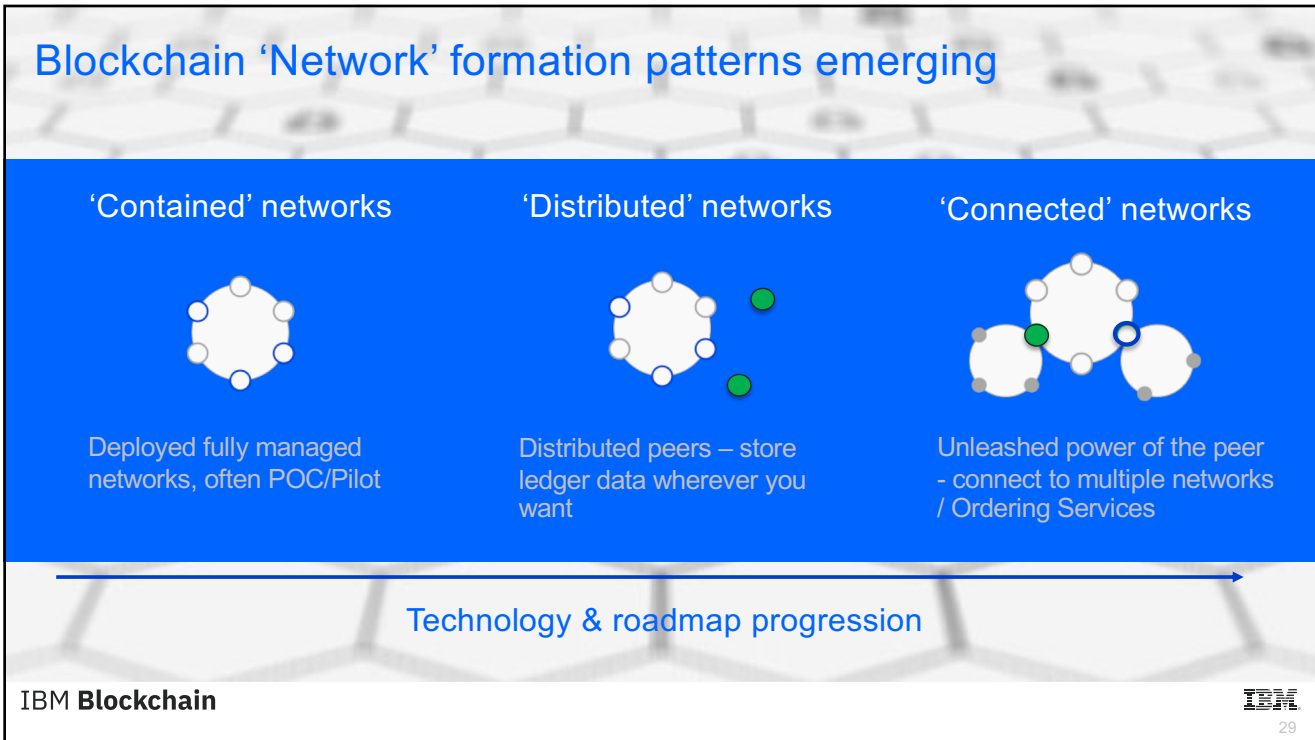
Architecture
The architecture behind IBM Blockchain Platform

IBM Blockchain IBM

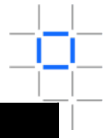
Customers want choice and control to scale blockchain

<p style="text-align: center;">It's a Multi-Cloud World</p> <p>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</p>	<p style="text-align: center;">Data Control</p> <p>Increasing regulations (e.g. GDPR) and privacy concerns impact how and where data is stored within a blockchain network</p>	<p style="text-align: center;">Blockchain = Distributed Ledger</p> <p>Growing networks need to have the ability to address the data hosting requirements of their members in order to recruit and scale</p>
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IBM Blockchain IBM



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**

32

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 of 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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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

<https://hub.docker.com/u/ibmblockchain/>

Self Managed

Deploy individual components of the blockchain network to the environment of your choice using IBM signed Docker images



Support-only option for running a Hyperledger Fabric blockchain network



IBM Blockchain Platform Overview

What you need to know



Getting Started

The tools to make your blockchain real



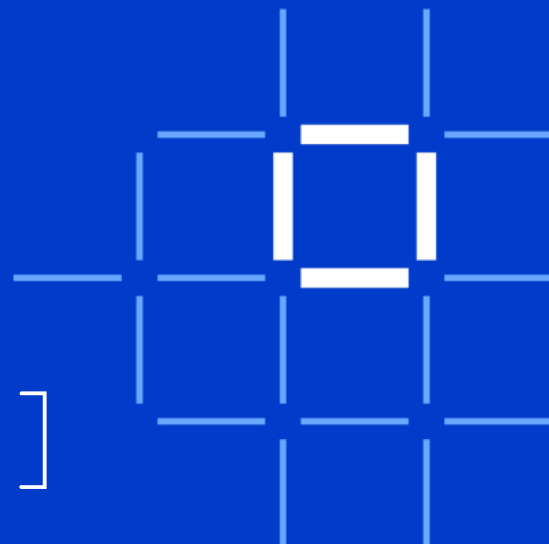
Roadmap

IBM's blockchain strategy and where the platform is going



Architecture

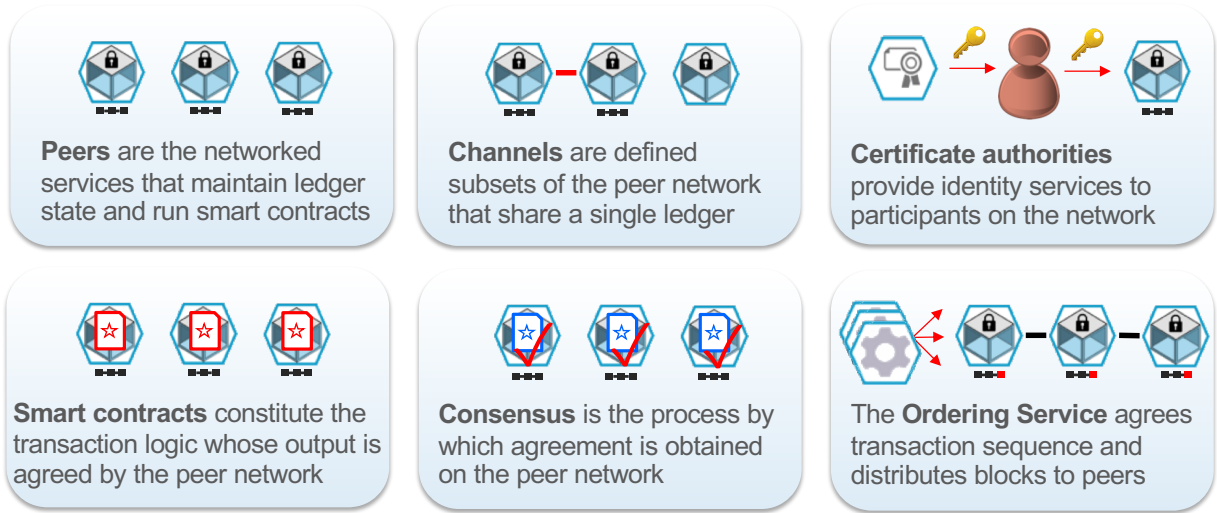
The architecture behind IBM Blockchain Platform



IBM **Blockchain**

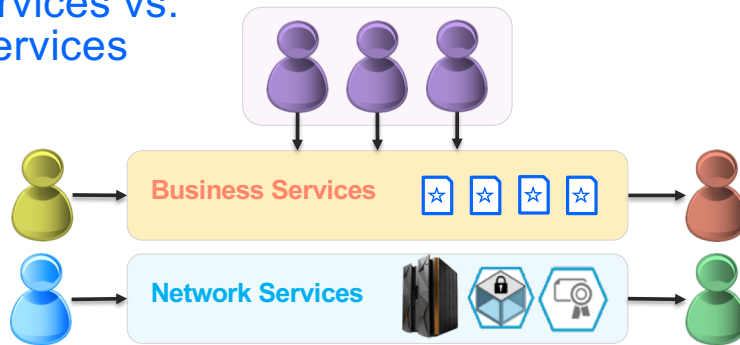


Blockchain Technical Concepts



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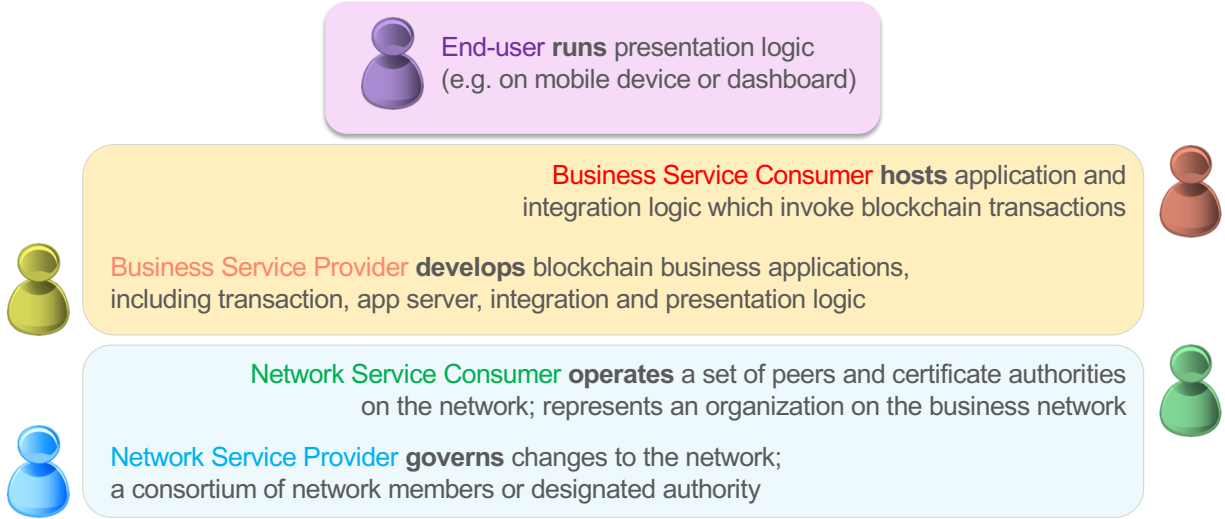
Network Services vs. Business Services



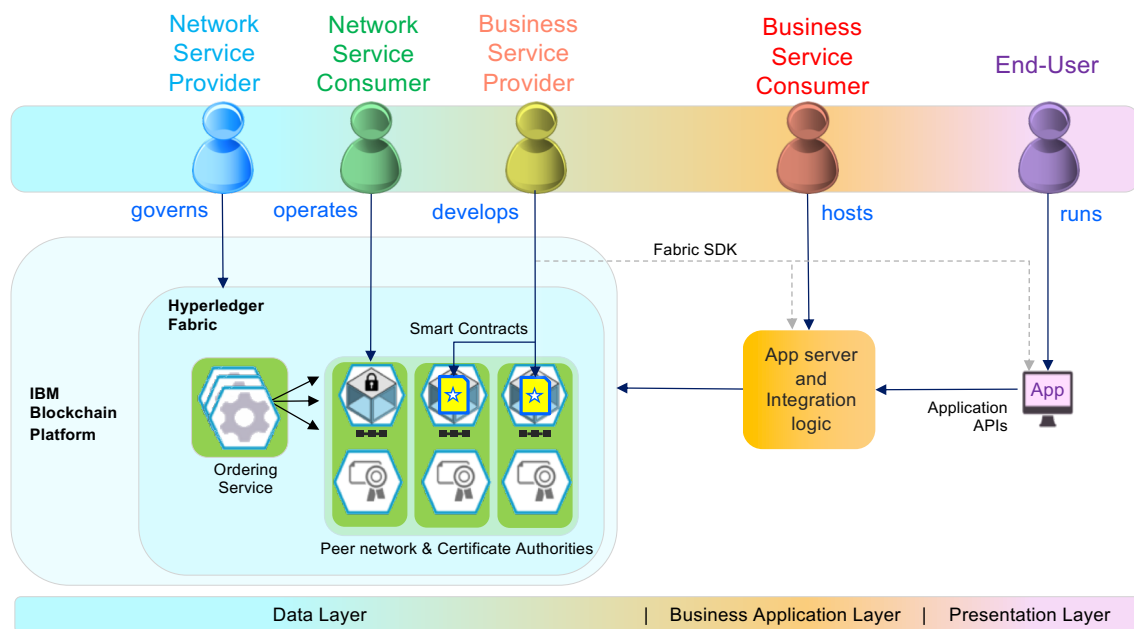
- A good enterprise architecture consists of **Network Services** and **Business Services**
 - Network Services provide a technical computing foundation
 - Business Services are an abstraction that provide meaningful business context
- A blockchain network also consists of Network Services and Business 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!)

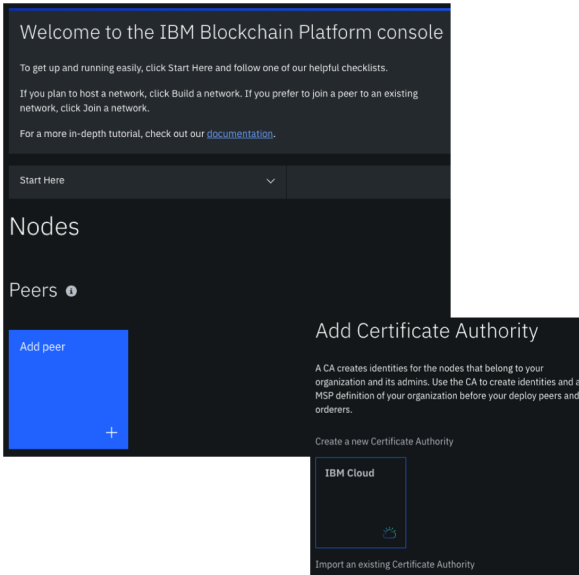


Network Architecture and Participant Roles



IBM Blockchain Platform for Network Service Providers

Governance of changes to the blockchain network

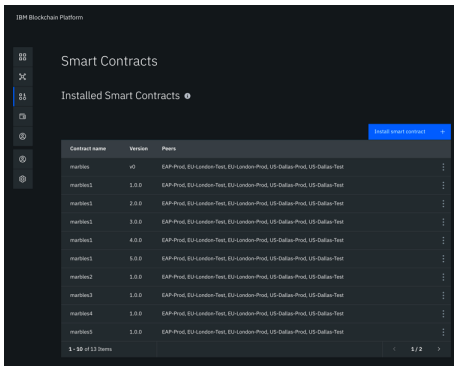


- Network Service Providers play a vital role in a blockchain network
 - Initiating the network
 - Creating membership, channel and smart contract policies
- Typically covers **changes to the network**; common recurring tasks (e.g. certificate management) are managed by Network Service Consumers
- Either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

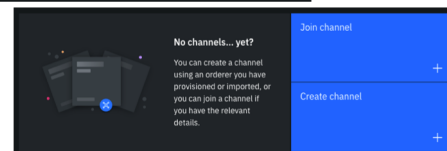
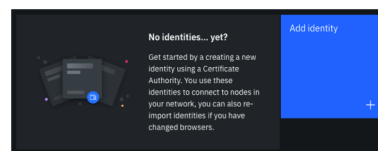
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IBM Blockchain Platform for Network Service Consumers

Operate a subset of peers in a blockchain network



- 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)



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

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IBM Blockchain Platform for Business Service Providers

Develop blockchain applications



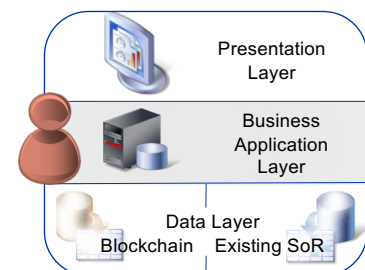
- A blockchain application consists of three components:
 - **Smart contracts:** transaction logic run on the distributed peer network
 - **Business logic:** business applications and integration services that invoke smart contracts
 - **Presentation logic:** client applications run by end-users of the 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

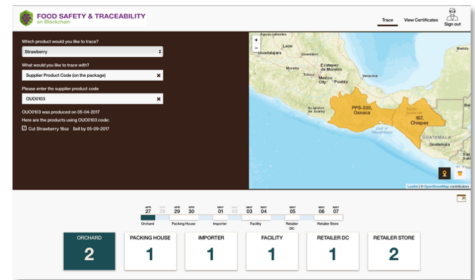
Exchange trustworthy information



- 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)

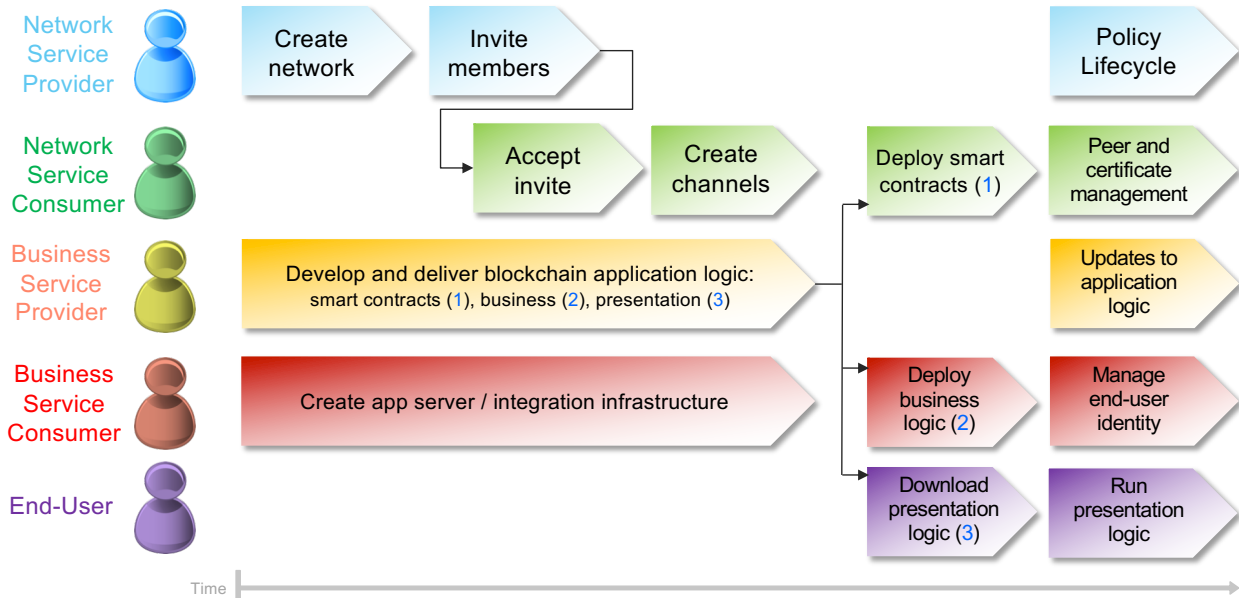
- The value proposition to end-users is that the information they see is **trustworthy**
 - Will probably be unaware of blockchain back-end
 - Uses an identity managed by the business application layer

- Many options for presentation logic implementation
 - IBM Blockchain Platform can integrate with end user applications via a REST server built using the Fabric SDK

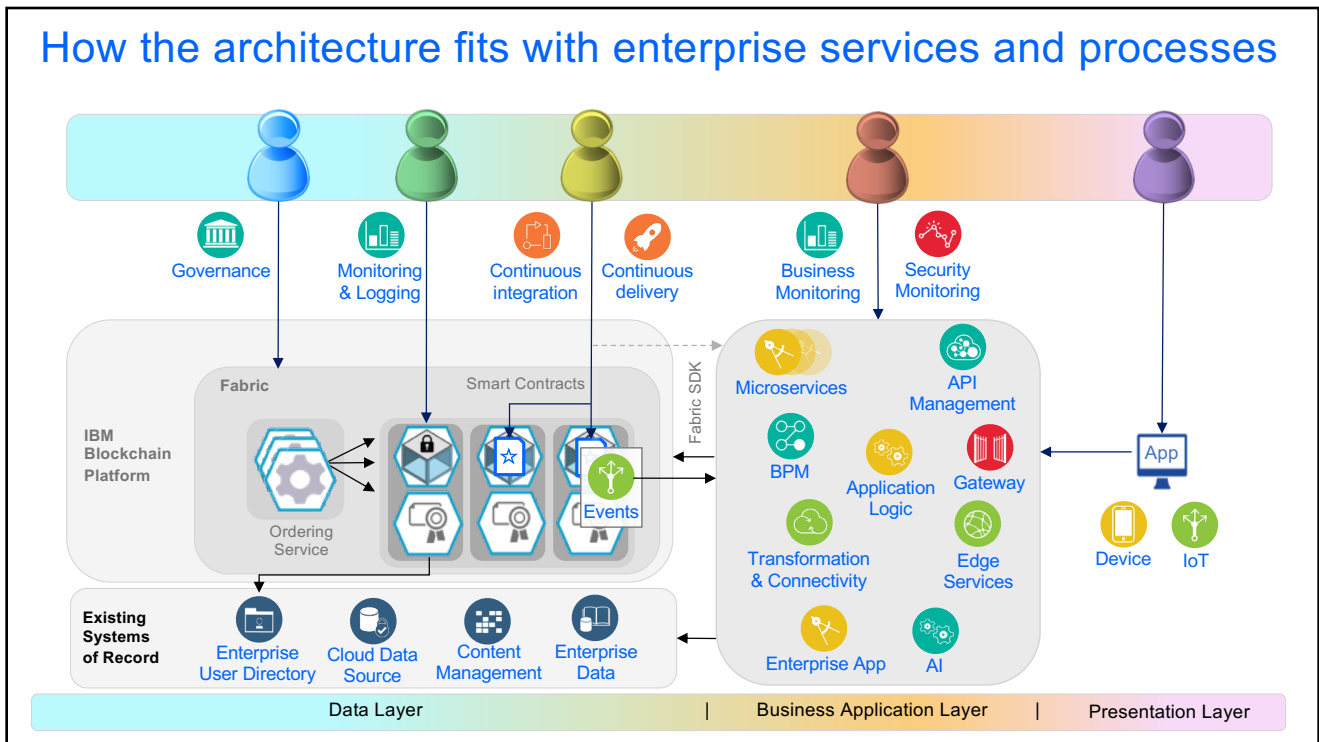


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Workflow for Network Formation



How the architecture fits with enterprise services and processes



Continuing your blockchain journey...



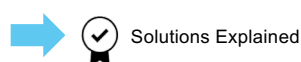
Business Stakeholder

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



Solution Architect

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

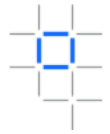


Developer

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



Further information

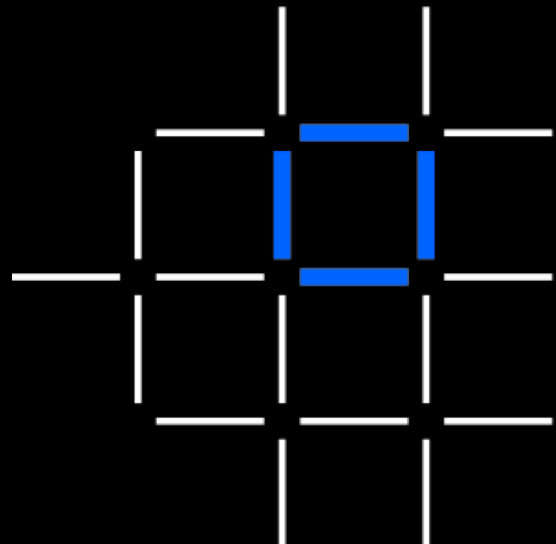


- Platform Information
 - <https://www.ibm.com/blockchain/platform/>
- Technical Overview
 - <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=KUW12555USEN&>
- Platform Service
 - <https://console.bluemix.net/catalog/services/blockchain>
- Platform Service Level Agreement
 - <https://www-03.ibm.com/software/sla/sladb.nsf/sla/bm-7836-03>
- ISO Certification
 - https://www-935.ibm.com/services/multimedia/saas_27k.pdf
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IBM **Blockchain**





Thank you



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