构建区块链服务平台

杨保华

About Me

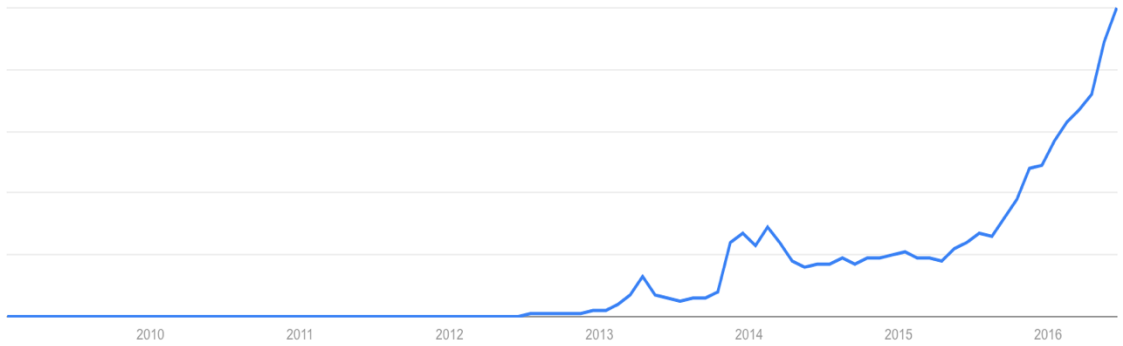
- Baohua Yang
  - Senior Researcher, IBM
  - Open-Source contributor (OpenStack, Hyperledger, etc.)
- Cloud, BigData, Fintech, Distributed System
- Favorite languages: JPG (Javascript, Python, Golang)

Content

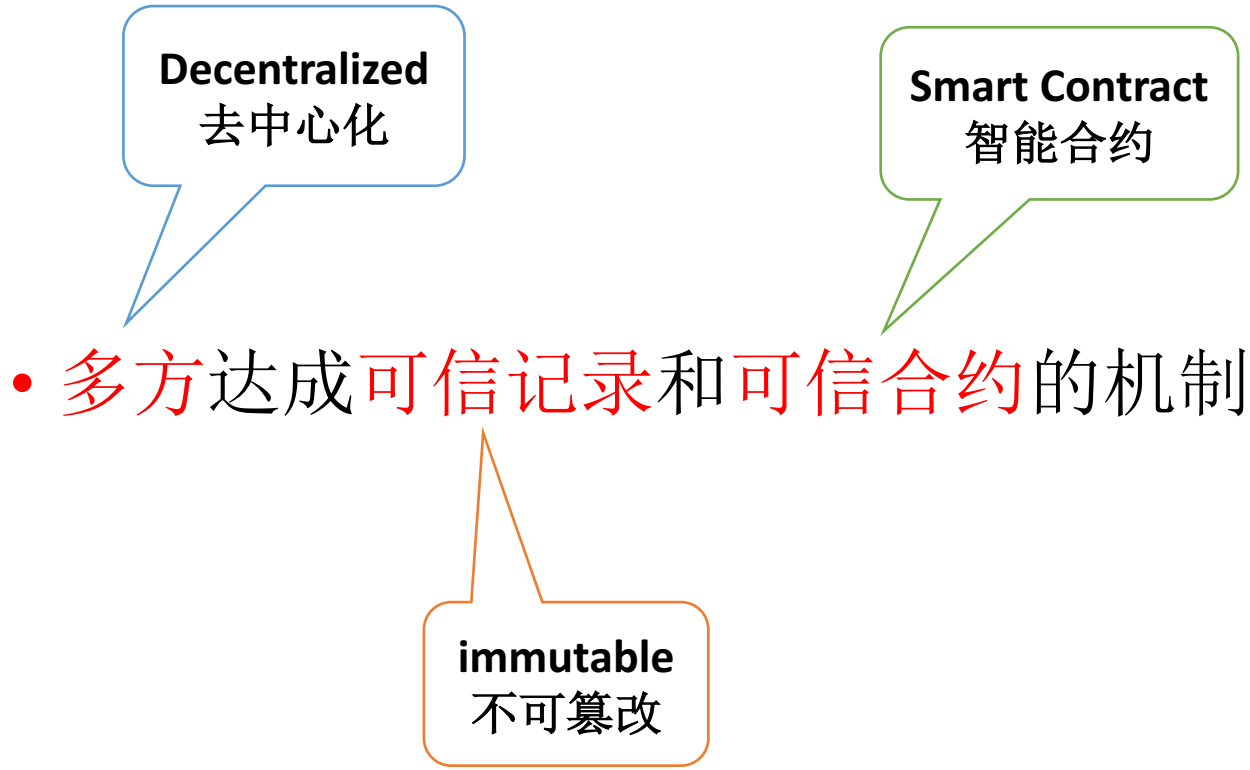
- About Blockchain
- Platform Design
- Implementation and Operation
- Demo

Brief History of Blockchain

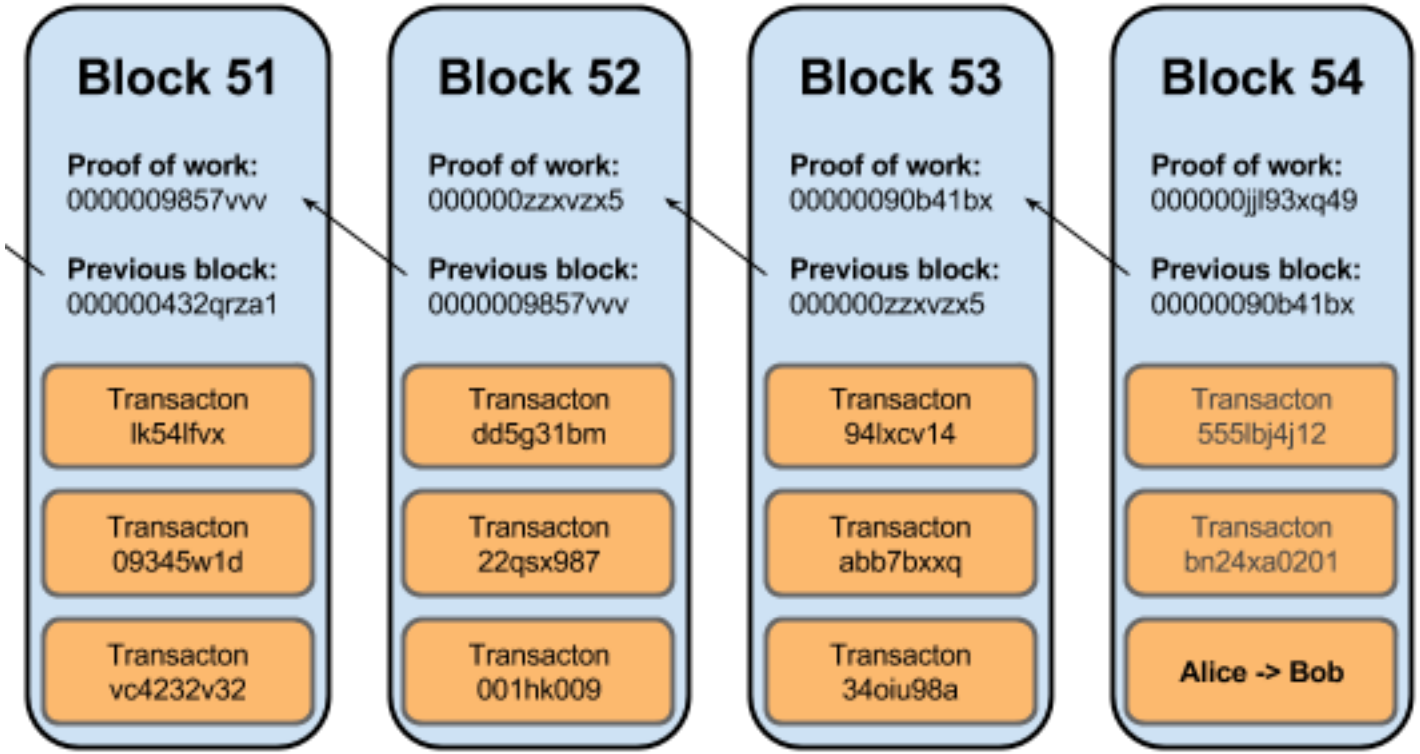
- 1494: Double Entry Bookkeeping
- 1998 ~: Crypto-currency
  - Double-spend
- 2008: bitcoin
  - 2009 online
  - 2013 explode
  - 2014 mining
- 2014: Blockchain
  - Transaction
  - Block
  - Chain
- 2015: smart contract/ledger
- 2016: Application/Scenarios



What is Blockchain



Example Structure

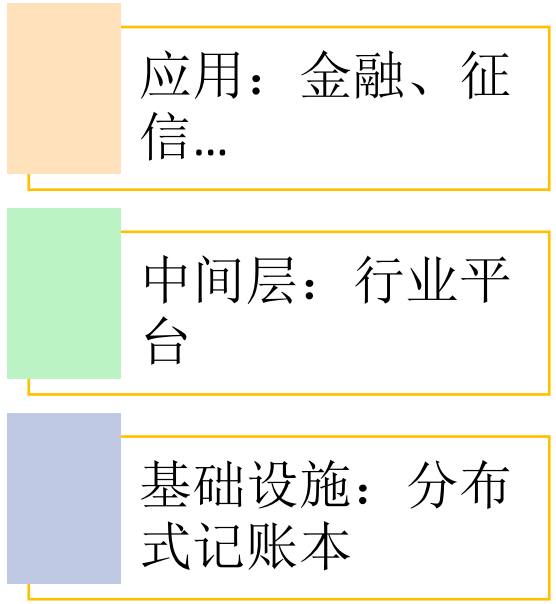


Related projects

- 公有链（Public）
  - 比特币（Bitcoin）区块链
  - 以太坊（Ethereum）区块链
- 联盟链（Consortium）
  - 超级账本（Hyperledger）
  - 其它：Chain 等
- 私有链（Private）

Business Architecture

- 基础设施层 fabric
  - 提供可靠的分布式账本设施
- 中间平台层 middle-platform
  - 抽象分布式账本的记账和计算能力
- 应用层 application
  - 商业应用



Applications

- 金融服务
- （跨境）贸易
- 资产权属
- 资源共享
- 供应链与物联网
- 其它应用

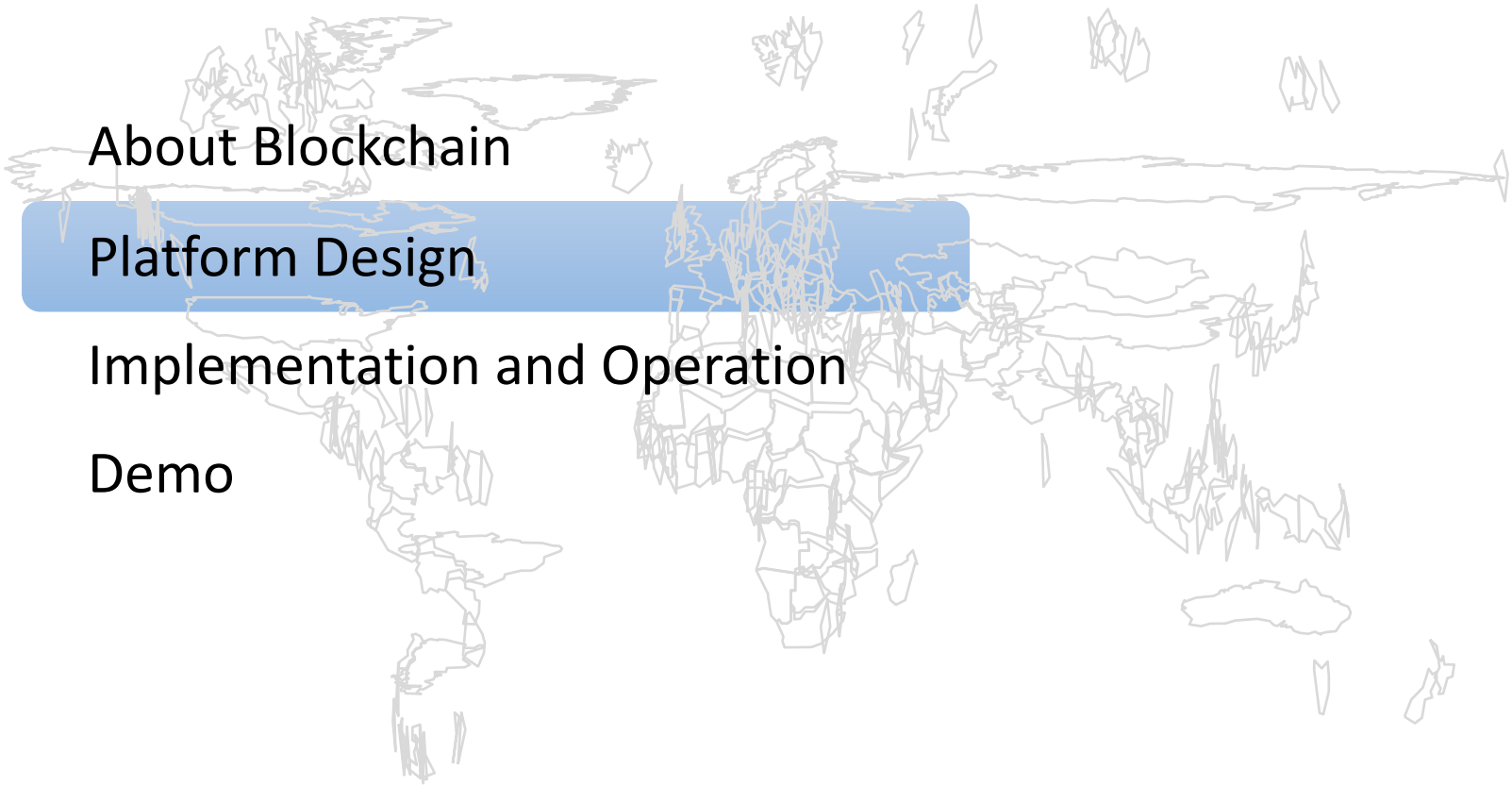
Applications

- BitShare：基于区块链的证券发行平台，号称每秒达到 10 万笔交易。
- 纳斯达克 Linq：探索使用区块链作为“纳斯达克私有市场”（公司在IPO前的股份交易市场）的交易记录系统。
- Circle：由区块链充当支付网络，允许用户快速进行跨币种的快速汇款。
- Ripple：实现多币种低成本实时交易。
- Factom：为安存正信公证服务定制区块链解决方案。
- OpenBazaar：在无中介的情形下，实现安全电商交易。
- Skuchain：创建基于区块链的新型供应链解决方案，实现商品流与资金流同步，解决假货问题。

More Tutorials

- 区块链技术指南
- hyperledger.org
- ethereum.org
- bitcoin.org

Content



About Blockchain

Platform Design

Implementation and Operation

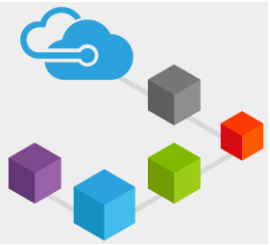
Demo

区块链开放服务

- Blockchain as a Service，让用户低成本使用区块链服务
- 结合云计算相关技术

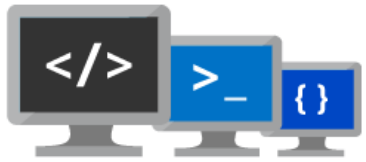
- 国际区块链即服务
  - 微软 Azure
  - IBM Bluemix
- 国内区块链即服务
  - 刚刚起步

Microsoft Azure: Blockchain as a Service



BaaS for enterprises and business networks

With intelligence services and tools, Azure is the cloud platform to develop, test and deploy blockchain applications. Try Azure DevTest Labs to explore BaaS.



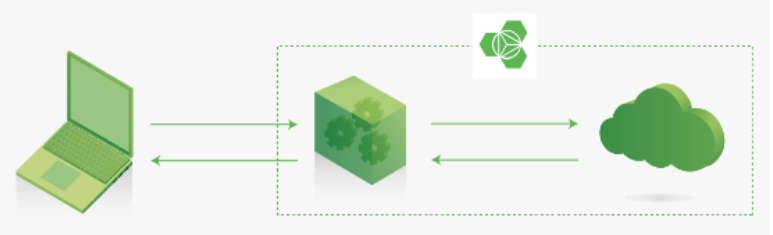
BaaS for developers and partners

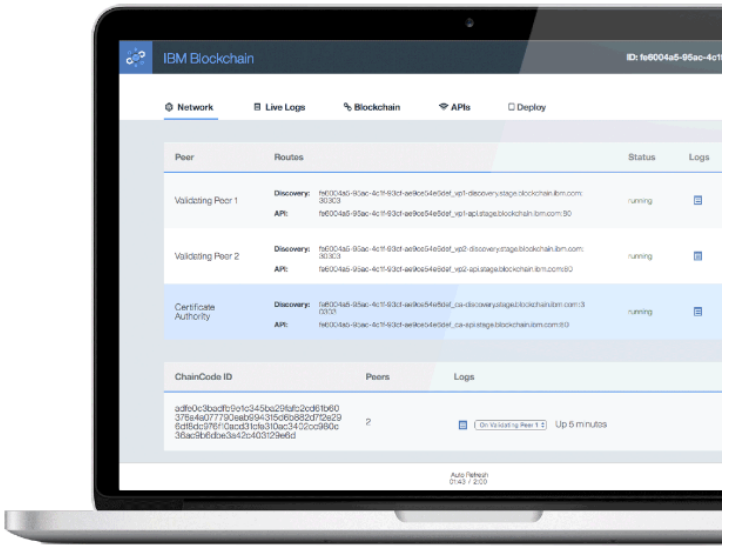
Find developer tools and blockchain-compatible cloud services to quickly bring solutions to market and at scale. Get started using blockchain with Solidity and Smart Contracts.

IBM Bluemix: Blockchain as a Service

- Create and manage a blockchain network in a few minutes. Deploy chaincode smart contracts and use the live log to view progress of transacti

- The architecture and technology sta on





Design Requirements

- High performance: Response in seconds
- Scalability: Support thousands of chains
- Configurable: Customized service for users, manageable for operators
- Automatics: self-life-cycle, minimize human effort
- Operational: Easy to integrate with operation tools
- Platform support: Easy to deploy on Cloud
- Physical Resource: Run on top of X86, Power, Z, with baremetal or virtualized environment

Design Principles

- Micro-service: Means we decouple various functions to individual micro services. No service will crash others whatever it does.
- Failure-resilience: Means the service should be tolerant for failure, such as database crash.
- Scalability: Try best to distribute the services, and to mitigate SPoF.

Content

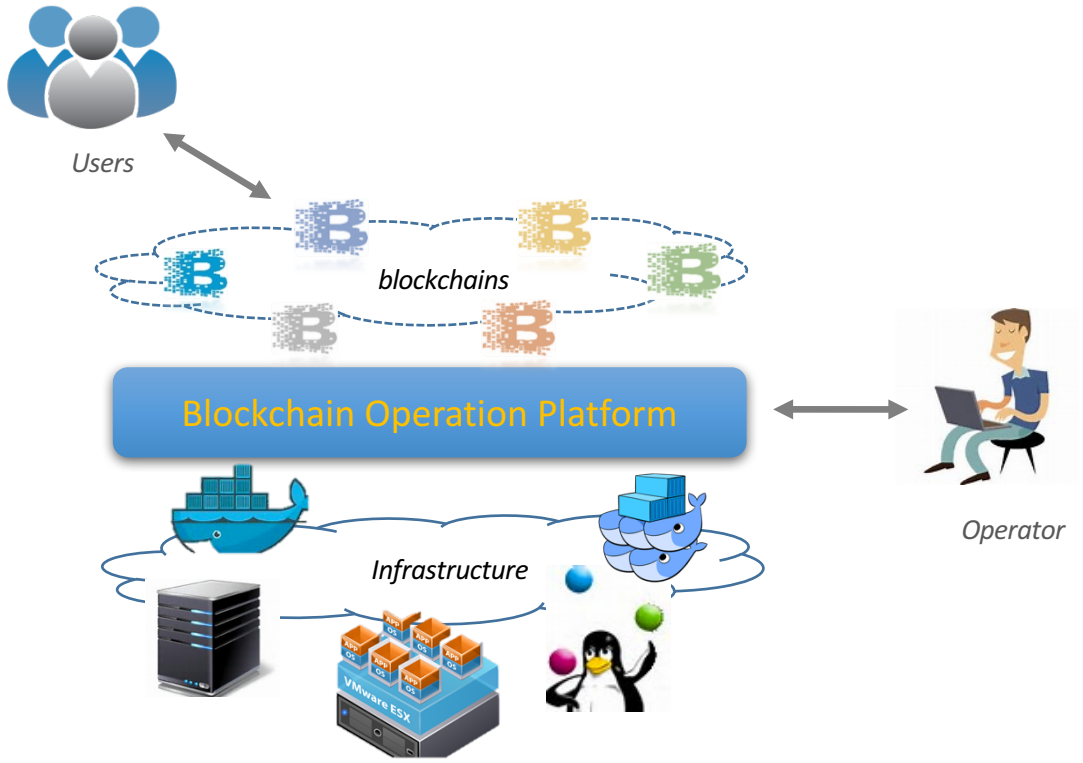
About Blockchain

Platform Design

Implementation and Operation

Demo

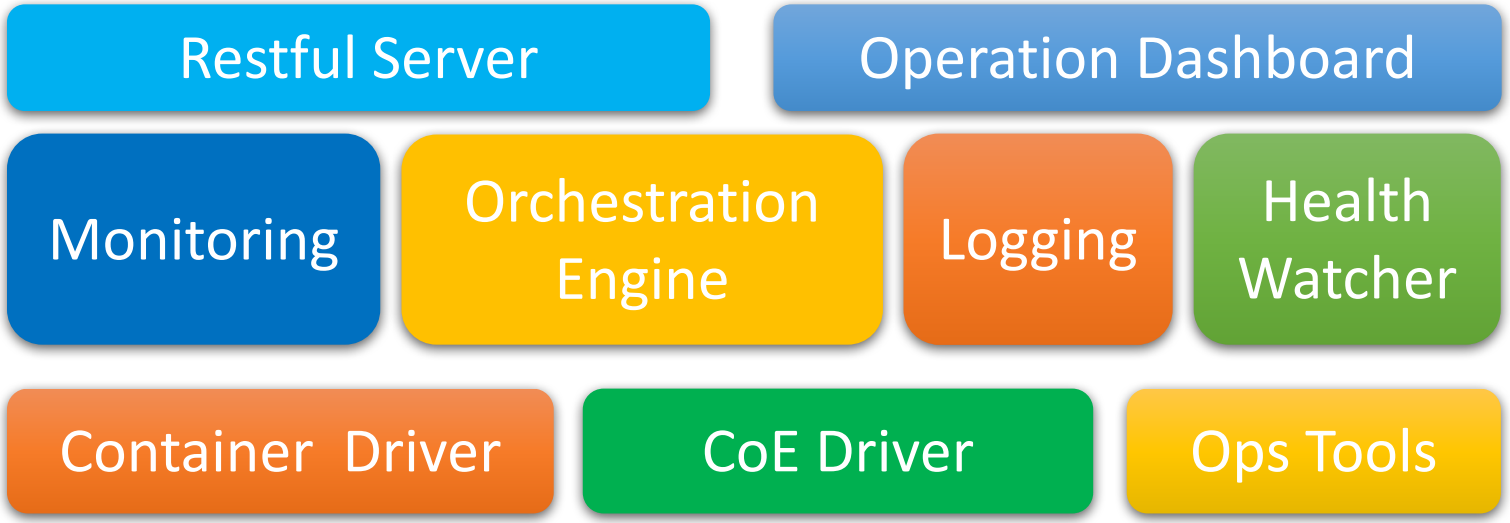
Service Scenarios



Scenario #1: **Developers** can test their smart contracts on provisioned chains through a portal.

Scenario #2: **Operators** can configure and monitor the system flexibly at runtime through a dashboard, with automatic mode support.

Core Architecture



区块链技术选型

特性	比特币（bitcoin）	以太坊（Ethereum）	超级账本（HyperLedger）
功能	比特币支撑平台	智能合约支撑平台	商业应用支撑平台
属性	公有	公有	联盟
隐私性	完全公开（可匿名）	完全公开（可匿名）	联盟内部公开（可匿名）
智能合约	较弱	Solidity，图灵完备	多种：Go， Java，Node 等，图灵完备
权限管理	无	无	支持
一致性	PoW	PoW、PoS	多种，PBFT 等
性能	受限	受限	可扩展
开发者	比特币社区	以太坊社区	Hyperledger 社区（大型科技、金融企业）
生产支持	较稳定	演进中，分叉	演进中，17年初 1.0 release

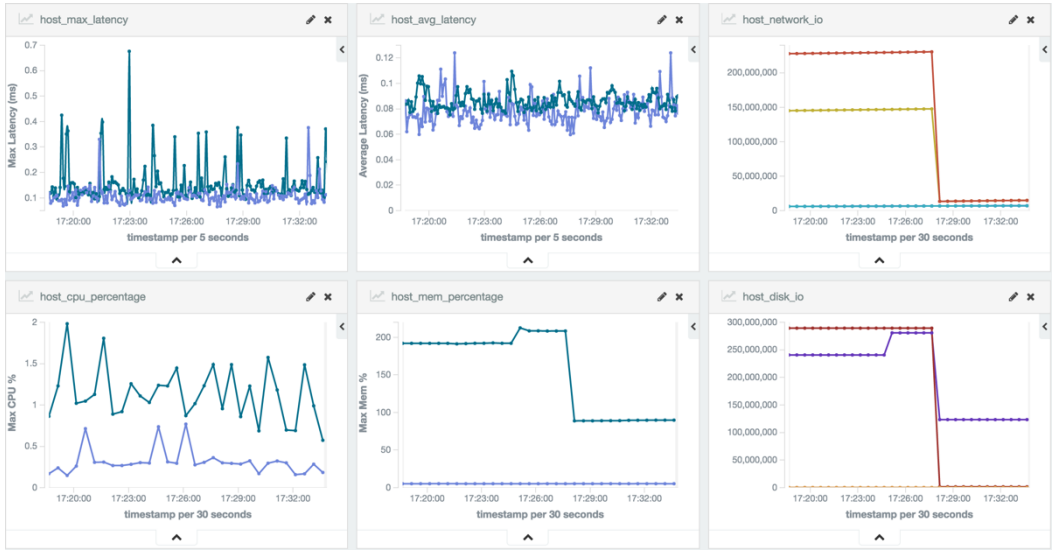
Related Projects

- Containerization
- Fabric-SDK-Python (https://github.com/hyperledger/fabric-sdk-py)
- Cello (https://github.com/yeasy/cello)
- Op-Tools (Open-sourcing)

- Welcome for more Pythoner to join!

Operation statistics

- Running
  - Half a year
- Users
  - From tens of organizations
- Chains
  - Thousands of chains



Demo Time

Q&A