Blockchain(区块链)

-- A new disruption in digital applications

LING Zong, Ph. D.
Senior Software Engineer / Scientist
IBM Almaden Research Center
San Jose, California, U.S.A.

About Speaker

LING Zong (凌 棕), Ph. D.

Senior Software Engineer / Scientist

IBM Almaden Research Center, San Jose, California, U.S.A.

Routine Work (Engineering and Services):

1. **(60%) Research and Development**
   - **On Cloud Data Storage Management Software**
2. **(25%) Critical Customer Services**
   - **In Special Weapon Attack Team (SWAT)**
3. **(10%) Global Training and Academic Lectures**
   - **As a Technical Evangelist and University Ambassador**
4. **(5%) Technical Consultations**
   - **For Venture Capital Investment in the Silicon Valley**

A global citizen based in the Silicon Valley

Contents

Why?

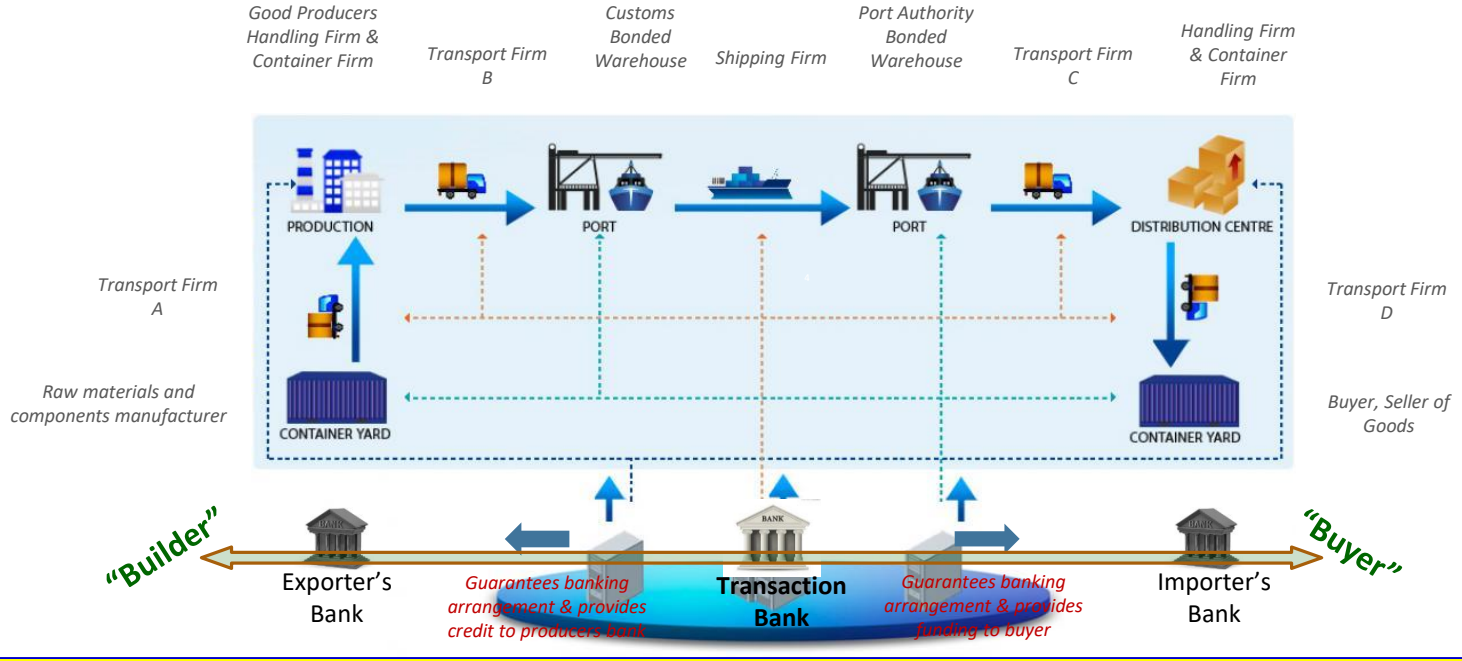
- Motivations
- Concepts
- Use Cases
- IBM Offers
- Demo

Payment Transactions: Today

Why?

Almost completely manual with a single "transaction" taking as long as 50 days!

几乎完全手工操作，单笔交易需要长达50天的时间



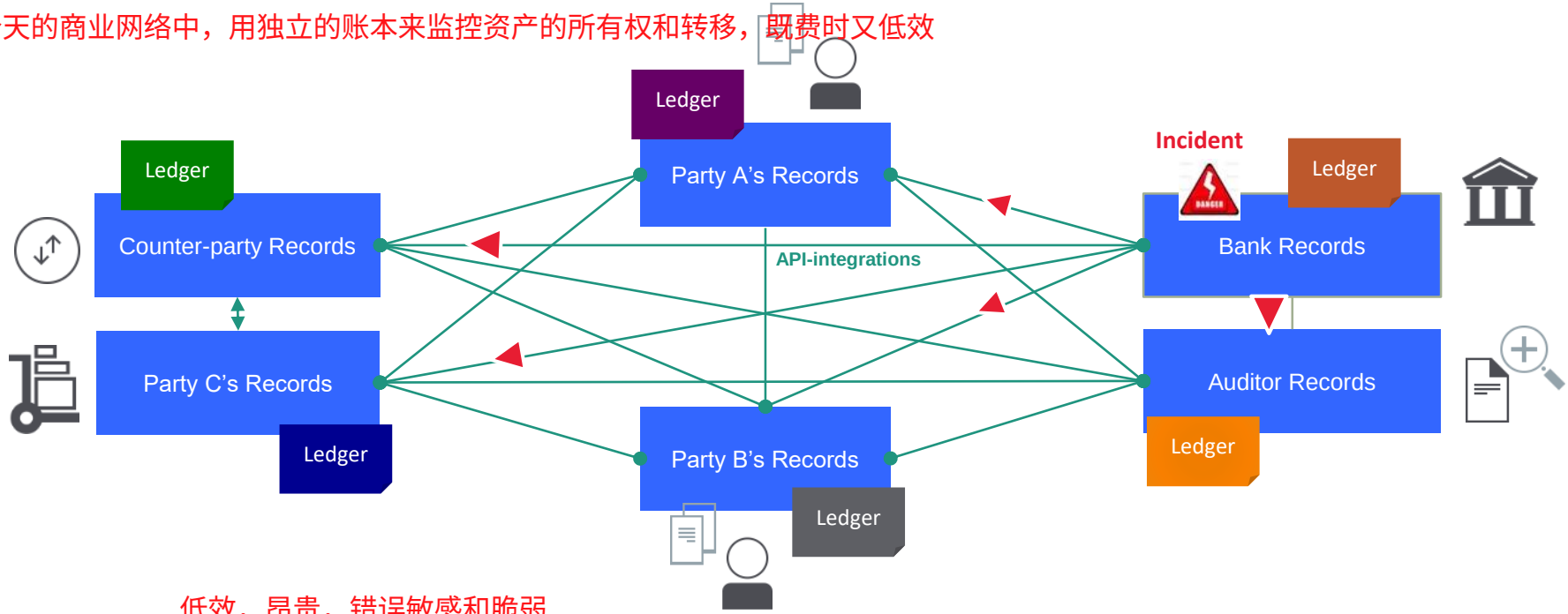
"The trade happens in seconds, but it takes days to complete the transaction."

-- Global Head of Technology Business Development, Goldman Sachs

Why?

Problem - Time consuming and inefficient to monitor asset ownership and transfers in today's business network with **independent ledgers**

在今天的商业网络中，用独立的账本来监控资产的所有权和转移，既费时又低效



低效，昂贵，错误敏感和脆弱

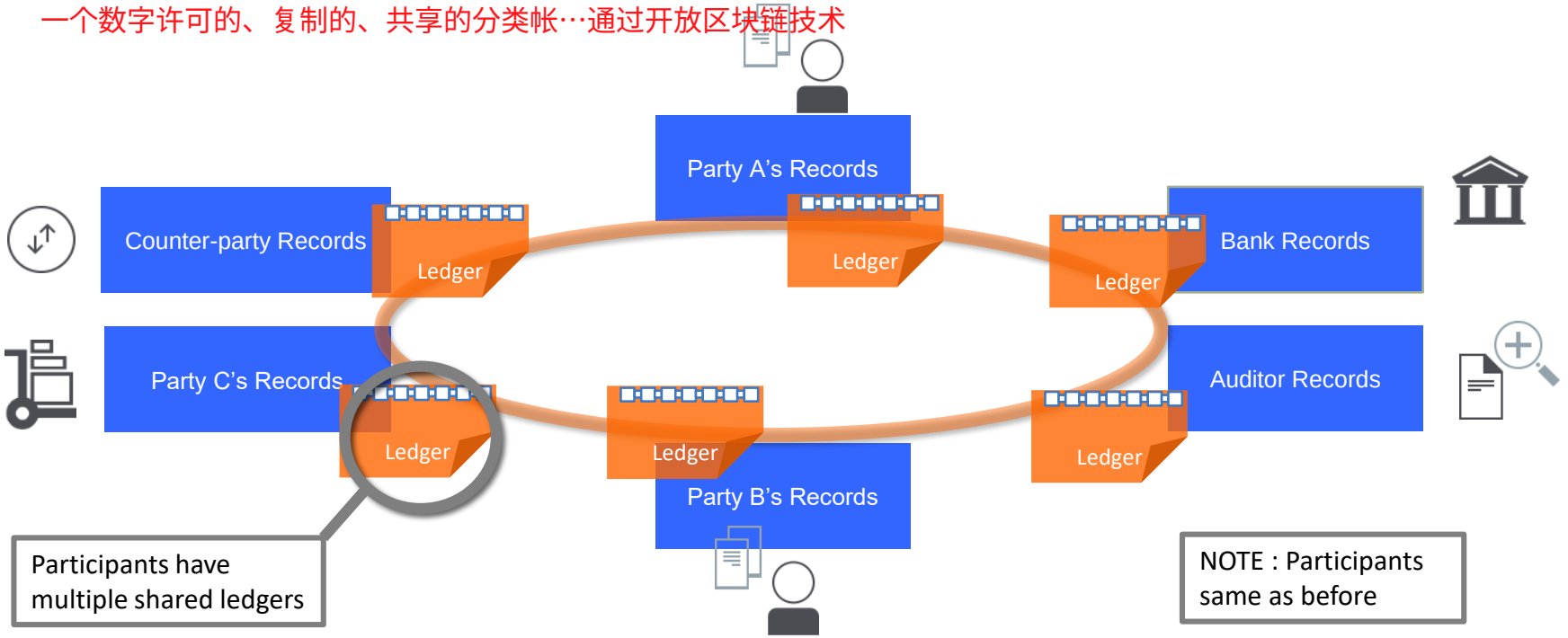
Inefficient, expensive, error sensitive and vulnerable

Solution – a digital permissioned, replicated, shared ledger

…enabled by open Blockchain technology

一个数字许可的、复制的、共享的分类帐…通过开放区块链技术

Why?



一致性、效率、安全性和弹性

Consistency, efficiency, security and resilience

引领计算模型到服务

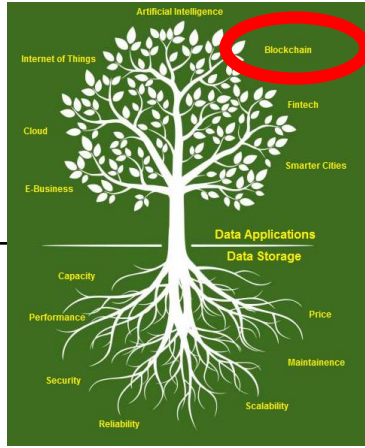
Leading Computing Models to Services

Why?

Computing-Tabulating-Recording

Personal Computers

Smart Planet



1950 1965 1980 1995 2010 2015

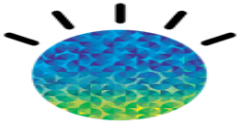
Mainframes

Internet

Watson

0101010101011111000011111000110101010101011001111110000001100100101001001001111001001010101010101111100001111100011010101010101100111111000000110010010100100100111110010010101

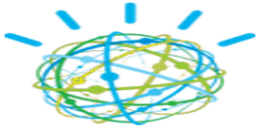
Business Analytics & Optimization



Smarter Commerce

Social Business

Smarter Cities



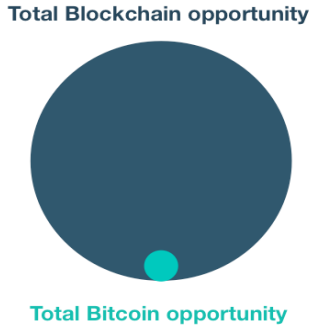
Watson Solutions

Blockchain in general

Why?

区块链是新一代事务应用程序的一项技术，它在简化业务流程的同时建立信任、可靠性和透明性。可以把它看作交互的操作系统。它有潜力极大地降低完成工作的成本和复杂性

Blockchain is a technology for a new generation of transactional applications that establishes trust, accountability and transparency while streamlining business processes. Think of it as an operating system for interactions. It has the potential to vastly reduce the cost and complexity of getting things done.



Blockchain is a **design pattern** made famous by its use in **Bitcoin**. But it's uses go *far beyond*

区块链是一种因在比特币中使用而出名的设计模式。但它的用途远不止于此

Blockchain can **reimagine** the world's most fundamental business interactions and open the door to invent new styles of digital interactions.

区块链可以重新想象世界上最基本的商业互动，开启了创新数字互动新风格的大门

IBM is adopting **Blockchain** to a very **broad range** of business applications

IBM正在非常广泛的业务应用程序中采用区块链

Value of Blockchain Technology

What?

降低成本和复杂性
Reduction of costs and complexity

共享信任的交易
Shared trusted transactions

减少错误
Reduction of errors

弹性
Resilience

Secure

可审核性
Auditability

Why?

区块链在金融服务业——一场数字革命

Blockchain in Financial Services - a Digital Revolution

区块链是一个新兴的交易服务平台。区块链技术有潜力从根本上改变多方业务网络，实现显著的成本和风险降低，以及新的创新业务模式。这是新一代的数字革命，继互联网一代带给我们的信息

*Blockchain is an emerging **platform** for transaction services.* Blockchain technology has the potential to radically transform multi-party business networks, enabling significant cost and risk reduction, along with new innovative business models. This is a new generation of the digital revolution, following the generation brought us the Internet of Information.

区块链将从根本上改变我们做生意的方式

Blockchain will fundamentally **change the way we do business.**

在金融服务领域,基于计算机技术的结合,区块链是巧妙地简单,革命性的协议,允许交易同时匿名和安全,点对点,即时和无摩擦,由强大的中介机构分发信任到大全球网络,通过大规模协作,聪明的代码和密码,使每笔交易的防篡改公共分类帐发生在网络上

In financial services, based on the combination of ***computing technologies***, blockchain is the ingeniously simple, revolutionary protocol that allows transactions to be simultaneously anonymous and secure, peer-to-peer, instant and frictionless, by distributing trust from powerful intermediaries to a large global network, which through mass collaboration, clever code and cryptography, enables a tamper-proof public ledger of every transaction that's ever happened on the network.

区块链是一种新的数字武器

Blockchain is NEW as a digital weapon

Why?

纵观历史，旧模式的领导者很少接受新模式

Throughout history, leaders of the old paradigms have rarely embraced the new.

在金融服务业，区块链可以从根本上降低银行成本，提高生产率，使其更容易向全球客户提供产品和服务，还可以降低行业风险，特别是批发金融。许多金融产品的结算时间需要几天，有时甚至是几周，这会占用资金，并使行业参与者面临巨大的对手风险。区块链承诺从根本上简化许多业务流程，降低风险并提高透明度

Skype vs AT&T; Paypal vs Visa; Twitter vs CNN; Uber vs taxi co; Airbnb vs Marriott…

In financial services industry, blockchain can radically **reduce costs** for banks, providing a boost to productivity and making it easier to offer products and services to a global clientele, can also **reduce risk** in the industry, particularly in wholesale finance. Settlement times for many financial products take days, sometimes weeks, tying up capital and exposing industry participants to huge counterparty risks. Blockchain promises to radically simplify many business processes, reducing risk and boosting transparency.

此外，区块链可以让我们重新构建公司，现代资本主义的支柱之一。随着全球的身份,信任,声誉和交易的p2p平台的崛起,我们将能够重新设计公司的深层结构，以促进创新和共享价值创造

Furthermore, blockchain could empower us to **re-architect the corporation**, one of the pillars of **modern capitalism**. With the rise of a global peer-to-peer platform for identity, trust, reputation and transactions, we will be able to re-engineer deep structures of the firm for innovation and shared value creation.

与之前的重大范式转变一样，区块链将创造赢家和输家

As with major paradigm shifts which preceded it, blockchain will create winners and losers!

Contents

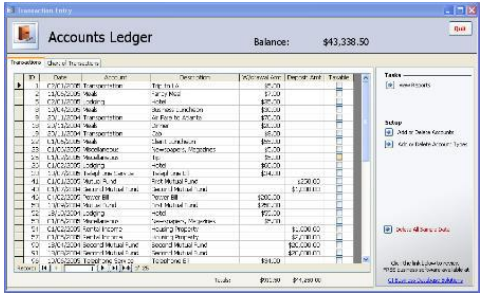
What?

- Motivations
- **Concepts**
- Use Cases
- IBM Offers
- Demo

区块链是(1)电子的，(2)分布式的，(3)复制的，(4)去中心化的分类帐

Blockchain is an (1) electronic, (2) distributed, (3) replicated, (4) decentralized Ledger

What?



Ledger is THE system of record for a business 分类账是企业的记录系统

- records asset transfer between participants. · 记录参与者之间的资产转移

企业将为其参与的多个业务网络设置多个账簿……因此可能在多个区块链中形成“对等”

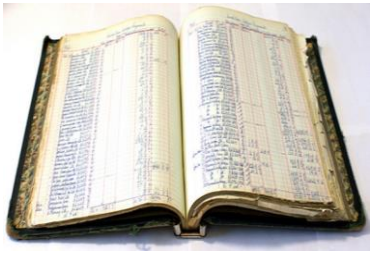
Business will have multiple ledgers for *multiple* business networks in which they participate… hence may be **“peers”** in *multiple* blockchains…..

“块”是一个已执行和验证的事务

The “Block” is an executed & verified transaction

“链条”就是总帐(所有交易纪录簿)

The “Chain” is the Ledger (book of record for all transactions)



BLOCKCHAIN

Blockchain in a Nutshell

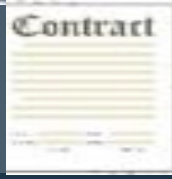
What?

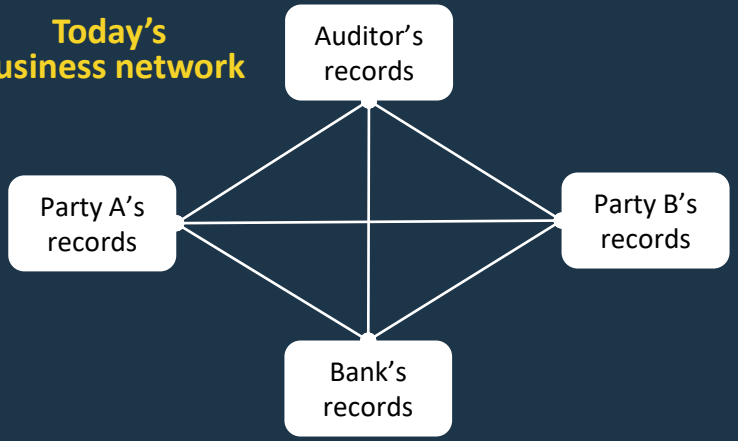
一种共享账本技术，允许商业网络中的任何参与者查看记录(账本)系统

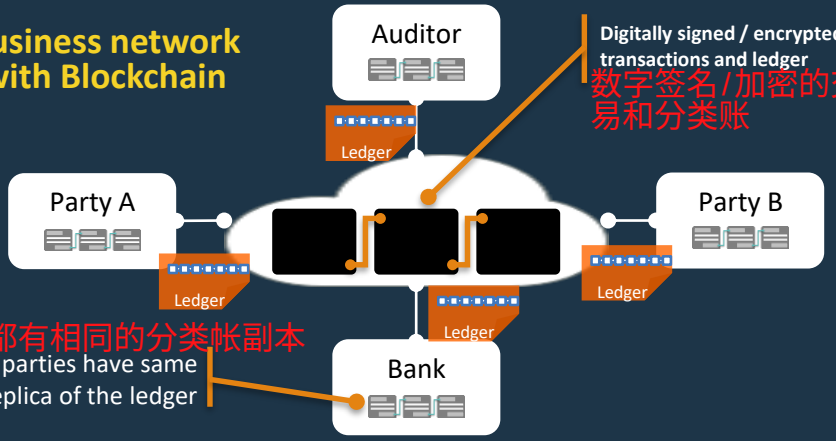
- *A **shared ledger technology** allowing any participant in the business network to see THE system of record (ledger)*

智能契约:契约隐含的业务规则，编纂在区块链中，并与可验证和签署的事务一起执行

- ***Smart Contracts**: Business rules implied by the contract, codified in the Blockchain and executed with the transaction which are verifiable and signed.*







Inefficiency, cost, error sensitiveness and vulnerability

Consensus, provenance, immutability, finality

Key Concepts of Blockchain

What?

Benefits:

Saves Time

事务时间从几天到瞬时附近

Transaction time from days to near instantaneous

Removes Cost

管理费用和成本中介

Overheads and cost intermediaries

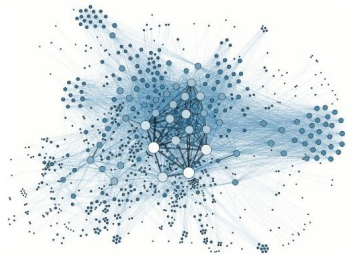
Reduces Risk

贿赂、欺诈、网络犯罪

Tampering, fraud & cyber crime

分布式共享帐单

Distributed shared ledger

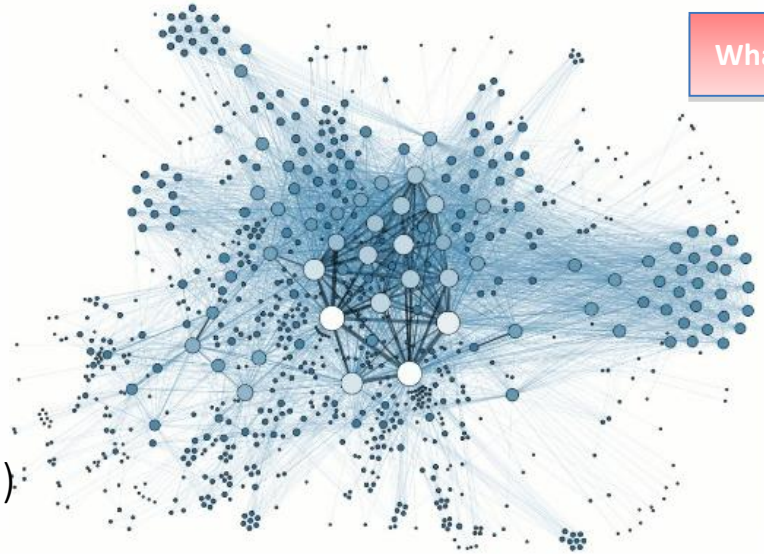


Cryptography

Consensus

Smart contracts

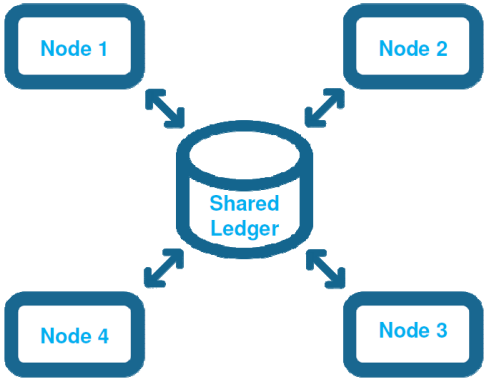
Distributed shared ledgers



What?

- Group of replicated logs/databases (nodes)
- Transactions distributed in blocks
- All nodes hold all transactions
- Parties identified with public key (= anonymised)
- Accessibility of transactions depending on blockchain implementation
- Resilient for failure of one or more nodes
- Group of nodes operate tamper proof

· 复制日志/数据库(节点)组
· 按块分布的事务
· 所有节点保存所有事务
· 使用公钥标识的各方(=匿名)
· 事务的可访问性取决于区块链的实现
· 对于一个或多个节点的故障具有弹性
· 一组节点操作防篡改

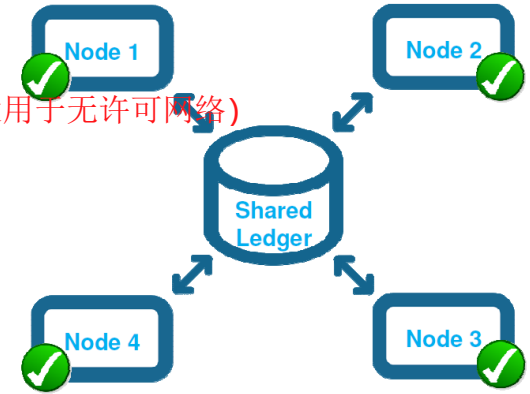


Consensus

What?

- Consensus = Majority of nodes agree on validity of transactions
- Includes validation on double-spending
- Permissionless (public) vs. permissioned (private) blockchain setup
- Proof-of-work / proof-of-stake the proof validity of node
  (only applicable for permissionless network)

· 一致=大多数节点同意事务的有效性
· 包括重复消费的验证
· 无许可(公开的)与许可(私有的)区块链设置
· 工作证明/权益证明节点的有效性证明 (只适用于无许可网络)

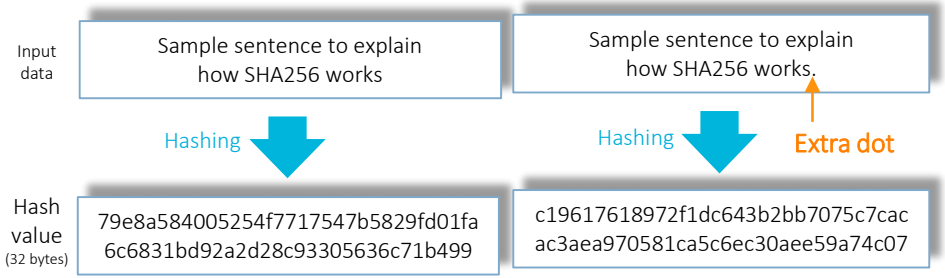


Cryptography

Hashing

创建一个表示其他字符串内容完整性的位字符串(摘要)。更改原始字符串中的一个字符将导致完全不同的散列。需要在很长一段时间内使用大量的处理能力，才能改变原始字符串中的多个字符，产生相同的散列。

Creation of a bit string (digest) representing integrity of content other string. Changing one character in the original string results in complete different hash. Changing multiple characters in original string that results in the same hash requires large amount of processing power for a long period of time.



Public & private keys and wallets

两个彼此有数学关系的大素数。用一个密钥加密的字符串只能用另一个密钥解密。一个密钥需要保密，另一个密钥可以公开，以便其他各方可以使用它以安全的方式与您交换数据。私钥需要被存储，只有所有者才能访问它，这可以在个人设备(pc、智能卡、u盘、电话)上完成，也可以通过服务提供商远程完成(冷热钱包)

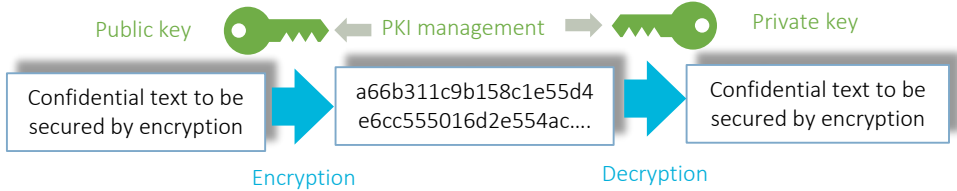
Two large prime numbers that have a mathematical relation with each other. A string encrypted with one key can only be decrypted with the other. One key needs to be kept private, the other one can be made publicly known so that it can be used by other parties to exchange data with you in a secure manner. Private keys need to be stored that it is accessible only for owner. This can be done on personal devices (PC, smart card, USB stick, phone, …) or remotely with a service provider (cold and hot wallets).

What?

使用接收方的公钥对明文进行置乱，以便该私钥的持有者是唯一可以对该消息进行解码的人。它用于保证所交换数据的机密性

Encryption

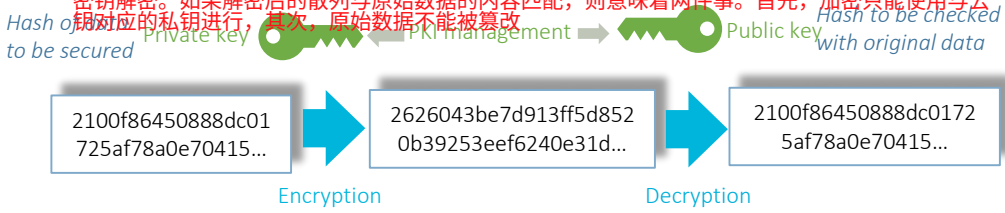
Scrambling of clear text with the public key of the recipient so that the holder of that private key is the only one that can descramble the message. This is used to guarantee the confidentiality of the data exchanged.



Digital signature

Encryption of hash representing of original data to be secured with the private key of the sender (called digital signature) that is decrypted by the recipient with the public of the sender. If the decrypted hash matches the content of the original data it implies two things. First, the encryption can only be performed with the private key corresponding with public key and secondly, the original data can't be tampered with.

用发送方的私钥(称为数字签名)对表示原始数据的散列进行加密，该私钥由接收方用发送方的公共密钥解密。如果解密后的散列与原始数据的内容匹配，则意味着两件事。首先，加密只能使用与公钥对应的私钥进行，其次，原始数据不能被篡改



Smart Contracts

What?

可以分配给区块链上交易的业务逻辑

- Business logic that can be assigned to a transaction on the blockchain

充当区块链交易的“公证人”

- Acts as a ‘notary’ of blockchain transactions

持有可以/必须执行特定操作的条件

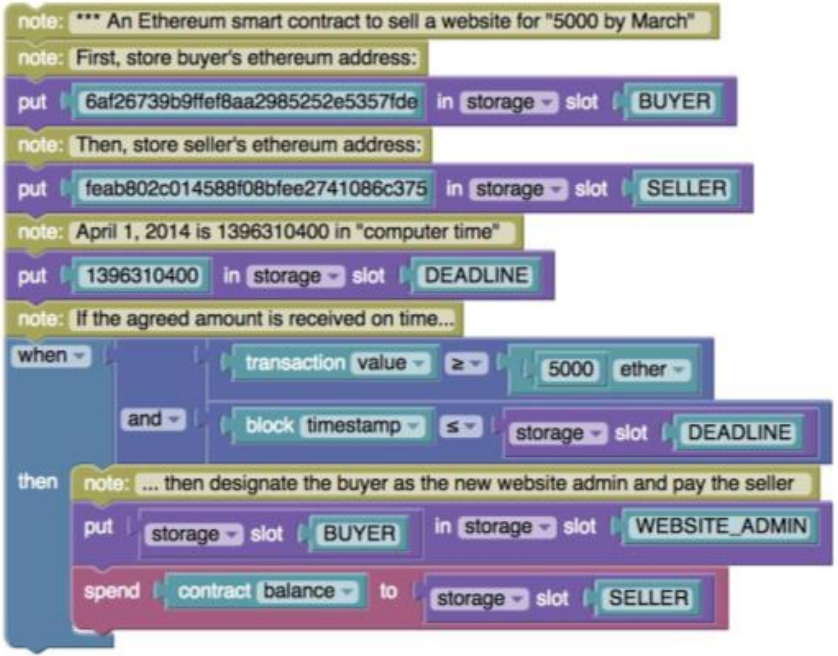
- Holds conditions under which specific actions can/must be performed

促进托管服务

- Facilitates escrow services

没有预定义权限不能修改

- Can’t be modified without predefined permissions

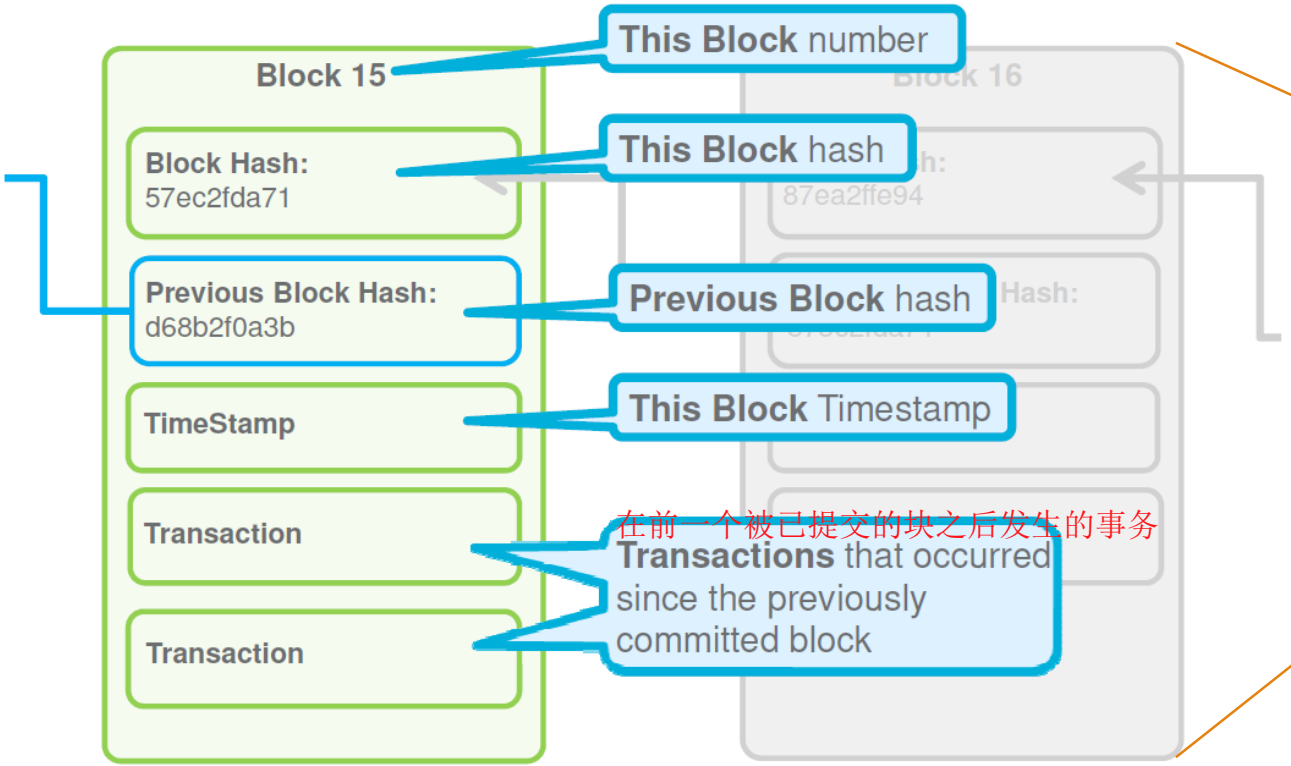


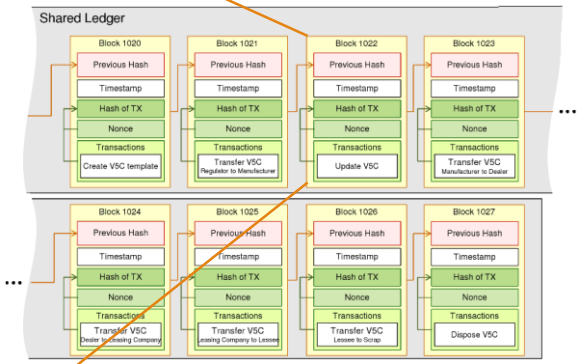
· 定义交易有效的条件
· 由代码和数据组成
· 可能从chain链接到相关的端存储(如加密数据库)

- Defines conditions under which transactions are valid
- Consist of **code** and **data**
- Maybe linked from the chain to an associated side-store (e.g. encrypted database)

What is in a Block?

What?





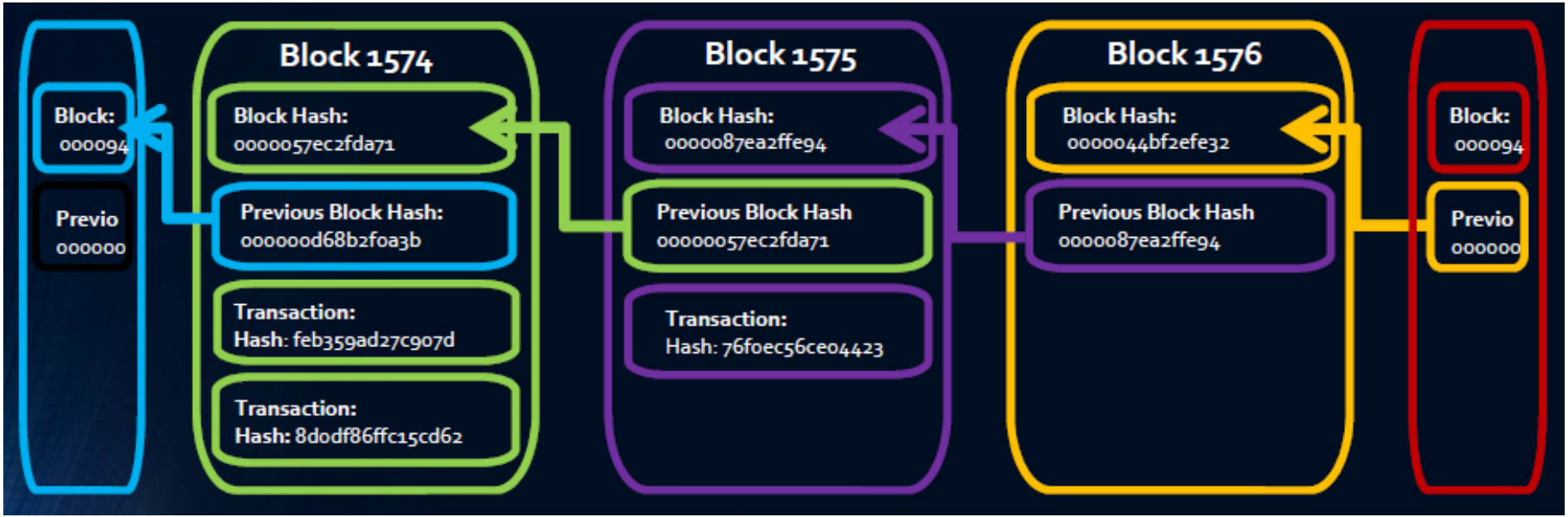
块的链表

A linked list of blocks

What?

按时间顺序添加

Added in chronological order

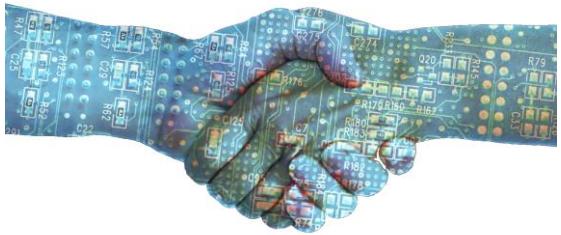


区块链由一系列的块组成

- A blockchain is made up of a series of blocks
- Blocks have pointers to the previous block creating a chain

块具有指向创建链的前一个块的指针

How it works



1 A wants to send money to B

2 The transaction is represented online as a 'block'

3 The block is broadcast to every party in the network

4 Those in the network approve the transaction is valid

5 The block then can be added to the chain, which provides an indelible and transparent record of transactions

不可磨灭的

6 The money moves from A to B

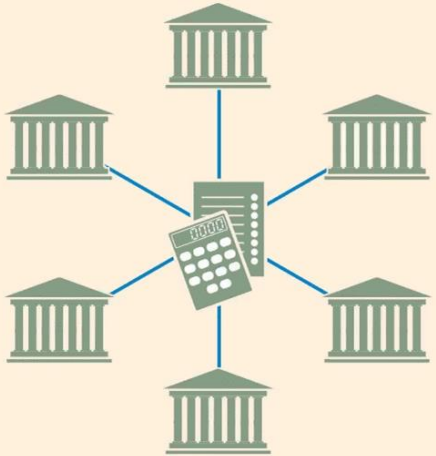
Remember—Blockchain is Decentralized…

区块链是去中心化的

What?

Model 1

Current system



All banks check with central electronic ledger

所有银行都要核对中央电子总帐

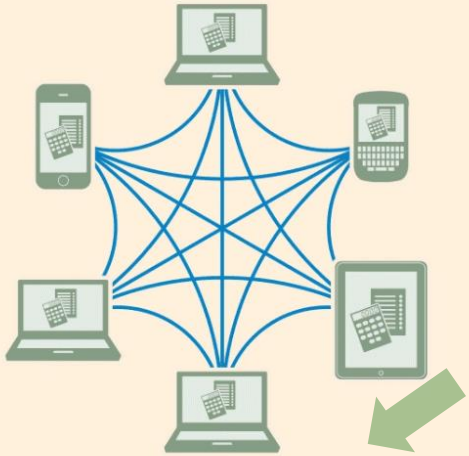
FT

Model 2

e.g. Bitcoin

Public blockchain (permissionless)

无许可



An open network that anybody can access, like the bitcoin model. The digital ledger of transactions is shared, transparent and run by all participants

FT

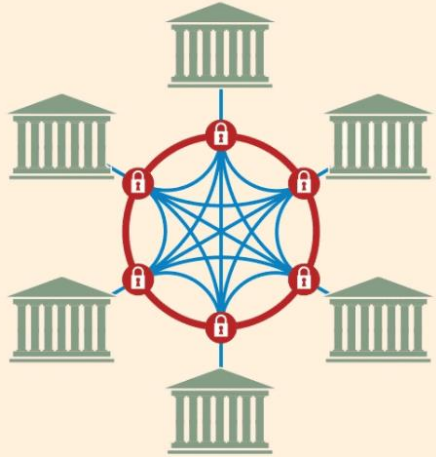
一个任何人都可以访问的开放网络，就像比特币模式一样。交易的数字账本是共享的、透明的，由所有参与者管理

Model 3

..for business

Private blockchain (permissioned)

有许可



The preferred option of most banks. It is a closed system checking all details and controlling access via invitation

FT

这是大多数银行的首选。它是一个封闭的系统，检查所有细节，通过邀请控制访问

Key factors that influence future of blockchain, crypto assets and smart contracts

What?

影响区块链未来的关键因素，加密资产和智能合同

Interoperability & standardization

-Messages
-Consensus
-APIs

互操作性和标准化
消息
共识
api

Scalability

-Volumes
-Response times

可扩展性
容量
响应时间

Vulnarability

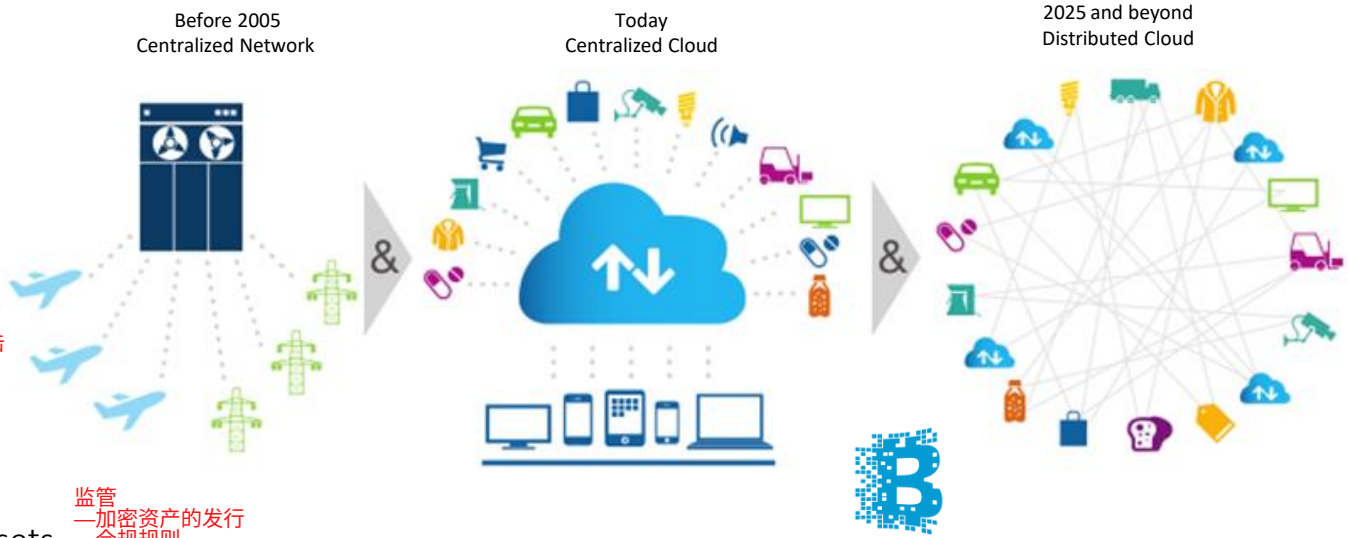
-DDoS attacks
-Confidentiality

-DDoS攻击
-机密性

Regulatory

-Issuance of crypto assets
-Compliancy rules
-Oversight

监管
—加密资产的发行
—合规规则
—监督



IBM对区块链的观点

IBM's point-of-view on Blockchain (5/10)

How?

区块链是一种新型的分布式数据库技术，它使企业能够在广泛的业务应用程序之间更有效、更安全地进行交互

1. Blockchain is a new-style **distributed-database technology** that enables enterprises to interact more efficiently and securely across a wide variety of business application
2. **Blockchain is not bitcoin**; and while it was made popular by bitcoin, the **computer science** behind blockchain has been in development for the past two decades

区块链不是比特币;虽然因为比特币而流行起来，但区块链背后的计算机科学在过去20年里一直在发展

3. Blockchain must be built in the **open**. IBM supports the Linux Foundation's Hyperledger project because of it's focus on balanced governance methodology and open source meritocracy. This approach will lower risk of adoption and has lead to record adoption by top industry companies and regulators.

区块链必须开放。IBM支持Linux基金会的Hyperledger项目，因为它关注平衡的治理方法和开源精英管理。这种方法将降低采用的风险，并已导致顶级行业公司和监管机构的采用记录

4. Blockchain must be made ready for **enterprise applications** with a focus on privacy, confidentiality, auditability, performance and scalability. IBM OBC fabric, is built from the ground up with these attributed as was donated to the Hyperledger project

区块链必须为企业应用程序做好准备，重点关注隐私、机密性、可审核性、性能和可伸缩性。IBM OBC fabric，是由这些捐赠给Hyperledger项目的基础上建立起来的

5. Blockchain must be **permissioned** to ensure greater trust across members, while enabling more optimized forms of consensus which avoids members need to mine, which comes are great cost in compute power and performance. Hence, IBM's view of blockchain does not include mining of coins, fuel, or any form of currency.

区块链必须是许可的，以确保成员之间更大的信任，同时实现更优化的共识形式，以避免成员需要挖掘，这带来了巨大的计算能力和性能成本。因此，IBM对区块链的看法不包括对硬币、燃料或任何形式的货币的开采

IBM's point-of-view on Blockchain (10/10)

How?

6. Blockchain must be **extensible** to enable experimentation that will lead to innovations in consensus algorithms, storage, integration and performance. Hyperledger supports a modular architecture which allows 3rd parties to create and plug-in new value that they can either munities or place back into the community.
区块链必须是可扩展的，以支持实验，从而在一致算法、存储、集成和性能方面带来创新。Hyperledger支持一个模块化的架构，允许第三方创建和插入新的价值，他们可以将这些价值归到社区中

7. **Cloud-based deployments** will provide the automation needed to quickly and accurately enable developers and operator adopt blockchain
基于云的部署将提供所需的自动化，使开发人员和运营商能够快速、准确地采用区块链

8. Use-cases for blockchain range from bold ideas to imagine (or re-imagine) business processes to more humble usage patterns to adopt sooner (2016) versus later. IBM defines **four style of usage** with increasing level of difficulty: compliance ledger, asset exchange, consortium ledger and high value market ledger.
区块链的用例包括大胆的设想(或重新设想)业务流程，以及更简单的使用模式，以便更早(2016年)采用。随着难度的增加，IBM定义了四种使用方式:合规分类账、资产交换、财团分类账和高价值市场分类账

9. IBM Blockchain is conducting business in 2016 across **three areas**:
2016年，IBM区块链在三个领域开展业务:
   - Community development (Hyperledger)
   - Cloud deployment which expands Hyperledger with value added features
   - Client engagement via the Blockchain Garage.

➢社区发展(Hyperledger)
➢云部署扩展Hyperledger的增值功能
➢客户接触通过区块链车库

10. IBM is engaging **government and regulators** to educate, demonstrate and encourage the broad adoption of Blockchain for Enterprise usage.
IBM正在与政府和监管机构合作，以教育、演示和鼓励企业广泛采用区块链

区块链并不适用于所有的用例

Blockchain is NOT for all use cases…

What?

Blockchain is

- **NOT** suited to high performance (millisecond) transactions
- **NOT** suited for small organization or just one participant (no business network)
- **NOT** suited for low value, high volume transactions
- **NOT** a messaging solution
- **NOT** a replicated database replacement
- **NOT** a transaction processing replacement

区块链
- 不适合高性能(毫秒)事务
- 不适合小型组织或只有一个参与者(没有商业网络)
- 不适合低价值、高交易量的交易
- 不是一个消息传递解决方案
- 不是一个复制数据库替换
- 不是交易处理替换

Contents

Where?

- Motivations
- Concepts
- **Use Cases**
- IBM Offers
- Demo

正在探索的潜在用例正在爆炸

Where?

Potential Use Cases Being Explored Are Exploding

Financial Services

金融服务
•支付
•证券登记和处理
•贷款

- Payments
- Securities registration & processing
- Lending

Property

财产
•房地产
•知识产权
•汽车

- Real estate
- Intellectual property
- Cars

Governmental services

政府服务
•投票
•注册(护照、驾照)
•允许

- Voting
- Registrations (passports, driving license)
- Permits

Identification & Security

识别和安全
•设备注册
•验证
•访问控制

- Party/device registration
- Authentication
- Access control

Trade

贸易
•文档交换
•资产交换
•托管服务
•贸易协定

- Document exchange
- Asset exchange
- Escrow services
- Trade agreements

Internet of Things (IoT)

物联网(IoT)
•自主设备，例如
•汽车
•无人机
•机器人

- Autonomous devices, such as
  - Cars
  - Drones
  - Robots

典型用例:智能业务合同

Typical Use Case: Smart Business Contract

Where?

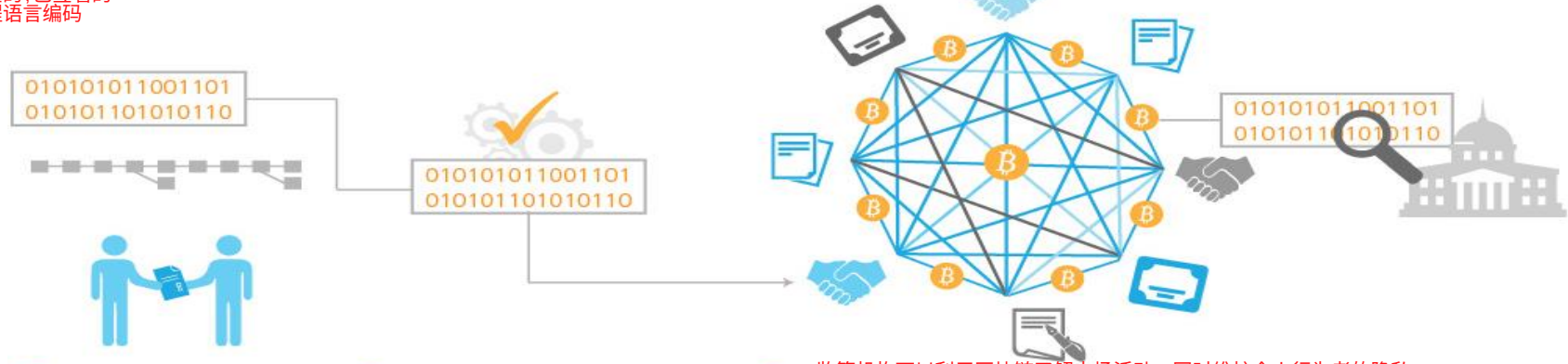
Business rules implied by the contract

- Embedded in the Blockchain & executed with the transaction
- Verifiable, signed
- Encoded in programming language

合同中隐含的业务规则
•嵌入到区块链中并与事务一起执行
•可核查的,已签署的
•用编程语言编码

- ***Personal Will / Trust:*** Terms & Conditions that beneficiaries must fulfill in order to receive a distribution of your assets
- ***Corporate bond transfer:*** Contract defines conditions under which corporate bond transfer occurs

· 个人意愿/信托:受益人必须履行的条款和条件，以接受你的资产分配
· 企业债券转让:在合同定义的条件下企业债券转移发生



1. An option contract between parties is written as code into the block chain. The individuals involved are anonymous, but the contract is in the public ledger.

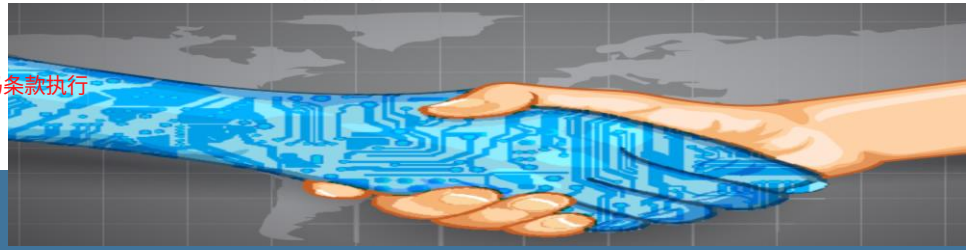
双方之间的期权合同被写成区块链的代码。涉及的个人是匿名的，但合同是公开的

2. A triggering event like an expiration date and strike price is hit and the contract executes itself according to the coded terms.

触发事件，如到期日期和执行价格，合同将按照编码条款执行

3. Regulators can use the block chain to understand the activity in the market while maintaining the privacy of individual actors' positions.

监管机构可以利用区块链了解市场活动，同时维护个人行为者的隐私



Industry Use Cases with Blockchain

区块链的行业用例

Where?

Use Case – Letter of Credit 信用证

What?

- 银行处理信用证(LOC)希望为包括初创公司在内的更广泛的客户提供信用证
- 当前受成本和执行时间的限制

•Bank handling letters of credit (LOC) wants to offer them to a wider range of clients including startups

•Currently constrained by costs & the time to execute

How?

- 区块链提供信用证的通用分类账
- 允许银行和交易对手拥有相同有效的交易和履行记录

▪Blockchain provides common ledger for letters of credit

▪Allows bank and counter-parties to have the same validated record of transaction and fulfillment

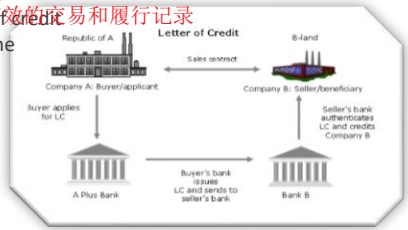
Benefits

- ➢增加信任
- ➢提高执行速度(小于1天)
- ➢大大降低成本

➢Increased trust

➢Increase speed of execution (less than 1 day)

➢Vastly reduced cost



Use Case – Business to Business Contracts 业务对业务合同

What?

- 买方希望以有效的方式将采购订单转换为有效的、自我执行的、能够更新以反映供应状况的合同
- 协议必须对买方、卖方、银行、物流合作伙伴和其他利益攸关方可见

▪Buyer wants efficient way of converting a purchase order into validated, self executing contract updated to reflect the status of the supply

▪Agreement must be visible to the buyer, the seller, banks, logistics partners and other stakeholders

How?

- 区块链提供合同状态的共享记录，该记录会随着合同的进展而更新
- 向协议各方及其银行和合作伙伴提供服务

▪Blockchain provides a shared record of the contract status which is updated as the contract progresses

▪Available to all parties to the agreement, their banks and partners

Benefits

➢Increased efficiency and transparency across the supply chain

➢Risk management improved through the near real time update of all contracts

- ➢增加整个供应链的效率和透明度
- ➢通过几乎实时更新所有合同，风险管理得到改善

Use Case – Corporate Debt (or Bond) 公司债务(或债券)

银行愿意持有公司债

What?

Bank holding a corporate debt would like to

- ▪为客户验证的交易快速向供应商付款
- ▪让企业客户看到付款情况
- ▪为政府提供过程监督

▪ pay vendors quickly for transactions validated by the client

▪ allow the corporate client to see the payment is made

▪ provide government with oversight of the process

How?

- ▪区块链提供了一个记录公司债务/债券的通用分类账
- ▪提供给银行、企业客户、供应商和政府

▪Blockchain provides a common ledger for recording the corporate debt / bond

▪Available to bank, corporate client, vendors & government

Benefits

➢Speeds up vendor payments bigger net discounts

➢Eliminates risk and accelerates decision making

➢Owning bank can spread the cost across each market

- ➢加速供应商支付更大的净折扣
- ➢消除风险,加速决策
- ➢拥有银行可以在每个市场传播成本

Use Case – Open, Trusted Supply Chain

开放、可信的供应链

What?

- ▪消费者要求其产品生产地点和方式的透明度
- ▪欧盟要求提供更多有关企业供应链的信息，并对违规行为进行处罚

▪Consumers demanding transparency on where and how their products are made

▪EU requires more information about corporate supply chains, with penalties for non-compliance

How? 区块链允许跨端到端供应链的财产安全数字转移

▪Blockchain enable safe digital transfer of property across the end to end supply chain

Benefits

➢Verifiable, preventing any party from altering

➢Efficiencies through greater transparency

➢Consumers can make informed purchases

➢Governments get reliable information

- ➢可验证,防止任何一方改变
- ➢效率更高的透明度
- ➢消费者可以作出明智的购买
- ➢政府得到可靠的信息

Blockchain is getting hot … with an emerging industry ecosystem

区块链正变得炙手可热……伴随着新兴的产业生态系统

Where?

Santander InnoVentures的负责人Mariano Belinky说:“我们已经在内部确定了20到25个可以应用这项技术的使用案例。”区块链技术每年可以减少银行高达200亿美元(128亿美元)的基础设施成本。Ripple筹得400万美元

"We have internally **identified 20 to 25 use cases** where this technology can be applied," Mariano Belinky, head of Santander InnoVentures… blockchain technology could ***reduce banks' infrastructure costs by up to $20 billion*** (£12.8 billion) a year. **4M funding to Ripple**

Digital Asset Holdings，由前摩根大通(J.P. Morgan Chase &amp)牵头;与纳斯达克一样，该公司高管马斯特(Blythe Masters)也在开发一种基于区块链的证券和基金交易结算系统

Digital Asset Holdings, led by **former J.P. Morgan Chase & Co. executive Blythe Masters**, is, like Nasdaq, developing a blockchain - based system for **settling transfers of securities and funds.**

区块链发展的43个潜在应用正在调查中，从身份到企业支付在财政部，以及供应链金融。签署协议:波与电子实验,无纸化提单流程使用区块链技术,虽然瑞士Chainalysis,巴克莱正在与金融犯罪和安全团队帮助比特币的银行办理与公司和区块链空间

43 potential applications for blockchain development under investigation from identity to corporate payments in treasury, and supply chain finance. Signed deals: **Wave** is experimenting with an electronic, paperless Bills of Lading process using blockchain technology, while Swiss-based **Chainalysis**, is working with Barclays financial crime and security teams to help the bank transact with companies in the bitcoin and blockchain space.

飞利浦医疗保健公司已经证实，他们目前正在探索区块链技术的潜在应用。该公司的兴趣最早是由基于区块链的记录保存初创公司Tierion的首席执行官韦恩·沃恩(Wayne Vaughan)在一条推文中透露的，他宣称这项服务是与这家医疗保健公司合作的第一个项目

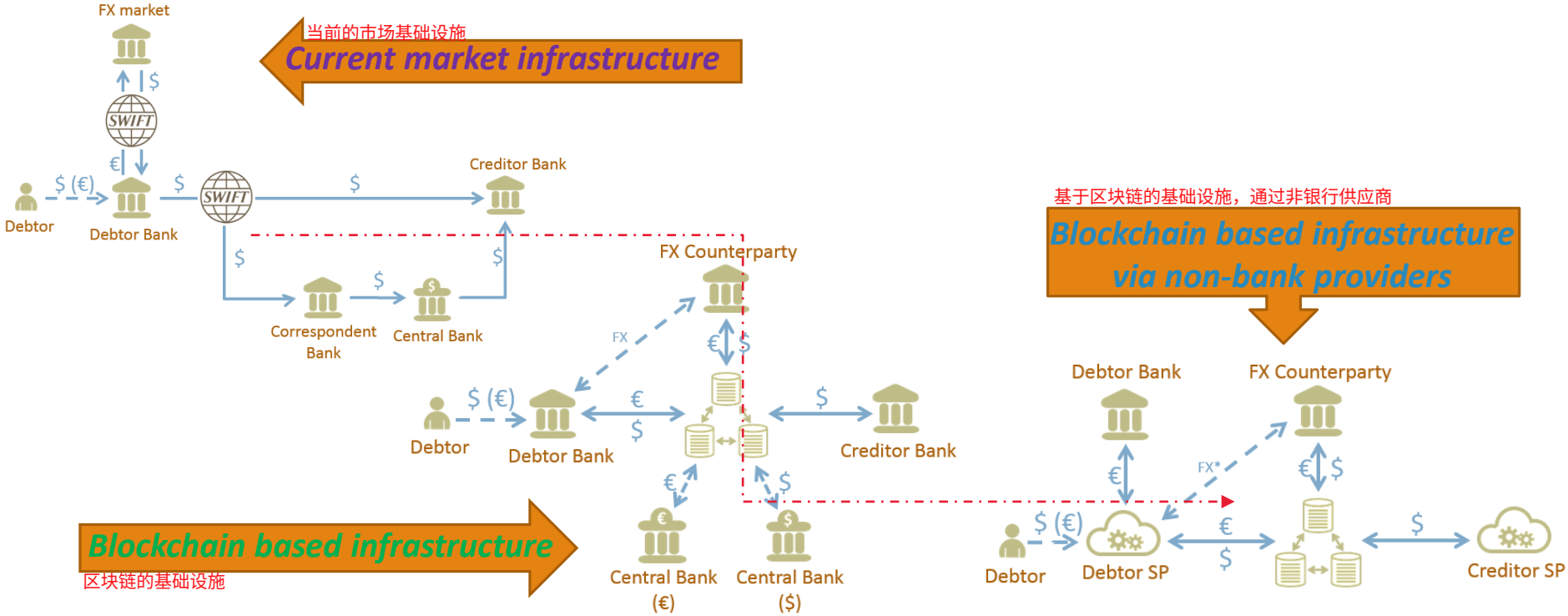
Philips Healthcare has confirmed it is currently exploring potential applications for blockchain technology. The company's interest was first revealed in a tweet by Wayne Vaughan, CEO of blockchain-based record-keeping startup Tierion, who touted the service as a "first project" with the health care company.

http://www.coindesk.com/health-care-giant-philips-exploring-blockchain-applications/

Potential Use Case:
International payments settlement (including FX)

国际支付结算(含外汇)

Where?



Finance Fields are Exciting…

金融领域令人兴奋

Where?

Excerpts from "Banking on the Blockchain, Reengineering the Financial Architecture, "

Institute for International Finance

节选自“依靠区块链，重整金融架构，”
国际金融研究所

USAA拥有并管理着大约2000亿美元的资产，尤其被分布式账本技术的可审核性所吸引，以及它如何能够取代纸质记录和耗时的传统审计。Alex Marquez，USAA公司发展总经理

USAA (P&C Insurance): USAA, which owns and manages approximately $200 billion in assets, is particularly attracted to the auditability of distributed ledger technology and how it could supplant paper trails and time-consuming traditional audits. *Alex Marquez, USAA's managing director of corporate development*

“区块链技术在允许资本市场更有效运作的同时提供更大的透明度和安全性方面大有希望，所有这些都是公共利益的根本。”

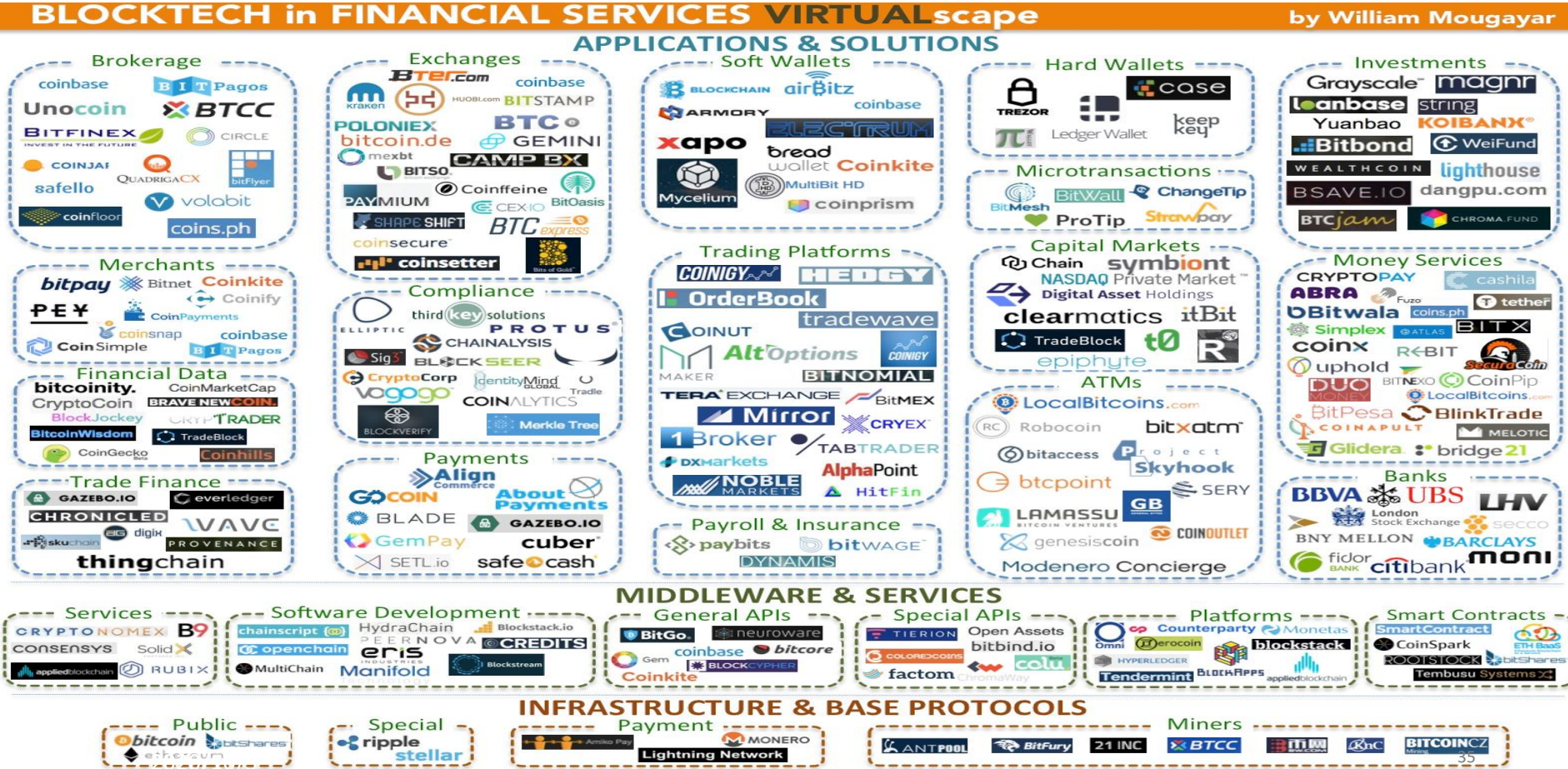
NASDAQ: "Blockchain technology holds great promise in allowing capital markets to operate more efficiently while simultaneously providing greater transparency and security, all of which are fundamental to the public interest."--*Robert Greifeld, CEO*

Deutsche Bank has found several possible uses for the technology in finance, including "fiat currency payment and settlement, securities issuance, transfer, clearing and settlement, enforcing derivative contracts, asset registries without the need for a central administrative authority, know your customer and anti-money laundering surveillance, and creating transparency and facilitating differentiated customer and regulatory reporting."

德意志银行(Deutsche Bank)已经发现了几个可能的使用的技术在金融领域,包括法定货币支付与结算、证券发行、转让、清算和结算,执行衍生品合约,资产注册不需要中央行政机关,了解你的客户和反洗钱监测,创造透明度和促进差异化客户和监管报告。

A whole new Eco-system is emerging!

Where?



How?

Contents

- Motivations
- Concepts
- Use Cases
- **IBM Offers**
- Demo

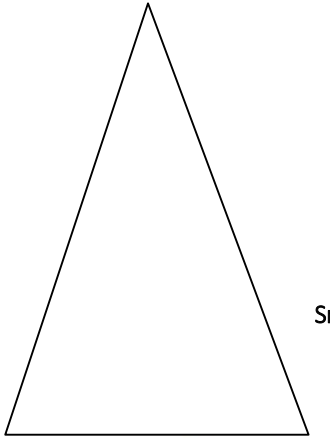
Serving World's Leading Clients

How?

IBM z系统和LinuxONE为企业开发了区块链

IBM z Systems and LinuxONE to Advance Blockchain for the Enterprise

中国银行 BANK OF CHINA
Deutsche Bank
SONY
BMW
WAL★MART ALWAYS LOW PRICES. Always.
AstraZeneca
AMERICAN EXPRESS
PORSCHE
ABB
LOWE'S Improving Home Improvement
中国移动通信 CHINA MOBILE
Merrill Lynch
cisco
中国石油天然气股份有限公司 PetroChina Company Limited
UNITED
SIEMENS
CATERPILLAR
ALCATEL
Bayer
SUNING 苏宁电器
Johnson&Johnson
中国电信 CHINA TELECOM 世界触手可及
PHILIPS
HUAWEI
lenovo



Large-scale Enterprises

Small/Medium Companies

Patterns for Customer Adoption

客户采用的模式

How?

(1) INTERNAL LEDGER

内部分类帐
- 用于内部报告、审计和合规的分类帐
- 对关键业务资产的一致看法
- 起源、不变性和最终性比一致更重要
- 接触审计和监管机构

- Ledger for internal reporting, audit and compliance
- Consistent view of key business assets
- Provenance, immutability & finality more important than consensus
- Access to auditor and regulator

(2) CONSORTIUM SHARED LEDGER

联盟共享分类帐
- 由一小群参与者创建
- 分享自己和消费者之间的参考数据
- 一致的关键信息的实时视图

- Created by a small set of participants
- Share reference data between themselves and consumers
- Consistent real-time view of key information

(3) INFORMATION HUB

信息中心
- 账本设置在一个组织
- 参与者之间的信息共享(例如:投票,红利通知)
- 资产只有信息，没有财务价值
- 要求来源、不变性和最终性

- A ledger set up in a single organization
- Sharing of information between participants (e.g. voting, dividend notification)
- Assets have *information*, not financial value
- Require provenance, immutability & finality

(4) HIGH VALUE MARKET

高价值的市场
- 在一个市场的许多参与者之间转移高财务价值资产的分类账
- 要求所有企业功能的区块链

- Ledger for the transfer of high financial value assets between many participants in a market
- Requires all enterprise features of Blockchain

IBM's value add in blockchain IBM的价值增加在区块链

How?

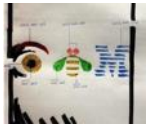
Help guide your blockchain exploration
帮助指导您的区块链探索


Research


Middleware


Services

Cloud


iX Design & Development

+

Help you design and build your POC
帮助您设计和构建POC




+

Deploy your blockchain fabric of choice
部署所选的区块链结构

hyperledger

SETL.io

eris INDUSTRIES

bitcoin

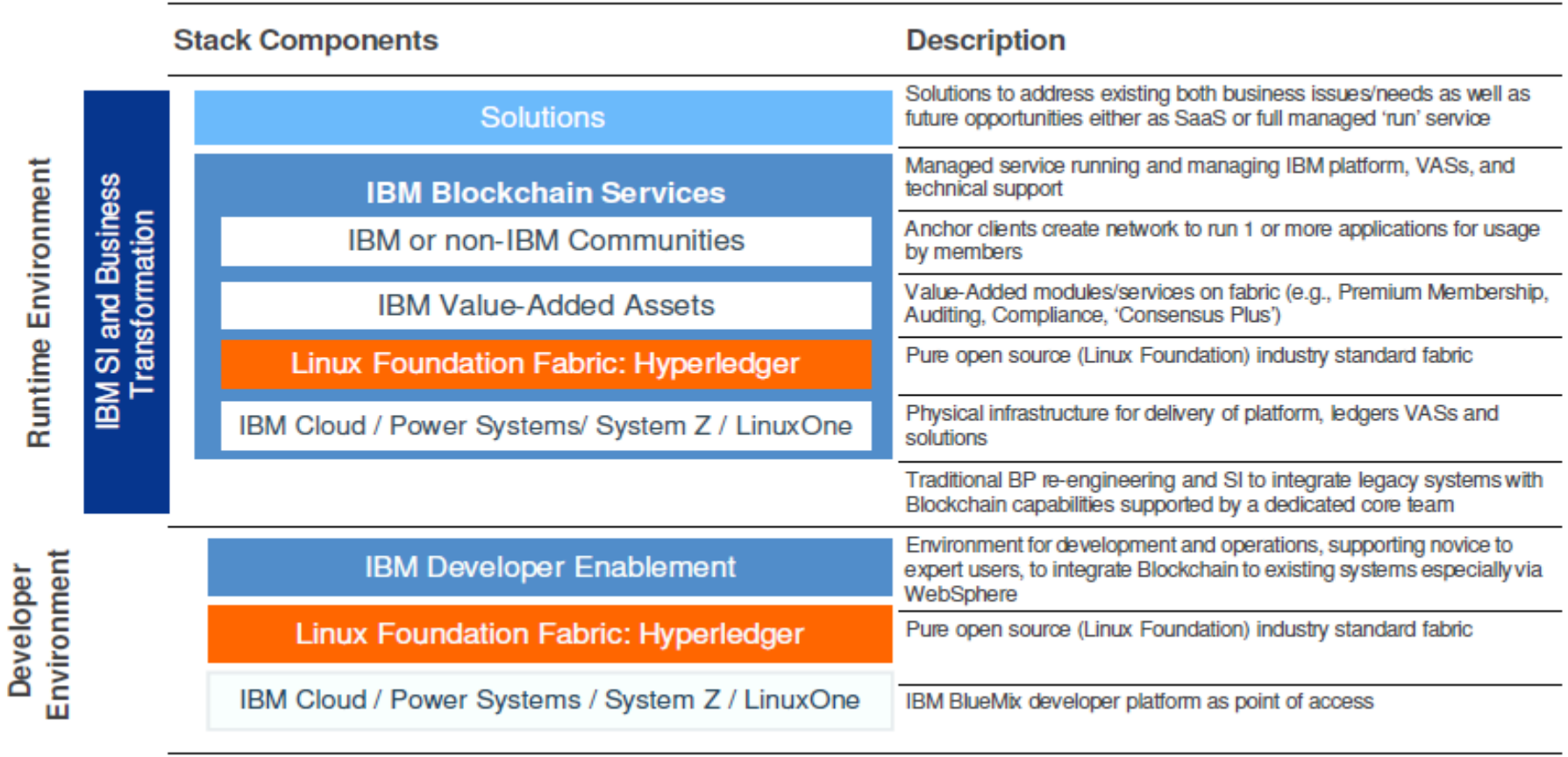
ripple

Blockstream

ethereum

IBM Blockchain Business Stack

How?



IBM Blockchain Platform

How?

Capabilities

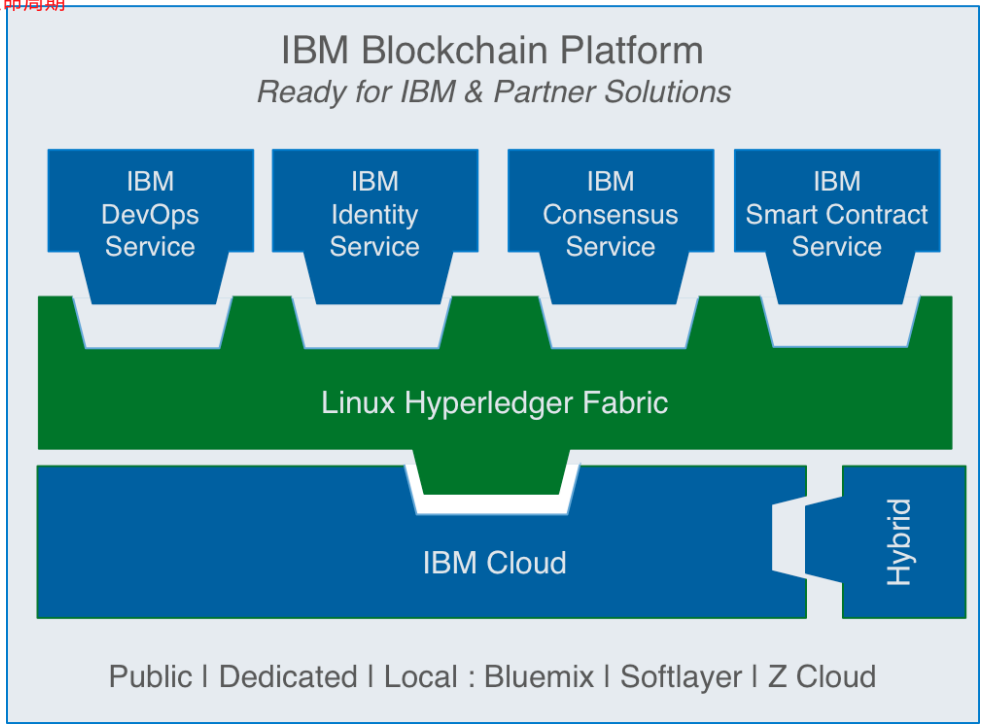
功能
➢通过Bluemix的DevOps完整生命周期
➢智能合同语言和API标准
➢企业级的身份,安全和隐私
➢无缝混合与遗留系统的集成
➢市场领先的性能和可伸缩性

- Complete DevOps Lifecycle via Bluemix
- Smart contract language and API standards
- Enterprise-grade identity, security and privacy
- Seamless hybrid integration with legacy systems
- Market leading performance and scalability

IBM Differentiators

IBM差异
➢深密码学:技能、资产、IP从研究
➢混合集成:WebSphere网关和连接器
➢优化:Z与加密硬件和蓝色的核心
➢行业和专业领域体现在IBM的解决方案
➢未来:分析&认知领导区块链

- Deep cryptography: skills, assets, IP from Research
- Hybrid Integration: WebSphere gateway & connectors
- Optimization: on Z with crypto hardware & blue cores
- Industry & domain expertise manifest in IBM solutions
- Future: Analytics & cognitive leadership on blockchain



IBM Blockchain Business Strategy

IBM区块链商业战略

How?

Community + Code

Linux Foundation

HYPERLEDGER PROJECT

Open Source Code: Blockchain built from the ground up for business;
Permission | Privacy
Confidential | Auditable

Open Collaboration advances technology for all

45k lines of code donated by IBM

开放源代码:区块链建立的基础上，为业务;
许可|隐私
机密|可审计的
开放协作促进了所有人的技术进步
IBM捐赠的45k行代码

Cloud

IBM云区块链
WebSphere区块链连接
IBM系统上的区块链集线器

IBM Blockchain Cloud
WebSphere Blockchain Connect
Blockchain Hub on IBM Systems

IBM Blockchain on Bluemix

Blockchain on Cloud with value add Services;
Identity | Consensus | Audit

Connect every WebSphere platform and IBM System to a Blockchain

区块链云端增值服务;
身份|一致|审核
连接每个WebSphere平台和IBM
从系统到区块链

Clients

区块链解决方案
区块链车库

Blockchain Solutions
Blockchain Garage

Blockchain Solutions for Financial Services;
TradeFinance | Securities Settlement

Blockchain Garage: Learn by doing
London | NY | SFO | Singapore | Japan

POWER for Blockchain

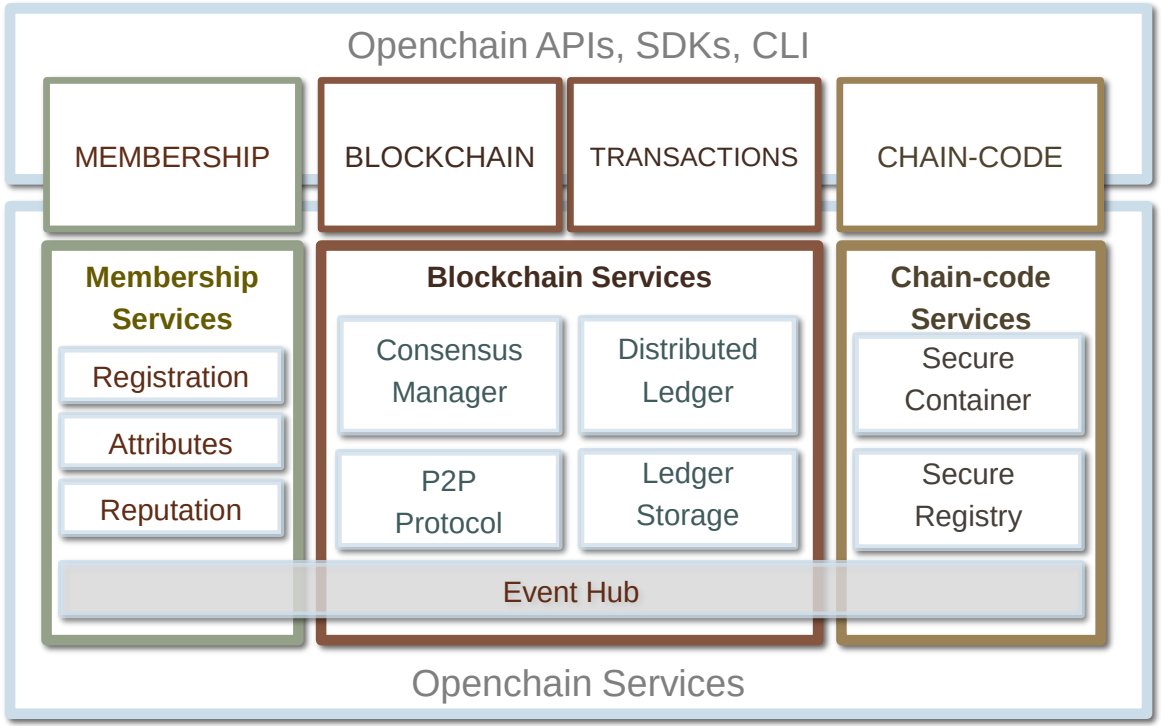
Blockchain GBS Practice

区块链解决方案，为金融服务;
贸易融资|证券结算
区块链Garage:从实践中学习
伦敦|纽约|上海|新加坡|日本
权力区块链
区块链GBS实践

IBM Blockchain Architecture & Code offered to Linux Foundation

IBM区块链体系结构&
代码提供Linux基金会

How?



MEMBERSHIP会员
区块链参与者的身份、隐私和可审核性。
Identity, Privacy and Auditability of blockchain participants.

区块链|交易
分布式交易分类帐，通过一致更新分类帐
BLOCKCHAIN | TRANSACTIONS
Distributed transaction ledger whereby the ledger is updated by consensus

链码
CHAIN-CODE “智能契约”，提供针对区块链运行业务逻辑的能力
“Smart Contracts”, provide ability to run business logic against the blockchain

CLI api，sdk
让开发人员能够通过编程的方式控制区块链网络
APIs, SDKs, CLI
Gives developers the ability to programmatically control the blockchain network

Open Source Code: Blockchain built from the ground up for business;
Permission | Privacy | Confidential | Auditable
开放源代码:区块链建立的基础上，为业务;
权限|隐私|机密|可审核

Blockchain on IBM Systems

How?

Integrate and Connect existing Business Processes

z Systems / LinuxONE

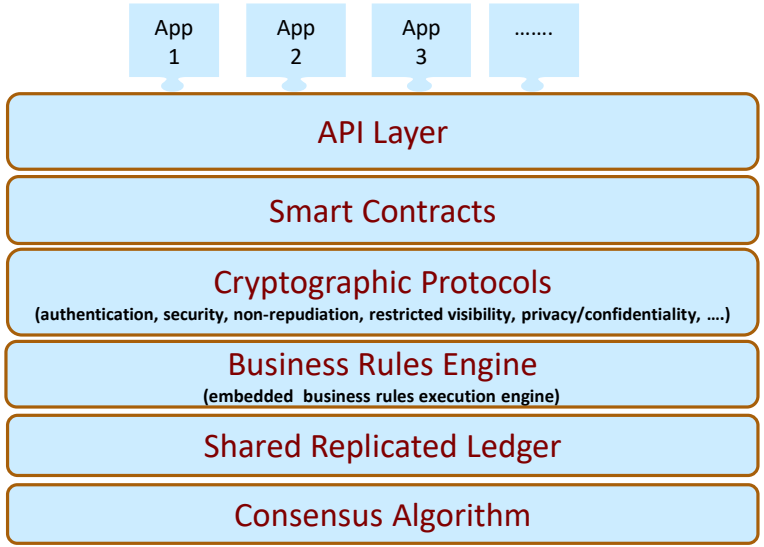
CICS/IMS/TPF/DB2/VSAM

Elliptical Curve Digital Signatures

Crypto Accelerators

In Memory (10 TB)

Hashing



Power Systems / OpenPOWER

DB2/Oracle/SAP EnterpriseDB

Crypto Accelerators

In Memory (32 TB)

Hashing Acceleration

z Systems Blockchain Assets

How?

Blockchain Code

- Download a prebuilt z Systems Docker image and try Blockchain on Linux on z Systems technology
- Setup a Blockchain environment quickly and easily on the LinuxONE Community Cloud https://lnkd.in/e4v99vh and by leveraging #docker https://lnkd.in/eYK4YAH via the Linux Foundation's Hyperledger Project
- If you want to build a Blockchain Open Ledger on z Systems from the source code:
  https://github.com/linux-on-ibm-z/docs/wiki/Building-Open-Ledger

Blockchain smart contract sample code & GUI

Including integration with CICS, DB2, IMS, and TPF

https://www.youtube.com/watch?v=EqZr4LPQIWk

Client Engagement Workshop: Blockchain on z Systems Technology

客户端参与车间:
区块链在z系统技术

- Enables clients to better understand and realize the benefits of applying Blockchain in their business by combining the client's own business knowledge with IBM's Blockchain knowledge

通过结合客户自身的业务知识和IBM的区块链知识，使客户更好地理解和认识到在业务中应用区块链的好处

- The engagement will build a deliverable solution that can be deployed within the customer's business environment proving that the benefits of Blockchain can be realized in practice

契约将构建一个可交付的解决方案，它可以部署在客户的业务环境中，证明区块链的好处可以在实践中实现

- Duration and commitment
  - Initial design thinking workshop (1 day)
  - Agile PoC development: Typically 3 iterations last about 2 weeks each
  - Both client and IBM commit 2 fulltime people for duration of PoC
  - Engagement may be billable

持续时间和承诺
•初始设计思考工作坊(1天)
•敏捷PoC开发:通常3次迭代，每次持续约2周
•客户和IBM都在PoC期间指派了2名全职人员
•订阅可能是收费的

z addresses compelling needs

z解决了紧迫的需求

How?

***Need #1*: Clients need business logic that can self-execute with assurance that the terms cannot be altered by any party without agreement from stakeholders (smart contracts + consensus)**

- **z Systems has built-in accelerators for hashing that can be used to encode Blockchain transactions so that once on the ledger, prior smart contracts cannot be tampered with**

需要# 1:客户需要业务逻辑可以自执行保证条款不能被任何一方没有改变协议从涉众(智能合同+共识)
z系统内置的加速器散列,可以用来编码区块链交易,这样一旦分类帐,之前智能合同不能被篡改

***Need #2*: Parties must be able to keep the terms and pattern of transactions private (private transactions and containerized logic)**

- **z systems has hardware accelerators for encryption, digital signatures and hardware that allows z systems to create an unlimited number of random keys to encode secure each transaction uniquely**

需求#2:各方必须能够保持事务的私有条款和模式(私有事务和包含的逻辑)
z系统拥有用于加密、数字签名的硬件加速器和硬件，这些硬件允许z系统创建无限数量的随机密钥，以确保每笔交易的惟一编码安全

***Need #3:* Client networks of different ledgers must be able to call public logic and refer to transactions on other ledgers: e.g., do Know Your Customer only once (multi-ledger addressing)**

- **On z systems, Blockchains would sit side by side to public logic that exists as current business processes on z. Blockchains and current business processes would be optimally integrated and referenceable through microservices and APIs**

需求#3:不同账本的客户网络必须能够调用公共逻辑并引用其他账本上的交易:例如，只知道你的客户一次(多账本地址)
在z系统中，区块链将与公共逻辑并排存在于z上的当前业务流程中，区块链和当前业务流程将被优化集成，并可通过微服务和api引用

How?

区块链和IBM z系统的优势

Advantages of Blockchain and IBM z Systems

Blockchain *on z*

在z区块链
性能:高度可伸缩的I/O系统，10 tb的超大内存空间，业界最快的商用微处理器，最大的缓存(z运行开源平台，比基于intel的平台快2 -3倍)
硬件加速器:用于区块链加密(哈希)和区块链加密的内置芯片上的加速器
安全:用于存储加密身份和区块链内容的密钥的防伪安全卡;z硬件安全模块(HSM) FIPS 140-2兼容，支持椭圆曲线SuiteB;企业PKCS#11非常安全，完全实现使用独特的固件加载在HSM和不可用在任何其他平台
平台:z设备基础设施提供hypervisor-secured容器,独立平台(LPAR on z);内置审计系统，智能合同可以使用它来控制和记录智能合同的交互

- ***Performance***: Highly scalable I/O system, very large memory space 10 TBs, fastest commercial microprocessor in industry, largest cache (z runs open source 2x-3x faster than Intel-based platforms)
- **Hardware accelerators**: built-in on-chip accelerators for Blockchain encryption (hashing) and Blockchain cryptography
- **Security**: Tamper proof security cards used to store keys for encrypting identities and contents of Blockchains; z Hardware Security Module (HSM) FIPS 140-2 compliant, supports Elliptical Curve SuiteB; Enterprise PKCS#11 very secure, complete implementation using unique firmware load in HSM and not available on any other platforms
- **Platform**: z appliance infrastructure provides hypervisor-secured containers; isolated platform (LPAR on z); built-in audit systems that smart contracts can use to control and log smart contract interactions

Blockchain *with z*

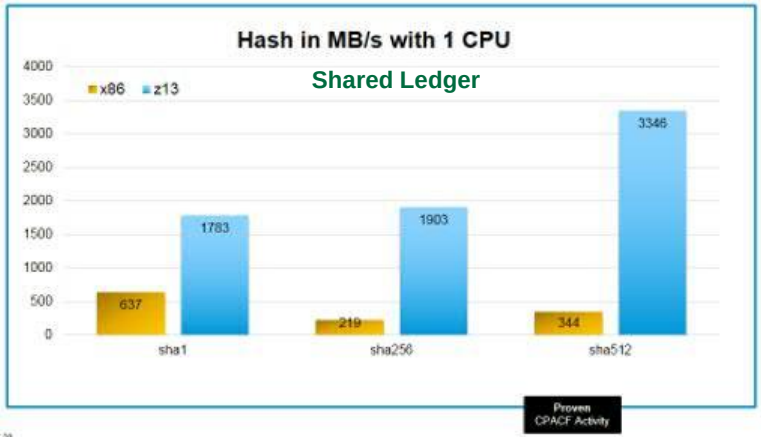
区块链与z
通过api更紧密地集成现有的SOR(标准操作记录)和现有的事务子系统(CICS、DB2、 IMS、TPF、批处理Cobol、z上的ODM(如果smart contract调用规则的话)，以缓解潜在的瓶颈
最少的网络跳点，使用公司已经到位的现有安全、审计、管理和运营业务实践
运行在z上的Linux上的区块链允许将额外的区块链功能与在IBM事务性运行时之上实现的智能契约api进行搭配

- **Tighter integration with existing SOR** (Standard Operation Records) with existing transactional sub-systems (CICS, DB2, IMS, TPF, Batch Cobol, ODM on z if smart contract invokes rules) via APIs to alleviate potential bottlenecks
  - Least amount of network hops and use of existing security, audit, management, and operational business practices the companies already have in place
  - Blockchain running on Linux on z allows for collocation of additional Blockchain capabilities with Smart Contract APIs implemented on top of IBM transactional runtimes

Infrastructure matters more than ever with Blockchain: Sustained performance

How?

基础设施比以往任何时候都更重要
区块链:持续的性能

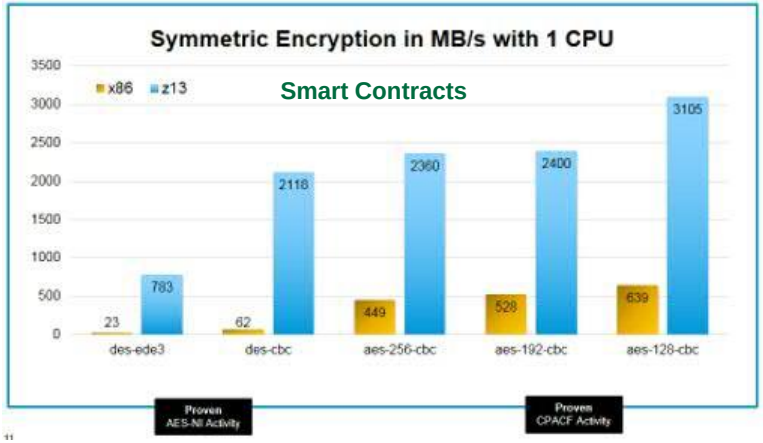


多达10倍的改进
Linux on z系统技术

Up to 10x improvement with Linux on z Systems technology

Up to 30x improvement with Linux on z Systems technology

最多30倍的改进
Linux on z系统技术



Blockchain on POWER: 区块链关于权力:差异化的机会

opportunities for differentiation

How?

POWER8

Core & New Data Repositories
•DB2, Oracle, SAP
•EnterpriseDB

Cloud
•Industry specific – defined by business network around Blockchain industry use case
•Hybrid
•Public (Softlayer and CSPs)
•Developing secure Docker containers

Acceleration
•Elliptical encryption (POWER9)
•Distributed hash tables
•Network latency
•Data layer (RocksDB acceleration)

Ecosystem
• ISVs
• OpenPOWER partners
• Other partners

核心和新的数据存储库
•DB2、Oracle SAP
•EnterpriseDB

云
•行业专用-由商业网络围绕区块链行业用例定义
•混合
•公共(Softlayer和CSPs)
•开发安全Docker容器

加速
•椭圆加密(POWER9)
•分布式哈希表
•网络延迟
•数据层(RocksDB加速)

生态系统
•isv
•OpenPOWER伙伴
•其他合作伙伴

How?

Advantages of Blockchain and IBM Power Systems

Blockchain *on POWER*

- **Performance and *Price/Performance***: Highly scalable I/O system (4X x86), high bandwidth memory sub-systems (4X x86), extremely large memory space to 32 TBs. , very large cache (5X x86) and up to 2.3x better price/performance to x86 for Open Source apps
- **Hardware accelerators**: CAPI attached accelerators for Blockchain encryption (hashing), Blockchain cryptography (developing plan) and Blockchain data store (RocksDB – in-memory NoSQL key value store)
- **x86 Compatibility:** LE Linux and KVM simplify ISV and IBM SW apps enablement and leverage similar x86 admin and development skills for Blockchain based solutions and Ecosystem partners
- **Flexibility/consumption model:** Power LC line and public cloud option via SoftLayer and CSPs provide flexibility and cost effective consumption model for PoTs/PoCs as well as for dev/ops and Blockchain solutions on distributed nodes across the business network
- **Security**: built-in POWER8 encryption engine, FIPS 140-2 compliant, HSM support (hardware security module)
- **Platform**: secure VMs with PowerVM; isolated containers with PowerKVM ; developing secure Docker containers to create and deploy Blockchain microservices

Blockchain *with POWER*

- **Tighter integration with existing SOR** (Standard Operation Records) with existing data and transactional sub-systems (SAP, DB2, Oracle, EnterpriseDB) via APIs to alleviate potential bottlenecks
  - Least amount of network hops and use of existing security, audit, management, and operational business practices the companies already have in place
  - Blockchain running on Linux on Power SOR allows for collocation of additional Blockchain capabilities with Smart Contract APIs implemented on top of application runtimes

IBM Blockchain Engagement Model

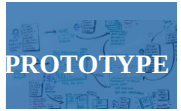
How?

Conversation → Demonstration → Proof of Technology → Proof of Concept

Conversation	Demonstration	Proof of Technology	Proof of Concept
1. Discuss Blockchain technology 2. Explore customer business model 3. Asses Blockchain suitability	1. Show Blockchain Application Demo 2. Explain technology usage 3. Validate Client Interest	1. Understand Blockchain concepts & elements 2. Hands on with Blockchain technology 3. Demo customization using Design Thinking	1. Explore customer specific business model 2. Design, build & iterate approach 3. Builds limited scope deployable solution
2 hours meeting	*2 hours demo*	*1 day workshop*	*2-6 weeks*
Remote or face to face	*Remote or face to face*	*Face to face*	*Co-located joint team*
Free of charge	*Free of charge*	*Free of charge*	*For charge*

Sample agenda 1-day workshop

- **Introduction** (10 mins)
- **Technology Overview** (50 mins)
- **Break** (15 mins)
- **Understand** (90 mins)
- **Lunch** (60 mins)
- **Explore** (90 mins)
- **Break** (15 mins)
- **Prototype** (30 mins)
- **Evaluate** (60 mins)



Initial Questions

How?

Blockchain for 21st Century business networks – what opportunities does this generate for you?

块链为21世纪商业网络-这为你带来了什么机会?

Conversation starters:

- What are the top three ***challenges*** in your organization that blockchain can address?
- Blockchain and Bitcoin are separate technologies. IBM sees Bitcoin as one potential use for blockchain technology but is focusing on the benefits of other use cases such as: supply chai management, Internet of Things, contracts, shared ledgers etc. What is your organization's view of Bitcoin (and other cryptocurrencies) vs. **blockchain technologies**?
- Has your business **invested** in blockchain industry projects? (e.g. R3, Linux Foundation)
- How can blockchain make your business network more **efficient and extend** its reach?
- There is a lot of hype surrounding blockchain and its capabilities - not all of which are well informed. What further information do you require about blockchain to be able to quantify the potential **benefit for your business**?

Consultancy/project work opportunities

- What are your plans for building on the **Linux Foundation** Hyperledger project for business success? Do you have a **team** which is tasked to explore use cases for blockchain for your organization?
- Many banks and FinTech organizations are experimenting with blockchain right now – is your organization involved? If not, what is your **strategy** around this?
- 2016 will be the year for first Blockchain projects. What is your concrete **30 – 60 – 90 day plan**?
- What is the view of your board regarding taking advantage of blockchain technology? What **cost savings** would you project through use of this technology?
- Are you going to be a **first adopter** who will take early benefit from blockchain, or a **fast follower**?

Summary

How?

1. Blockchain is a shared, replicated ledger technology
2. Blockchain can open up business networks by taking out cost, improving efficiencies, and increasing accessibility
3. Blockchain addresses an exciting and topical set of business challenges, which cross every industry
4. Linux Foundation Open Ledger project developing open source, open standards shared ledger technology
5. IBM supports an open standards, open source, open governance Blockchain
6. IBM has an easy to access, proven and incremental engagement model giving customers the confidence to get started NOW

1．区块链是一种共享的、复制的账本技术
2．区块链可以通过降低成本、提高效率和增加可访问性来开放商业网络
3.区块链解决了跨越每个行业的令人兴奋和热门的业务挑战集
4．Linux基金会开放账本项目开发开源、开放标准共享账本技术
5．IBM支持开放标准、开放源码和开放治理区块链
6．IBM有一个易于访问的、经过验证的增量参与模型，使客户有信心现在就开始

Contents

DEMO

- Motivations
- Concepts
- Use Cases
- IBM Offers
- **Demo**

DEMO

Making Blockchain Real for Business

Show Demo

https://www.youtube.com/watch?v=EqZr4LPQIWk

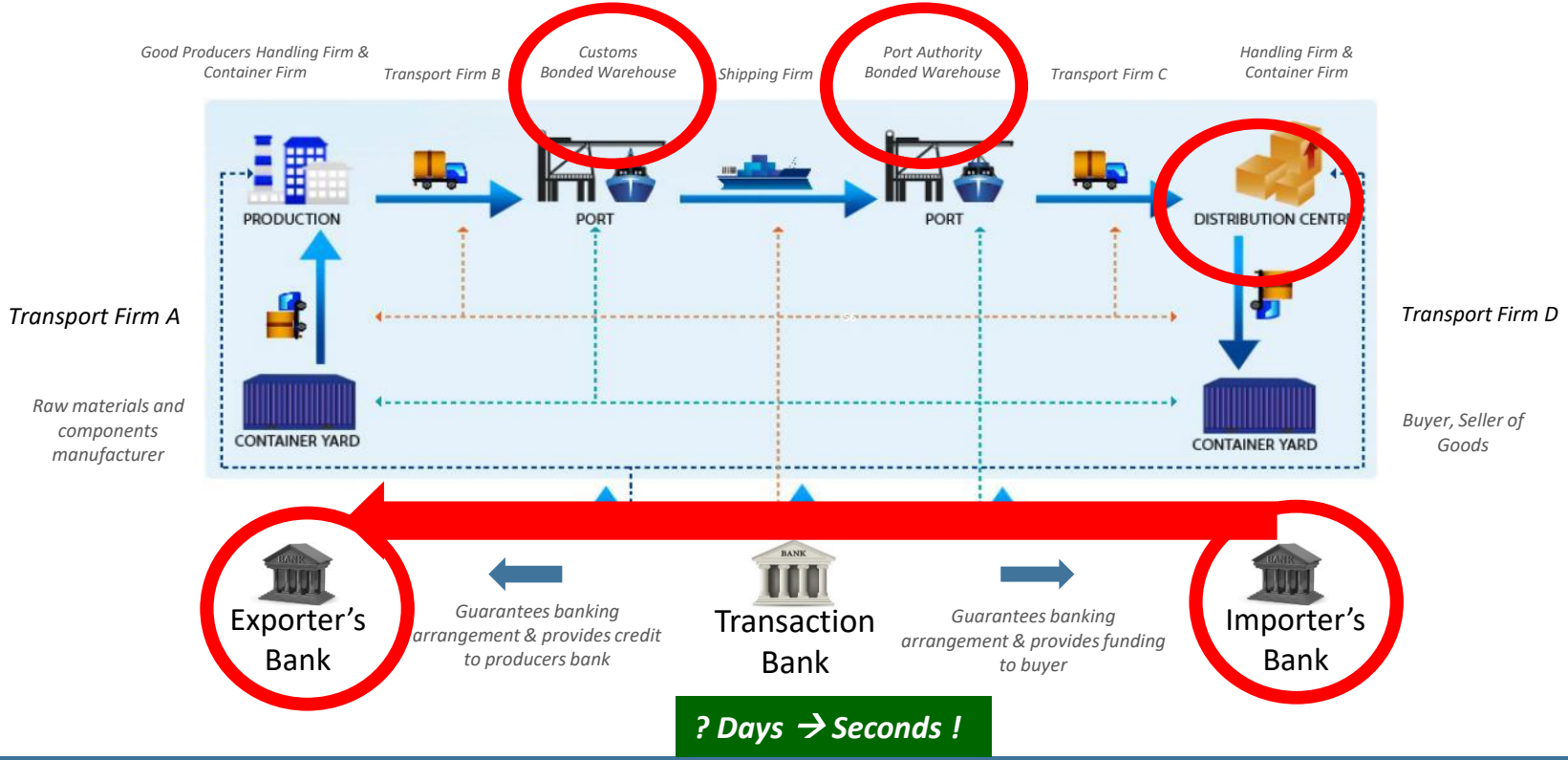
Blockchain on z Systems

Trade Finance/Logistics and Integration with Existing Business Processes

Traditional Trade Finance: >10 parties, ~30 documents, physical presence and overwhelmingly paper-based

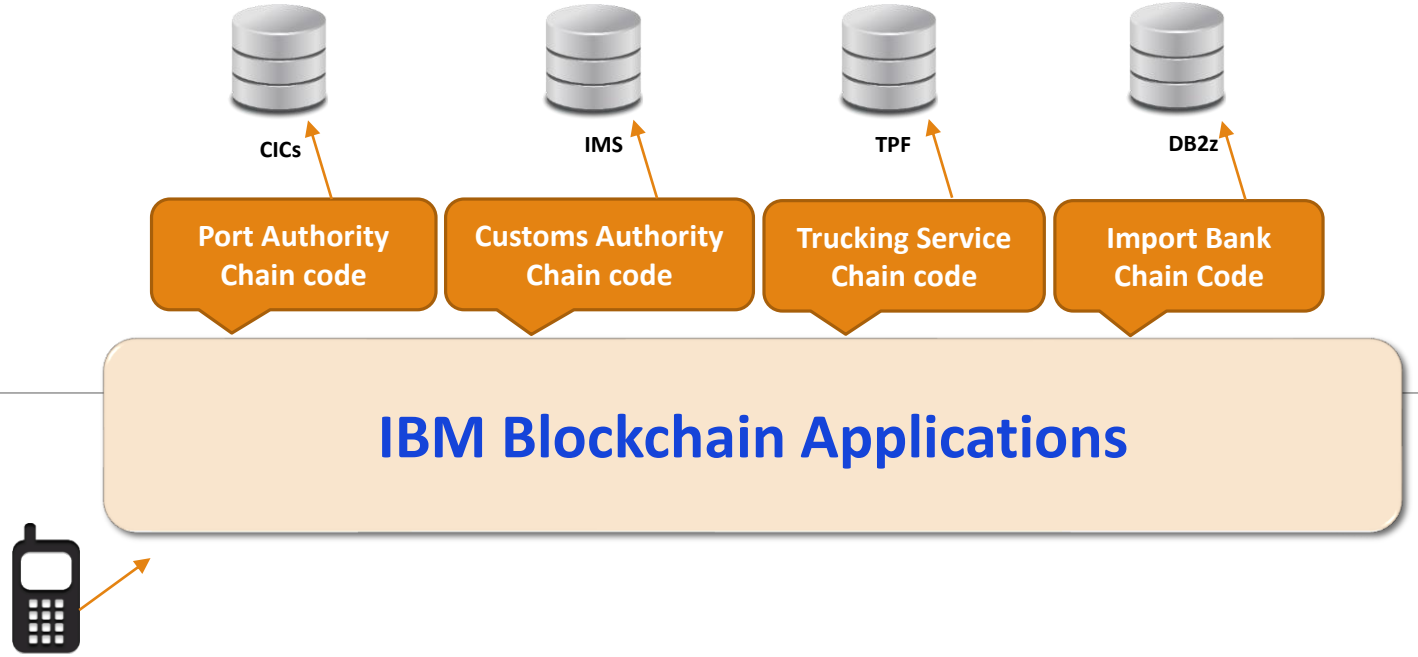
DEMO

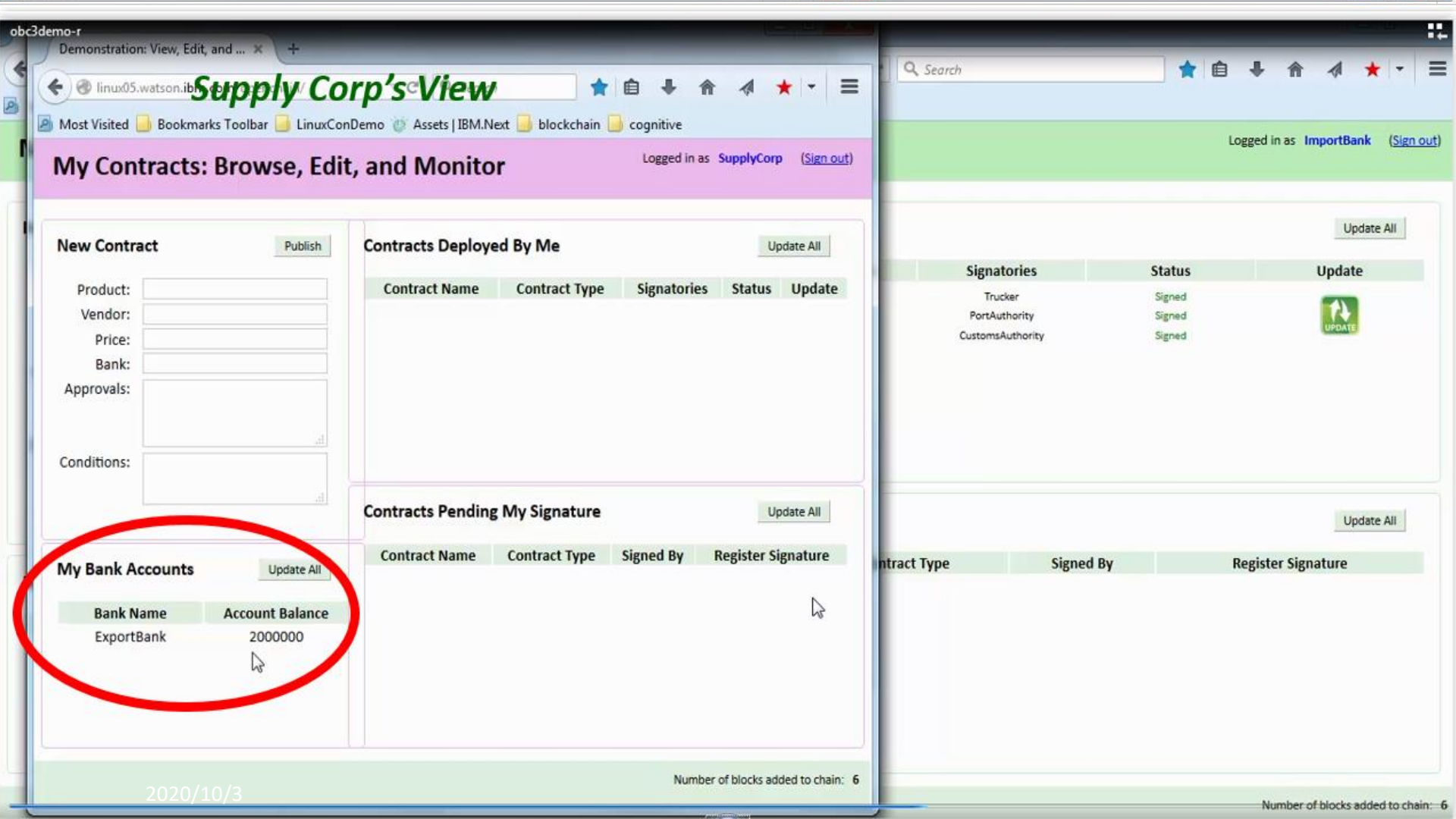
传统的贸易融资:10个缔约方，大约30个文件，实体存在，绝大多数以纸张为基础



DEMO

Trade Finance Smart Contract




obc3demo-r
Demonstration: View, Edit, and ...
linux05.watson.ibm
Supply Corp's View
Most Visited
Bookmarks Toolbar
LinuxConDemo
Assets | IBM.Next
blockchain
cognitive
My Contracts: Browse, Edit, and Monitor
Logged in as SupplyCorp (Sign out)
New Contract
Publish
Product:
Vendor:
Price:
Bank:
Approvals:
Conditions:
Contracts Deployed By Me
Update All
Contract Name
Contract Type
Signatories
Status
Update
Contracts Pending My Signature
Update All
Contract Name
Contract Type
Signed By
Register Signature
My Bank Accounts
Update All
Bank Name
Account Balance
ExportBank
2000000
Number of blocks added to chain: 6
Search
Logged in as ImportBank (Sign out)
Update All
Signatories
Status
Update
Trucker
PortAuthority
CustomsAuthority
Signed
Signed
Signed
UPDATE
Update All
Signed By
Register Signature
Number of blocks added to chain: 6
2020/10/3

DEMO

Infrastructure Requirements & Deliverables / z Support Offered for Blockchain PoC

基础设施需求&交付/ z支持区块链PoC提供

- 2 shared IFLs
- 48 GB memory
- 48 GB storage
- zVM
- Debian 7 or 8
- Blockchain code
- Sample Smart Contracts/Chaincode
- Sample GUIs to connect to 6,7 above

- 2共享ifl
- 48 GB内存
- 48 GB存储
- zVM
- Debian 7或8
- 区块链代码
- 样本/ Chaincode聪明的合同
- 样本gui连接到6、7以上

Contents

- ✓Motivations
- ✓Concepts
- ✓Use Cases
- ✓IBM Offers
- ✓Demo

Resources to Learn More about Blockchain

For general information: http://www.ibm.com/blockchain/

Join the communities:

- IBM blockchain - http://ibm.biz/InternalBlockchainCommunity
- System Z Gang on Blockchain - https://ibm.biz/BdHC2P

Access connections, for linkage to Enablement materials.

- http://ibm.biz/BCEngagement

Presentations, Videos, Labs

- https://ibm.box.com/BlockchainBox

Blockchain on Linux on System z

- https://ibm.biz/Bd4i4V

Sample code from demo to start you creating smart contracts with our help

- https://github.com/linux-on-ibm-z/docs/wiki/Building-Open-Ledger


Is blockchain going to be the next big disruptor for…
… information technology
…our economy
…our society
… our lifestyle
?

完


धन्यवाद
Hindi
多謝
Traditional Chinese
ขอบคุณ
Thai
Спасибо
Russian
Gracias
Spanish
Thank You
English
شكرا
Arabic
Obrigado
Brazilian Portuguese
Grazie
Italian
多谢
Simplified Chinese
Danke
German
Merci
French
நன்றி
Tamil
Tamil
ありがとうございました
Japanese
감사합니다
Korean

Glossary of terms related to Blockchain

Business Networks

Business Networks connect

Participants who are customers, suppliers, banks, partners

Cross geography & regulatory boundary

Wealth is generated by the flow of goods & services across business network

Markets are central to this process

Public: fruit market, car auction

or

Private: supply chain financing, bonds

Assets

An asset is anything that is capable of being owned or controlled to produce value

Two fundamental types of asset

Tangible, e.g. a house

Intangible e.g. a mortgage

Intangible assets subdivide

Financial, e.g. bond

Intellectual e.g. patents

Digital e.g. music

Cash is also an asset

Has property of anonymity

Ledger

Ledger: THE system of record for a business

Business will have multiple ledgers for multiple business networks in which they participate

Transaction: an asset transfer onto and off of the ledger

John gives a car to Anthony (simple)

Contract: conditions for transaction to occur

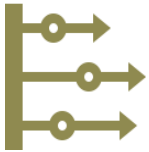
If Anthony pays John money, then car passes from John to Anthony (simple)

If car won't start, funds do not pass to John (as decided by third party arbitrator) (more complex)

Glossary of Blockchain Terms

Shared Ledger

contains the current world state of the ledger and a Blockchain of transaction invocations



Events

creates notifications of significant operations on the Blockchain (e.g. a new block), as well as notifications related to smart contracts. Does not include event distribution.

Smart Contract

encapsulates business network transactions in code. transaction invocations result in gets and sets of ledger state

Systems Management

provides the ability to create, change and monitor Blockchain components

Consensus Network

a collection of network data and processing peers forming a Blockchain network. Responsible for maintaining a consistently replicated ledger

Wallet

securely manages a user's security credentials

Membership

manages identity and transaction certificates, as well as other aspects of permissioned access

Systems Integration

responsible for integrating Blockchain bi-directionally with external systems. Not part of Blockchain, but used with it.