IBM Blockchain Platform

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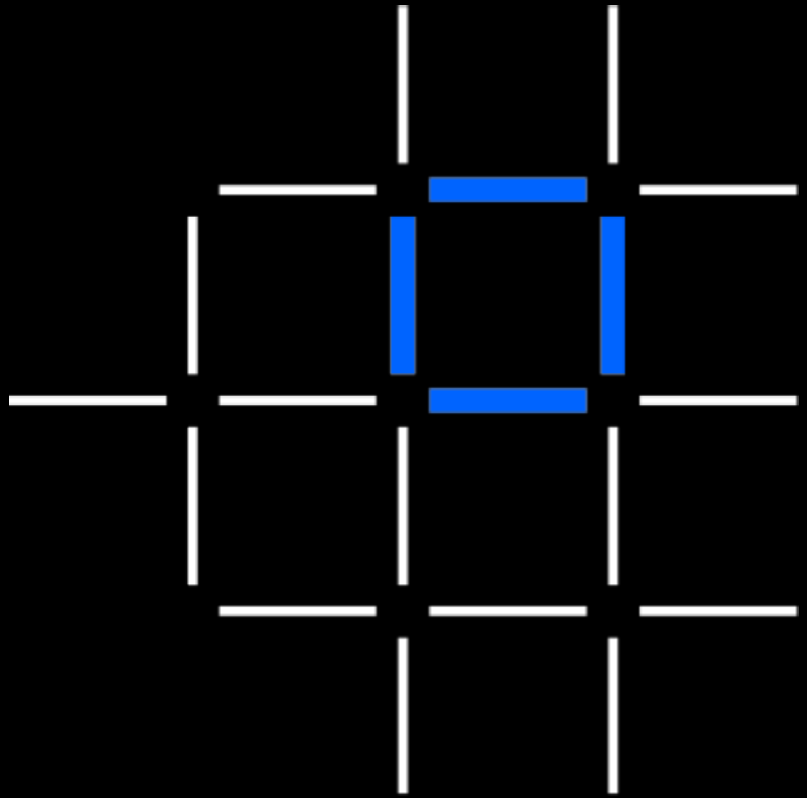
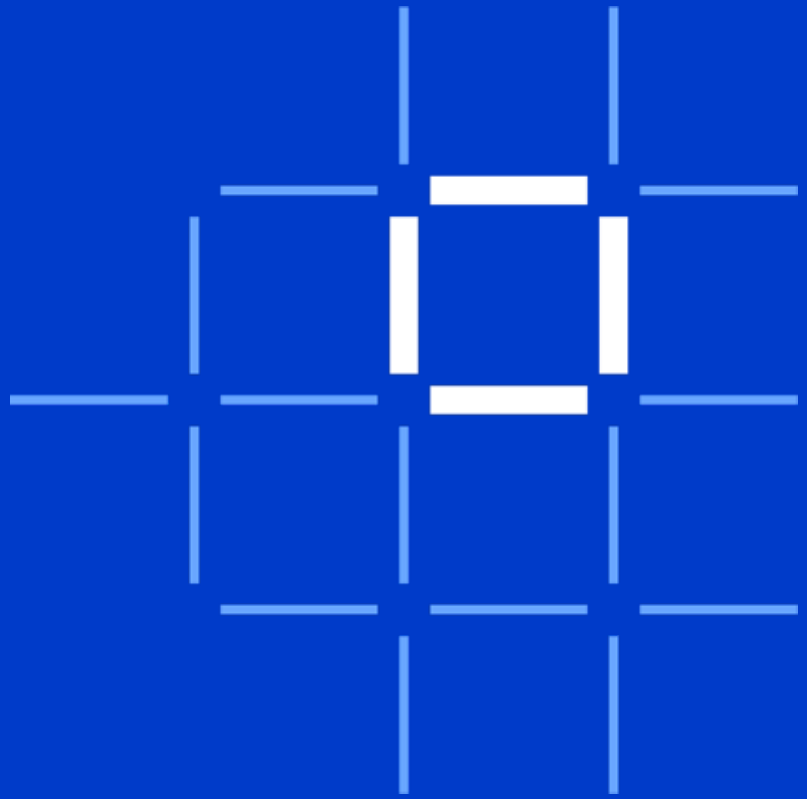


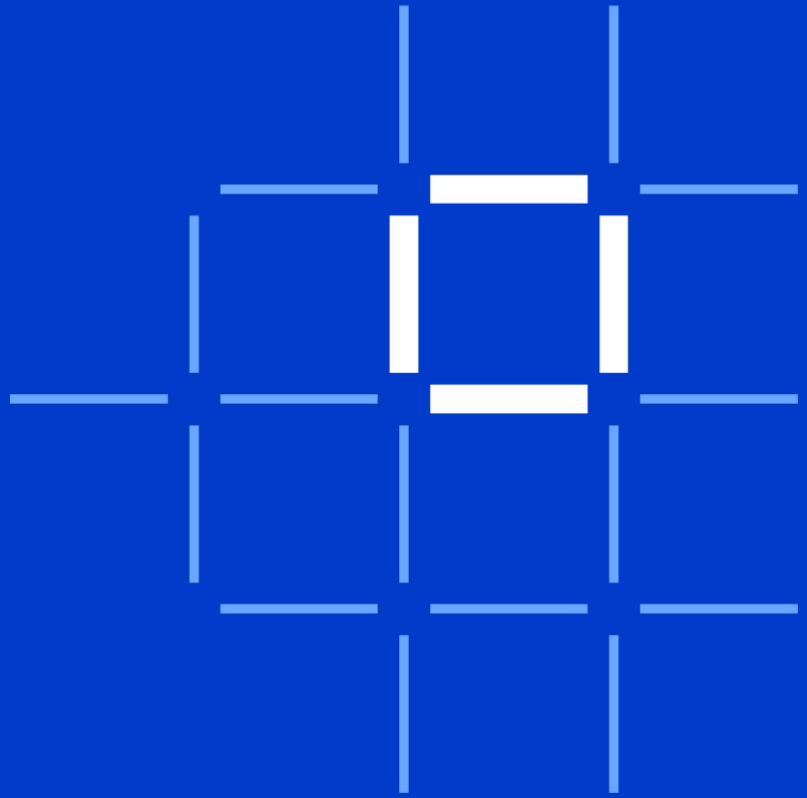
IBM Blockchain Platform

Demo

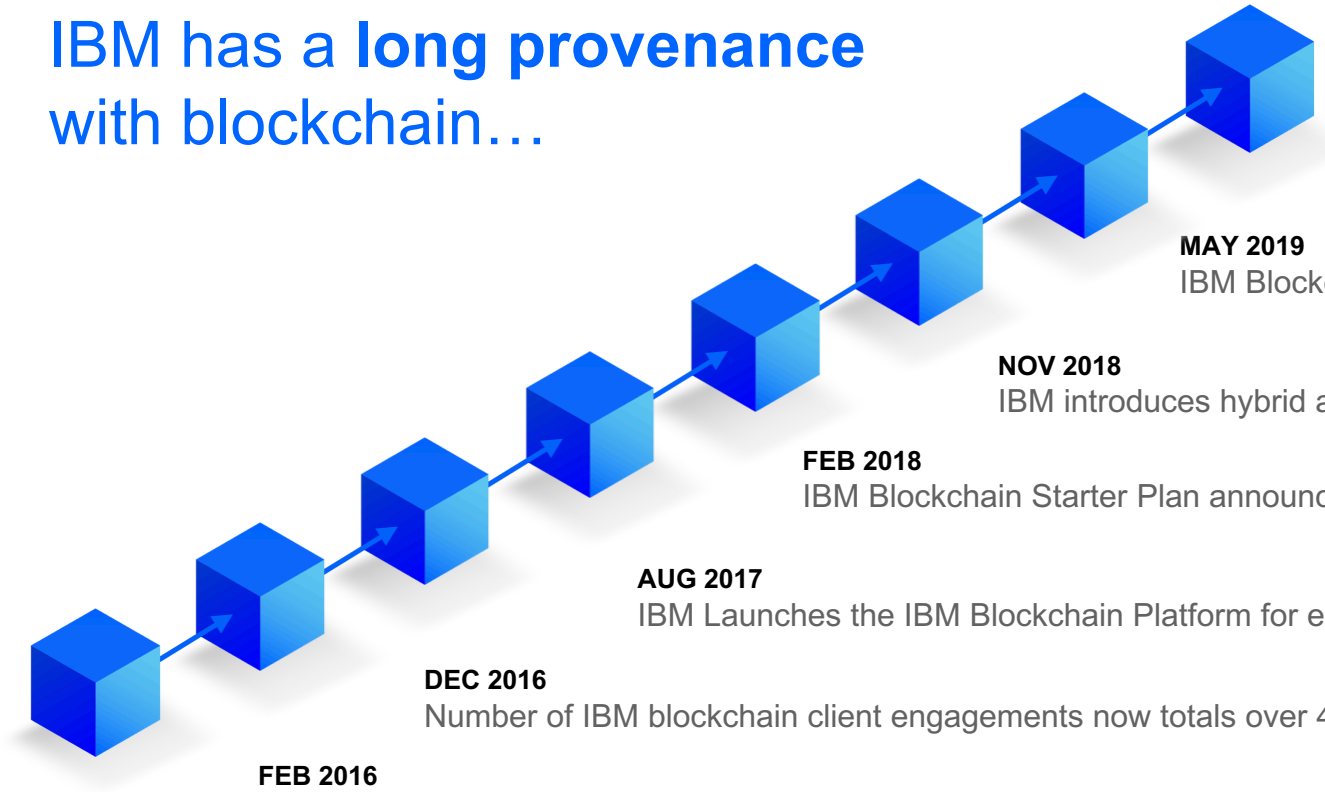
Why IBM Z



IBM Blockchain Platform



IBM has a **long provenance** with blockchain…



JUNE 2019
IBM Blockchain Platform for Multicloud released

MAY 2019
IBM Blockchain Platform for IBM Cloud released

NOV 2018
IBM introduces hybrid and multi-cloud networks

FEB 2018
IBM Blockchain Starter Plan announced at THINK

AUG 2017
IBM Launches the IBM Blockchain Platform for enterprise use cases

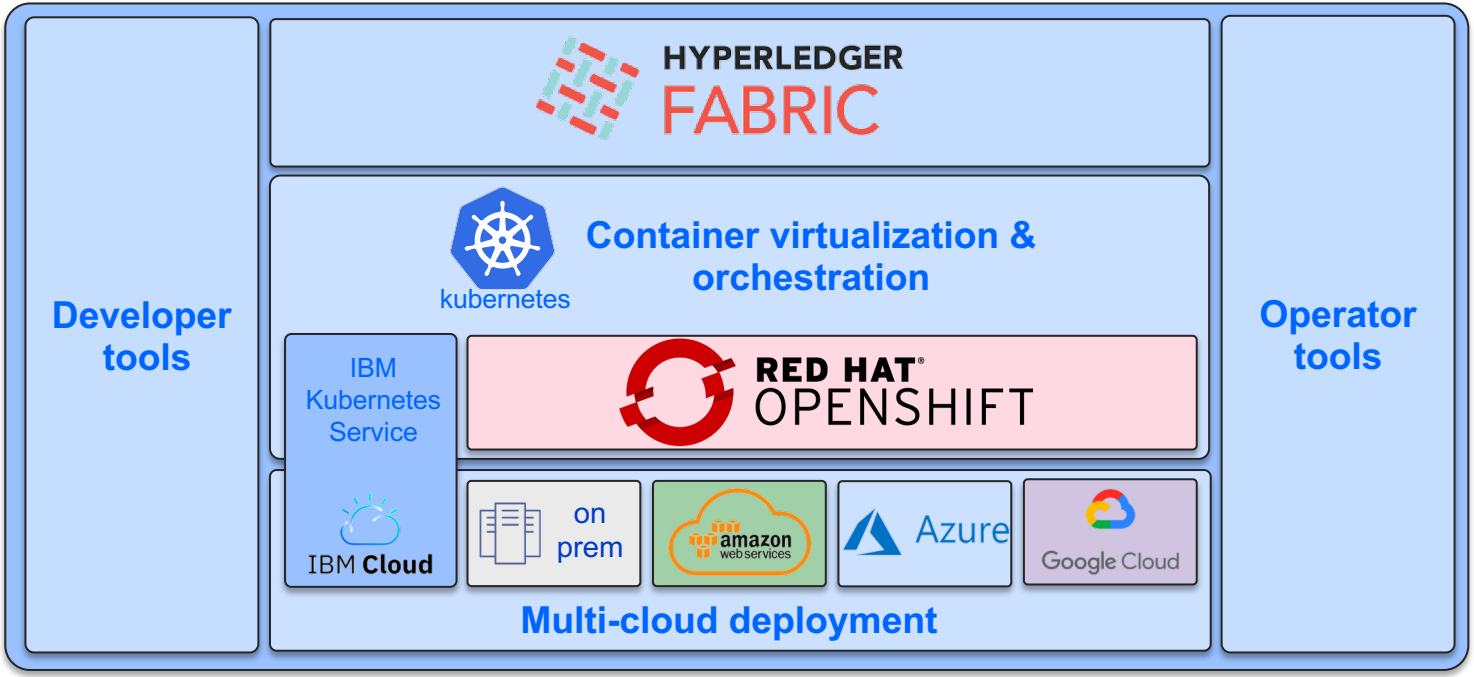
DEC 2016
Number of IBM blockchain client engagements now totals over 400

FEB 2016
IBM becomes a founding member of Linux Foundation Hyperledger; donates code and intellectual property

AUG 2015
IBM starts developing first prototype of blockchain technology (Open Blockchain); first client engagements

Introducing **IBM Blockchain Platform**

Build, operate and grow Hyperledger Fabric networks



Advanced tooling
Create & manage smart contracts, applications & networks

Open technology
Hyperledger Fabric, Containers, Kubernetes

Deploy anywhere
Comprehensive cloud & on-premises options

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

Self—Managed

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

OPENSHIFT

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.

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

OPENSHIFT

aws

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

IBM Managed

IBM hosts it for you through its IBM Cloud services

IBM Cloud

IBM Blockchain Platform For IBM Cloud

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

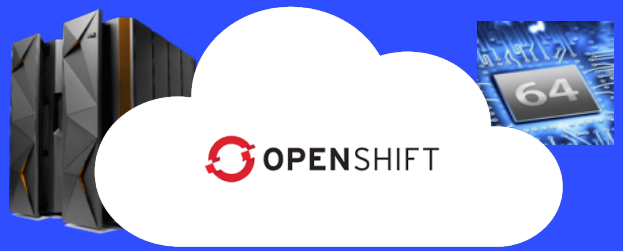
IBM Blockchain Platform for Multicloud

- Deploy a distributed peer or the entire network to an environment of your choice
  - Supports **data residency**, **regulation** and **compliance** requirements
  - Includes single/Raft instances of orderers

- IBM Blockchain Platform distributed peers on Red Hat OpenShift (OCP) leverage the ordering service and certificate authorities running on IBM Cloud

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.

Included Capabilities

Easily build, manage, and grow your blockchain applications

- **Console** (User Interface)
  - Deploy
  - Manage
  - Upgrade
  - Govern
  - Scale
- **APIs** to automate operations
- Compatibility with **IBM Blockchain Platform Extension for VS Code** to easily write and deploy smart contracts
- Includes Certified Images for Hyperledger Fabric v1.4.x
- **Multicloud** capabilities
  - Compatibility with other IBM Blockchain Platform deployments – import and manage any node
  - Compatibility with other Hyperledger Fabric deployments – connect to any Hyperledger Fabric node to form a network
- Easily deploy IBM Blockchain Platform to **Kubernetes** via OpenShift

Why IBM Blockchain Platform software?

It should be considered by clients with data residency, on-prem, or other public cloud requirements.

DATA RESIDENCY

Address data residency requirements

IaaS OF CHOICE

Enables organizations to work with their IaaS of choice without being locked into a single vendor

ON-PREMISES DEPLOYMENT

Have a copy of your ledger on your own infrastructure

NETWORK GROWTH

Recruit consortia members who also need deployment flexibility and on-prem capabilities

IBM Blockchain Platform vs IBM Blockchain Platform for IBM Cloud Private

Features & Capabilities	**IBM Blockchain Platform (New!)** *requires Red Hat OpenShift*	**IBM Blockchain Platform for IBM Cloud Private**
Easy to use Console (UI)	Yes	Yes
Fastest Transaction Speeds with LevelDB	Yes	No
Hyperledger Fabric Versions	1.4.3	1.4.1
Governance: Update admin certificate	Yes	No
High Availability Certificate Authority	Yes	No
Security: Improved CA security	Yes	No
Infrastructure	Kubernetes via Red Hat OpenShift 3.11 (not included; excludes OpenShift Online which is not compatible)	Kubernetes via IBM Cloud Private (Foundations version included)
Z/LinuxOne support	No – planned for future pending Z/OpenShift compatibility	Yes
Supported environments	See OpenShift documentation the up to date list Currently OpenShift 3.11 has been tested with AWS, Azure, Google Cloud, VMware, OpenStack, on premises and others	AWS, Azure, VMware, OpenStack, on premises and others

IBM Blockchain Platform for Multicloud

- Deploy a distributed components in 10-15 minutes using OCP templates
  - Supports **data residency**, **regulation** and **compliance** requirements
- Distributed peers on OCP/AWS leverage the ordering service and certificate authorities running on IBM Cloud
- Support provided by the IBP resource and support forums

Hybrid Deployment

Deploy individual components (peers) locally within your own Private Cloud (OCP) 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

IBM Blockchain Platform for IBM Cloud

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

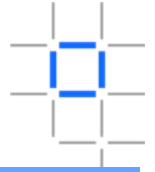
The next generation

Provision the next generation of hybrid blockchain networks

The easiest way to get started

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 (CP)
- 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

Why the New IBM Blockchain Platform?

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

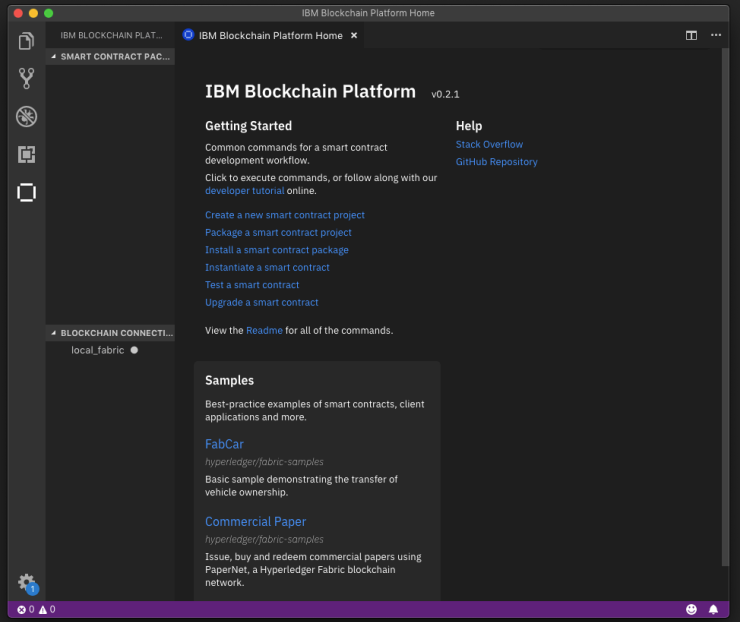
- Connect to nodes running in any environment (on-premises, public, hybrid clouds)
- Easily connect a single peer to multiple industry networks
- Start small, pay as you grow for what you use with no upfront investment and upgrade easily through Kubernetes

IBM Blockchain 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

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

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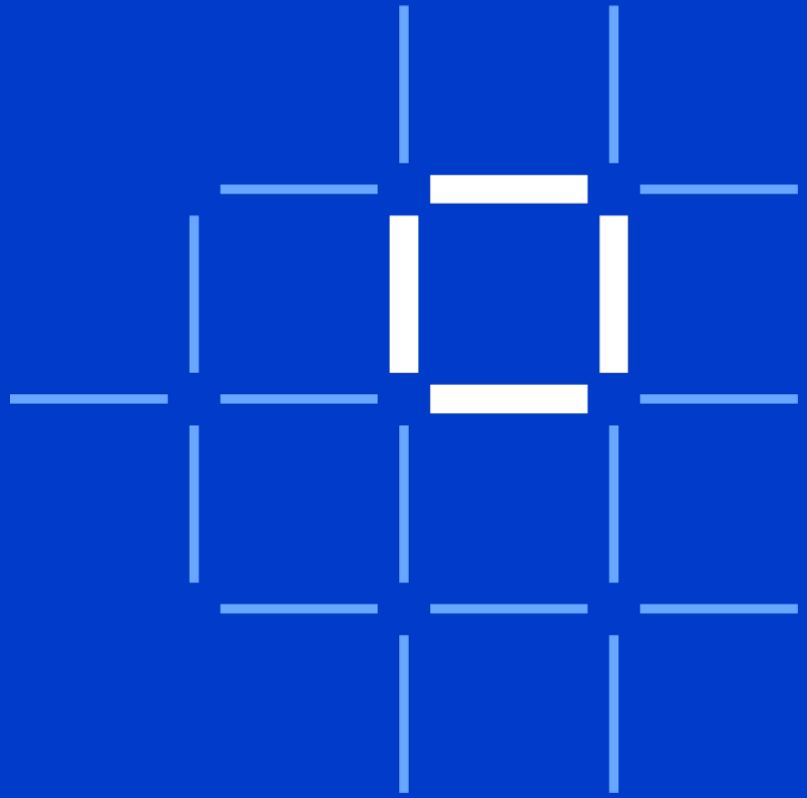

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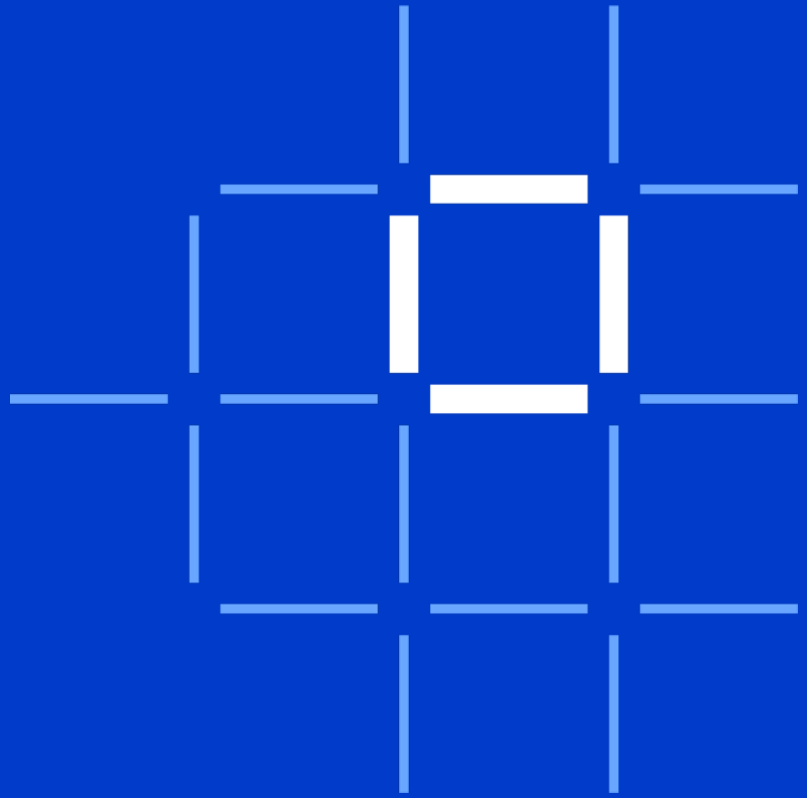


IBM Blockchain Platform on LinuxONE

Same experience on the power of LinuxONE

Integration

Seamless and low latency connections between legacy applications

Scalability

Scale peers horizontally, multiple secure peers hosted on the same infrastructure

User Interface

One User Interface, multiple platforms

Modern Development

*Hyperledger Fabric on **Kubernetes** that can be deployed through IBM Cloud Private*

Helm charts to ease deployments

Tooling

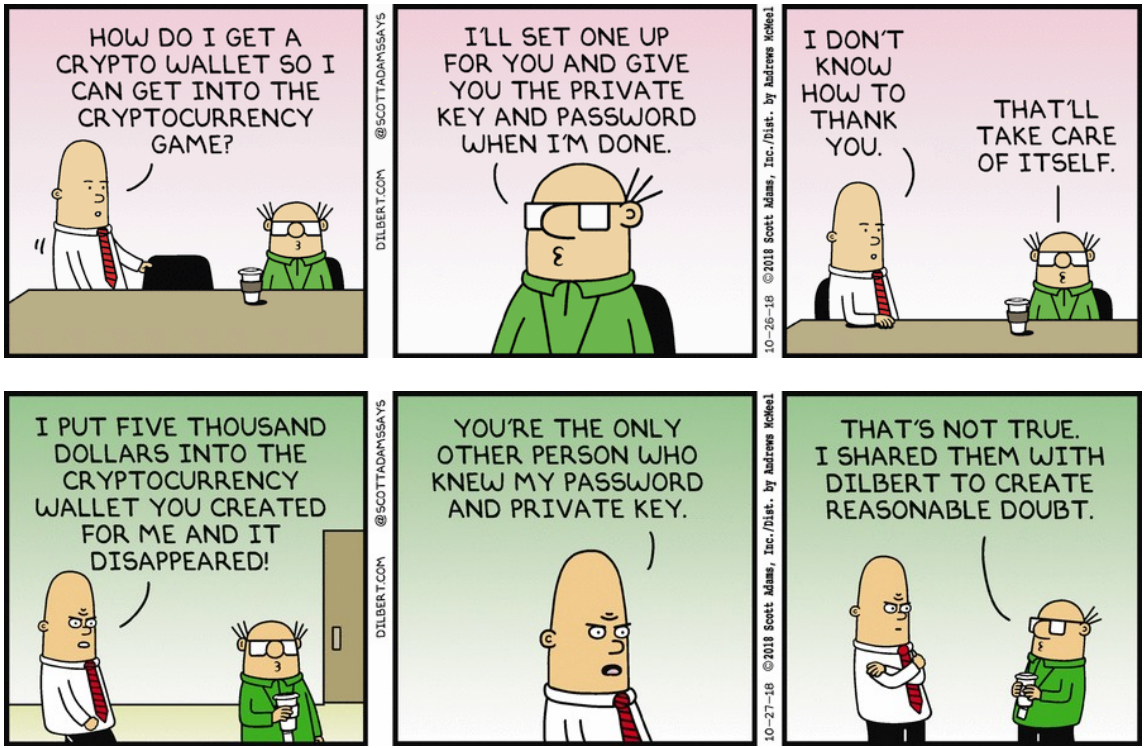
***Operational tools** that enable administrators to manage, monitor and govern their nodes across any deployment.*

IBM Cloud Private

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

IBM Blockchain Platform benefits from Z Security

Workload Isolation	Enables isolation of network components on one system from each other and from other processes
Integrated Crypto Hardware	Every transaction requires signatures and verification which involves crypto (make sure this is done right)
Key Encryption & Management	Protect your keys -> your keys are your identity (estimated 1.1 $billion worth of cryptocurrency stolen in 1st half of 2018)
Data Encryption	Blockchain has potentially sensitive data -> protect with encryption
Network Encryption	Protect data transmitted between application, blockchain components, and integrated systems
Time Source Security	Blockchain timestamps crucial to keeping accurate ledger



FIPS 140-2 Level 4 – What is the difference?

Security requirements	Security level 1	Security level 2	Security level 3	Security level 4
Environmental Failure Protection Protection against attacks using extreme voltage or temperature.	—	—	—	✓
Tamper resistance Incl. active and immediate zeroization of plain text secret keys in case of attacks.	—	—	—	✓
Identity-based authentication The operator be individually identified.	—	—	✓	✓
Enhanced protection of secret and private keys Key entry and output only encrypted or in split-knowledge procedure.	—	—	✓	✓
Tamper detection and response Attempts at removal or penetration of the strong enclosure will have a high probability of causing serious damage to the module, i.e., the module will not function.	—	—	✓	✓
Tamper evidence An attack leaves visible traces. The attack may have been successful.	—	✓	✓	✓
At least one cryptographic algorithm or security function implemented	✓	✓	✓	✓
FIPS 140-2				

How we protect our keys – Why FIPS matters?

- Why risk the protection of the most important part of a blockchain?
- How do you access your keys to do transactions?
- Keys never in the clear
- Domains – more master keys per card
- TRNG

Keeper of the keys!

TECH • BITCOIN

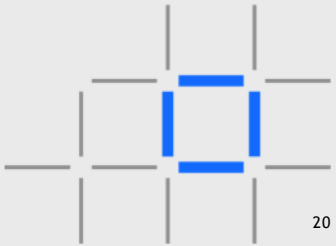
Bitcoin Worth $72M Was Stolen in Bitfinex Exchange Hack in Hong Kong

CEO of Canadian Exchange QuadrigacX Dies With Private Keys to Cold Wallet

You're not using bitcoin – **Why should you care about key safety with blockchain for business?**

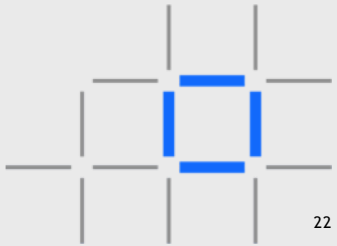
IBM Blockchain Platform benefits from Co-location on IBM Z with core transaction systems

Integration with transaction systems		Integrate Blockchain apps with legacy systems that contain connected information such as PII
Performant communication		Important for blockchain to reduce latency between network components to increase tx/s and to reduce wait time when connecting to legacy systems for information
Scalability ’Data center-in-a-box’		Grow your blockchain network to suit your needs (CPU, Memory, Network)
Operational efficiency		Manage your system efficiently and securely



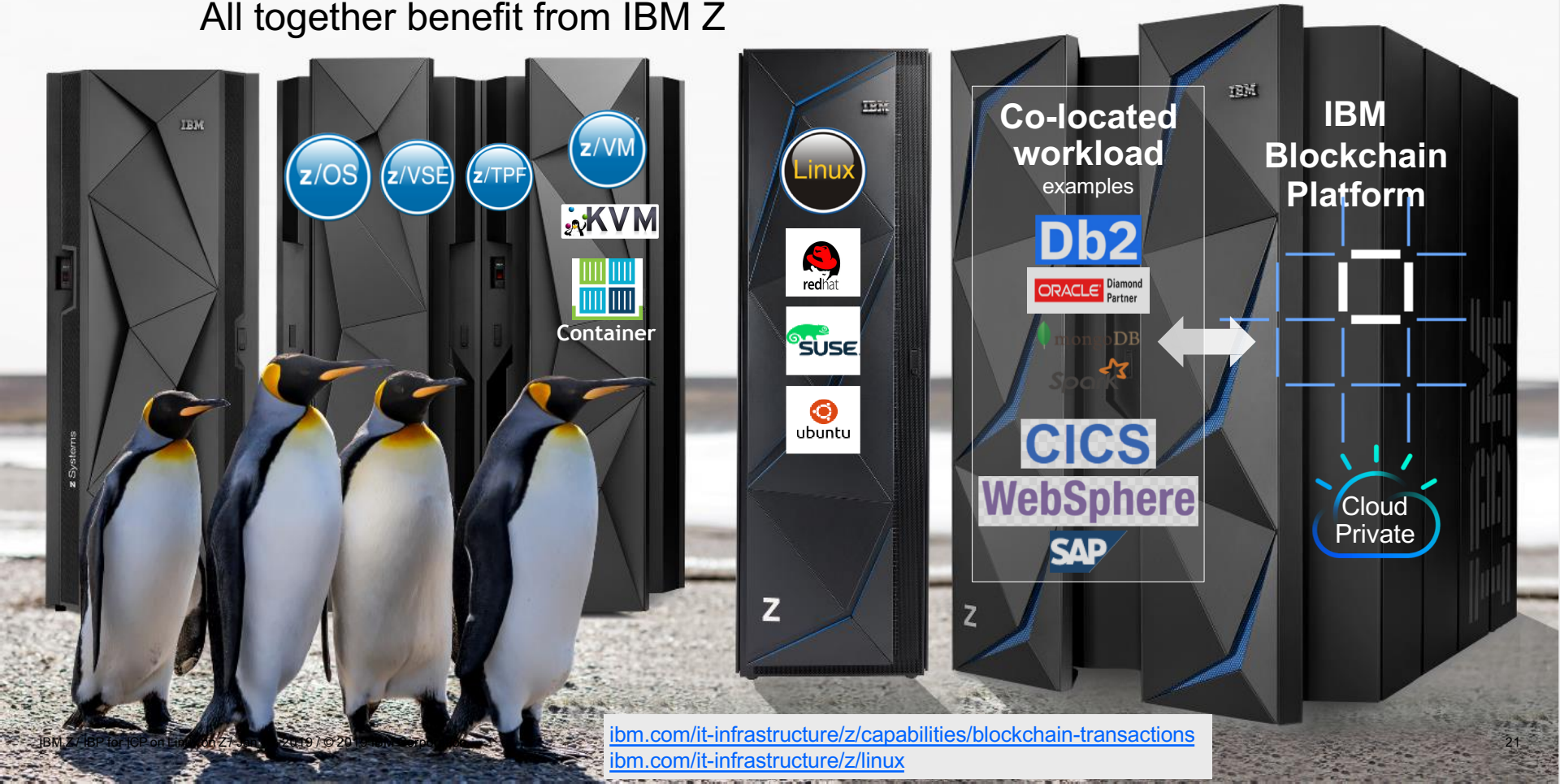
IBM Blockchain Platform benefits from IBM Z RAS

Extensive self-checking and self-recovery capabilities	Keep your blockchain up and running
Concurrent replace, repair, and upgrade	Make upgrades as needed
Redundant array of independent memory (RAIM) technology	You use blockchain to come to a consensus on which data should be on the ledger, make sure all this work is preserved by protecting data in case of emergency
Near-continuous availability and disaster recovery solutions	Make your blockchain network available to all participants all the time



IBM Blockchain Platform on IBM Z

All together benefit from IBM Z



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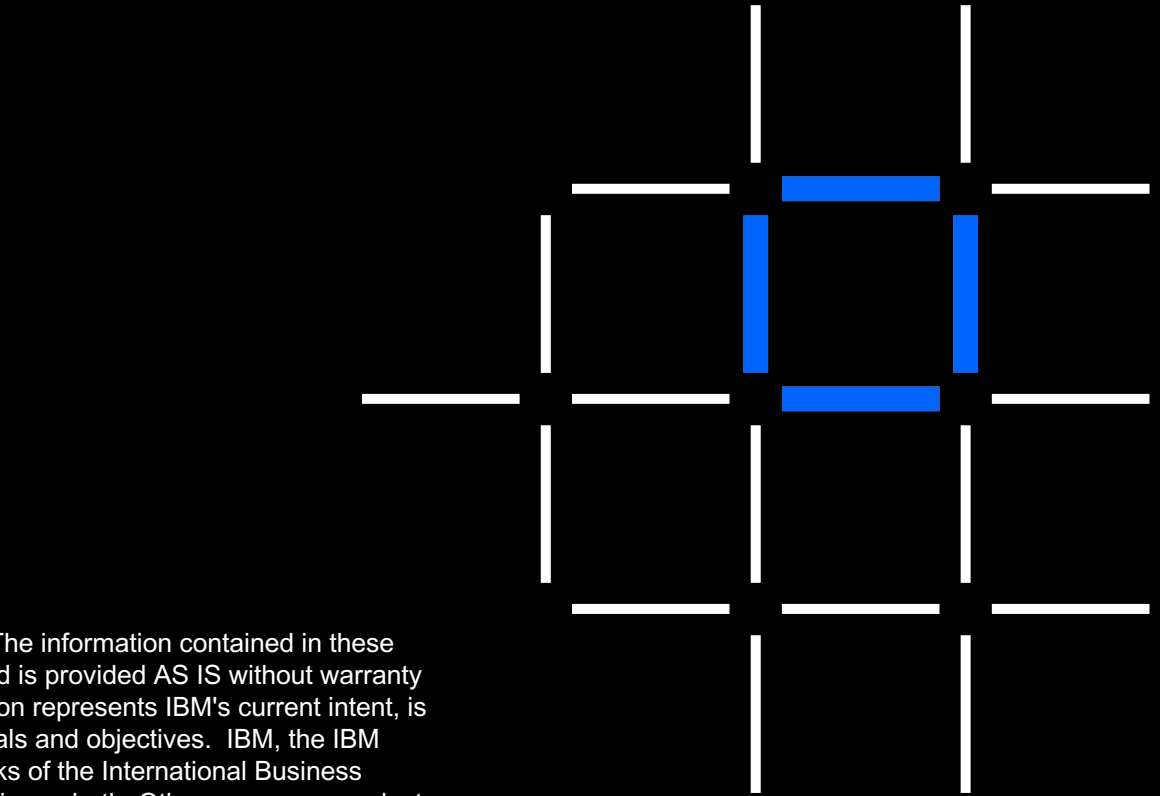
Thank you

IBM **Blockchain**



www.ibm.com/blockchain

developer.ibm.com/blockchain

www.hyperledger.org

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