



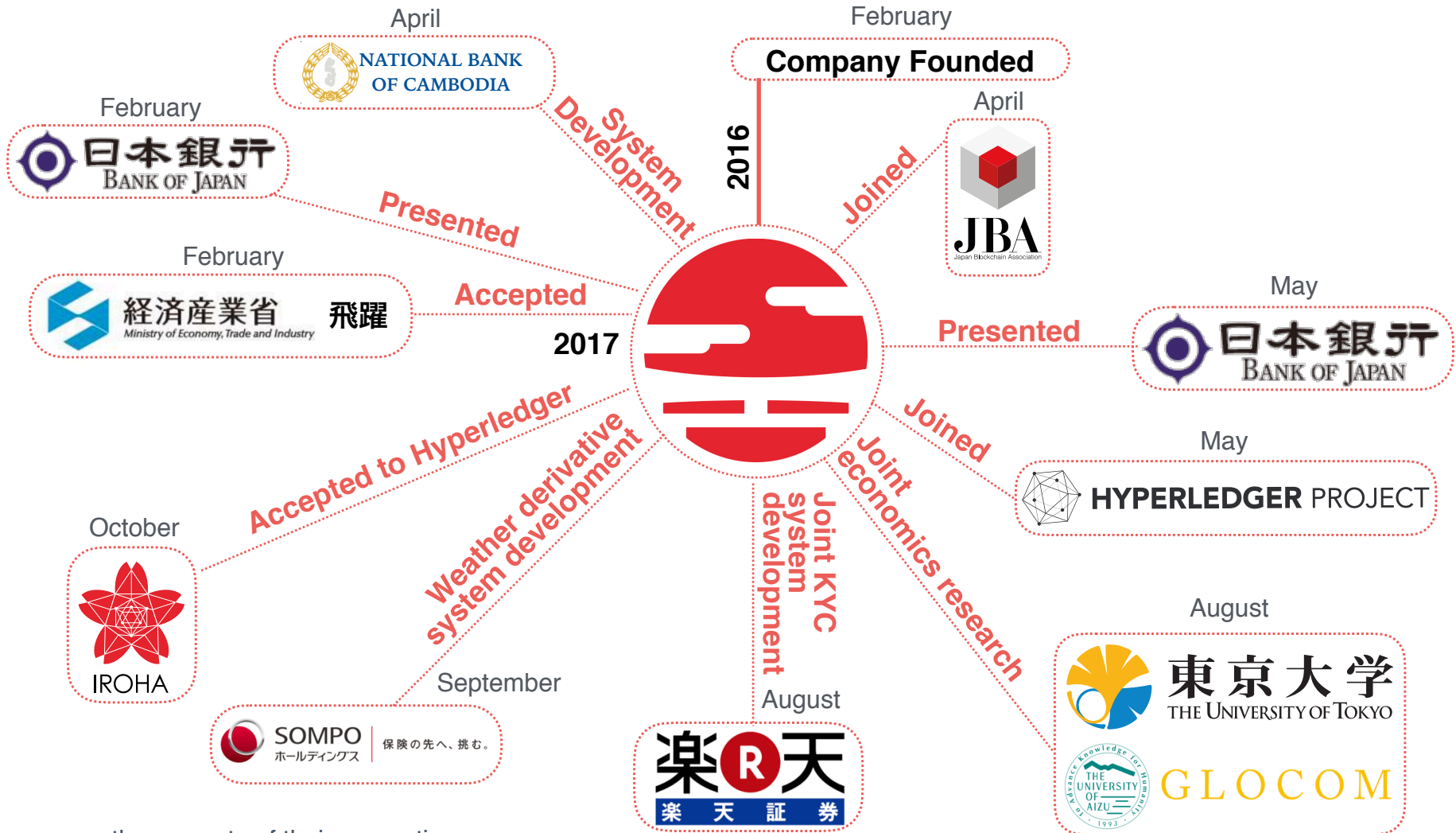
SORAMITSU
ソラミツ

Hyperledger Iroha :
**Working towards standard protocols for
identity and digital asset management**

Soramitsu Co., Ltd.

About Soramitsu

- Founded in February 2016, as a Japanese fintech company
- Building blockchain framework and creating service and applications



※Logos are the property of their respective owners.

© 2017 SORAMITSU All Rights Reserved.

These materials are to be used only for discussion purposes. Unauthorized copying or distribution to a third party without the consent of Soramitsu Co., Ltd. is strictly prohibited. Logos and images are property of their respective owners and are included for informational purposes only.

Board member



Ikkei Matsuda

Chairman & Founder

PhD medicine
Venture Capitalist
Japanese Government
advisor



Makoto Takemiya

Co-CEO & Founder

Iroha chief developer
PhD computer science



Ryu Okada

Co-CEO & Founder

CPA, Former Deloitte
Entrepreneur of many
companies



Kazumasa Miyazawa

Chief Operating Officer

Former SONY
Creator and founder of Edy
electronic money



Tsukasa Ojima

Executive Advisor

Former Lehman Brothers
and Nomura Securities
Executive

Provides full stack blockchain service, from the development of framework for distributed ledger to service, mobile and web applications.



HYPERLEDGER
IROHA

Blockchain Development
Open Source Project

**Full Stack
Development**



Service Development

- **Digital Identity Platform**
- **Digital Asset Platform**

Hyperledger project

- Linux Foundation initiated with over 120 companies from the world
- Working towards creating standards for distributed ledger technology


<http://www.hyperledger.org>



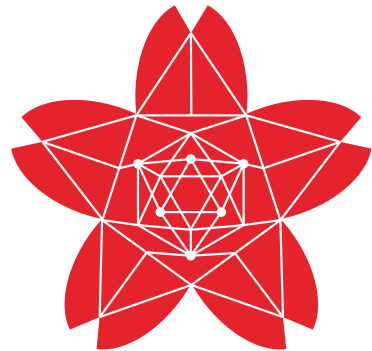
*Logos are the property of their respective owners.

Hyperledger project

The Hyperledger Project currently has 4 distributed ledger frameworks, originally proposed by IBM, Intel, and Soramitsu.

Framework name	Original developer	Main programming language	Status
Fabric	IBM	Go	Active
Sawtooth Lake	Intel	Python	Active
 Iroha	Soramitsu	C++	Active
Burrow	Monax	Go	Incuvation

- Originally developed by Soramitsu and open sourced in September 2016
- Accepted into the Hyperledger Project as a framework in October 2016



HYPERLEDGER
IROHA

<http://iroha.tech>



Simple & Fast

Transaction finality within 3 seconds
Several thousand of transactions per second



Mobile First

iOS, Android, and JavaScript SDKs are provided to ease development of end-user applications.

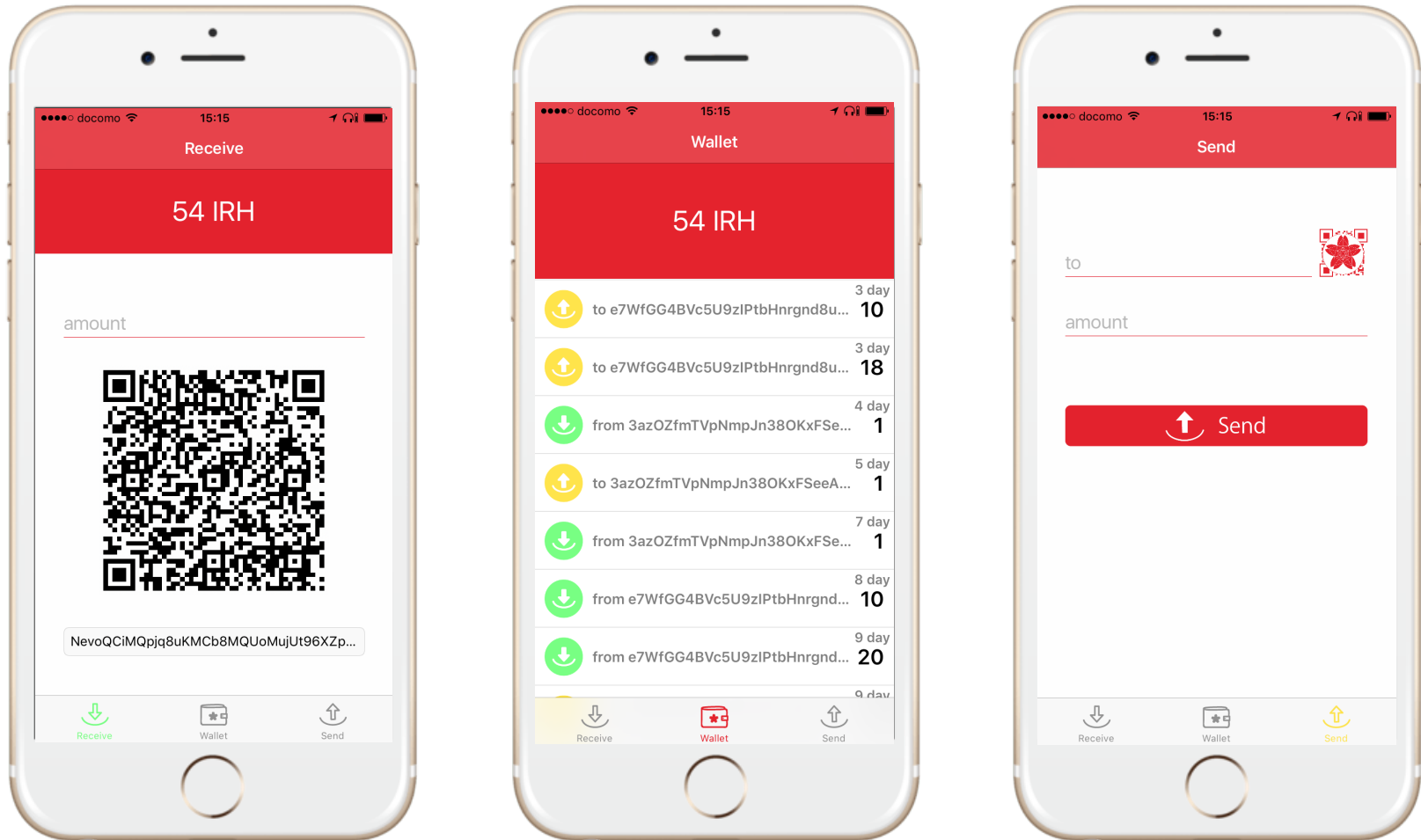


Asset Management

Assets such as currencies, points, tickets, securities, registry, identity, SCM can be managed using prepared commands in Iroha.

Hyperledger Iroha: Mobile first

- As a part of ecosystem, SDK for mobile and web applications are provided
- Easily create safe applications that interface with Iroha



Low latency

Transaction finality within 3 seconds

High throughput

Several thousand transactions per second

Permission model

Unique features of decentralized permission

Asset management

Data model & prepared commands to manage asset easily

Smart contract

Business automation and programable features

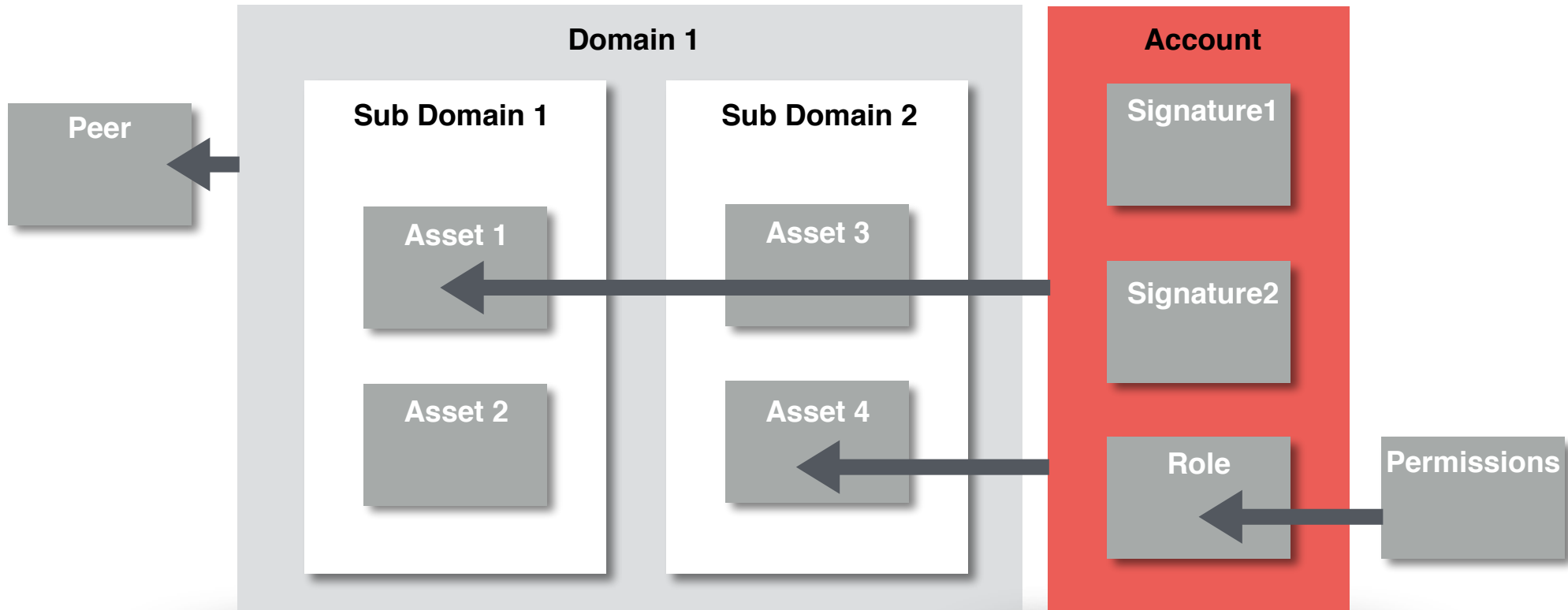
Hyperledger Iroha: Consensus algorithm

Consensus algorithm affect Latency and throughput

Platform	Type of consensus algorithm	Name of consensus algorithm	Transaction Finality	Latency	Throughput
Bitcoin	Stochastic BFT	Proof of Work	No	10 min.	about 7 transactions per sec.
Iroha	Hash graph BFT	YAC	Yes	within 3 sec.	several thousand transactions per sec.

Hyperledger Iroha: Data model

- Support multi domain and multi sub domain
- Domain have multi asset, Account handle multi asset
- Account have multi signature and role, Role have permissions



Hyperledger Iroha: Command driven architecture

- Without writing code, Asset, Identity & SCM management can be done by prepared commands for data model
- Benefit of prepared commands is fast development and assured quality
- Use smart contract, if prepared commands doesn't cover the requirement



Prepared commands

Peer

AddPeer

Domains

CreateDomain

Assets

CreateAsset
AddAssetQuantity
TransferAsset

Account

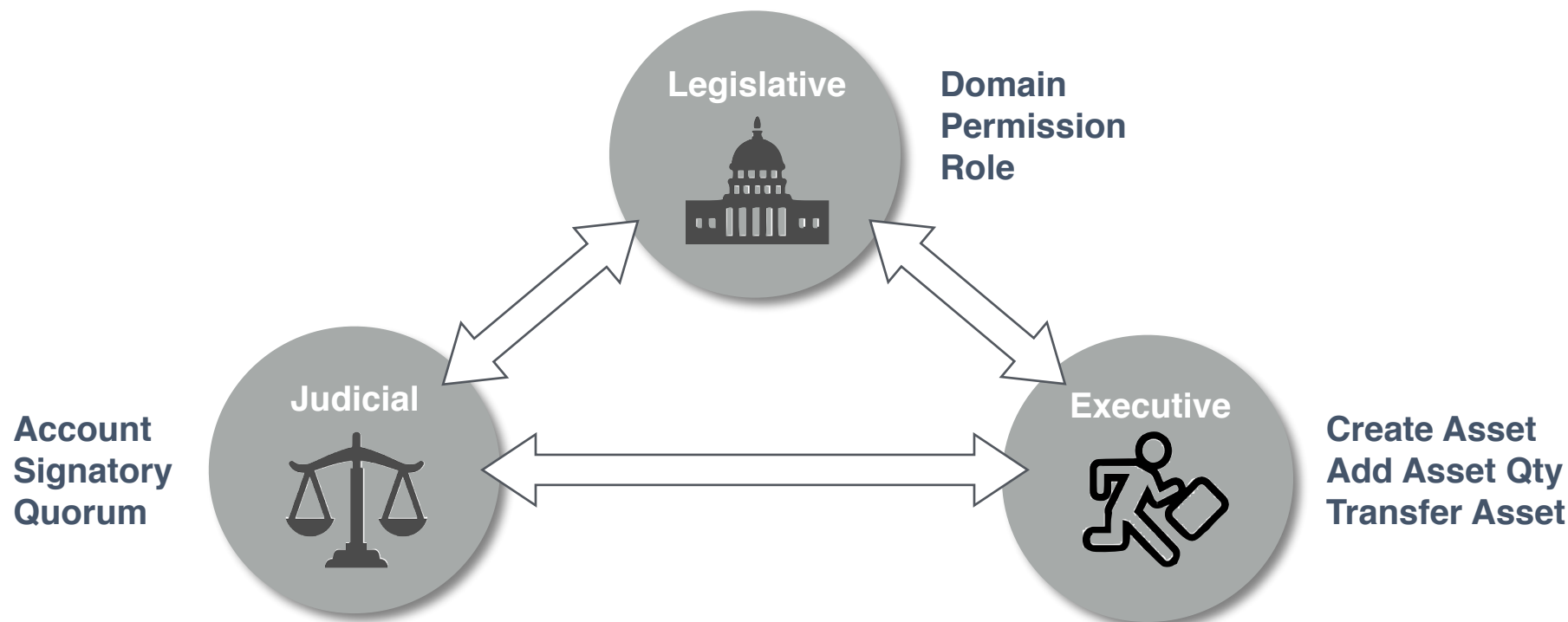
CreateAccount
AddSignatory
RemoveSignatory
SetQuorum

Permissions

CreateRole
AppendRole
GrantPermission
RevokePermission

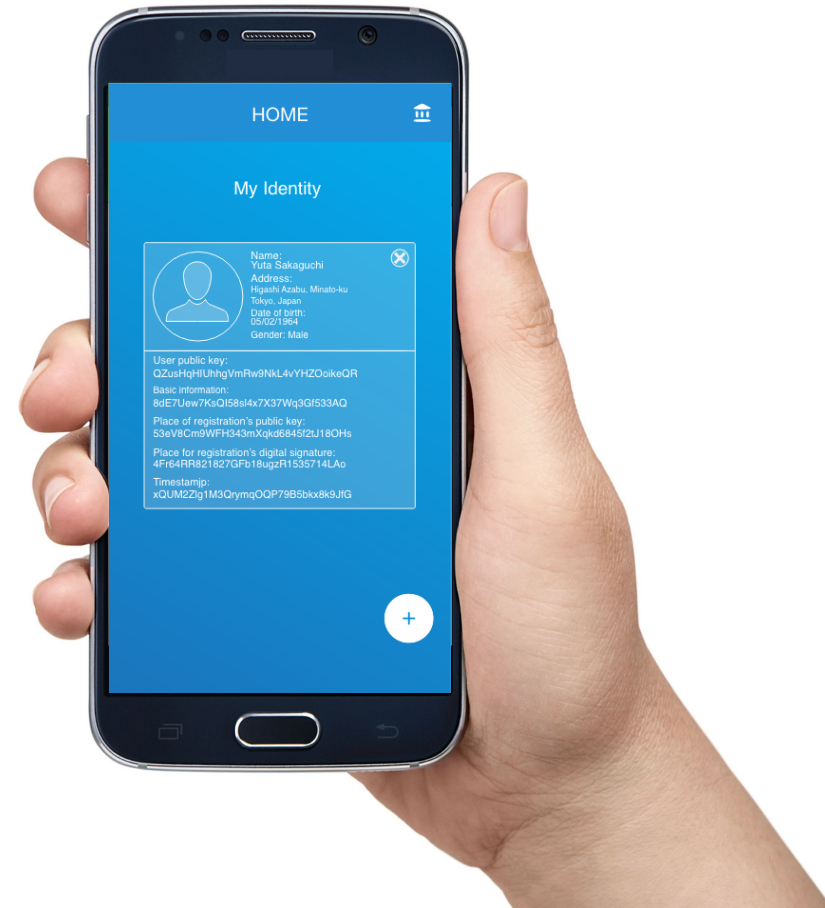
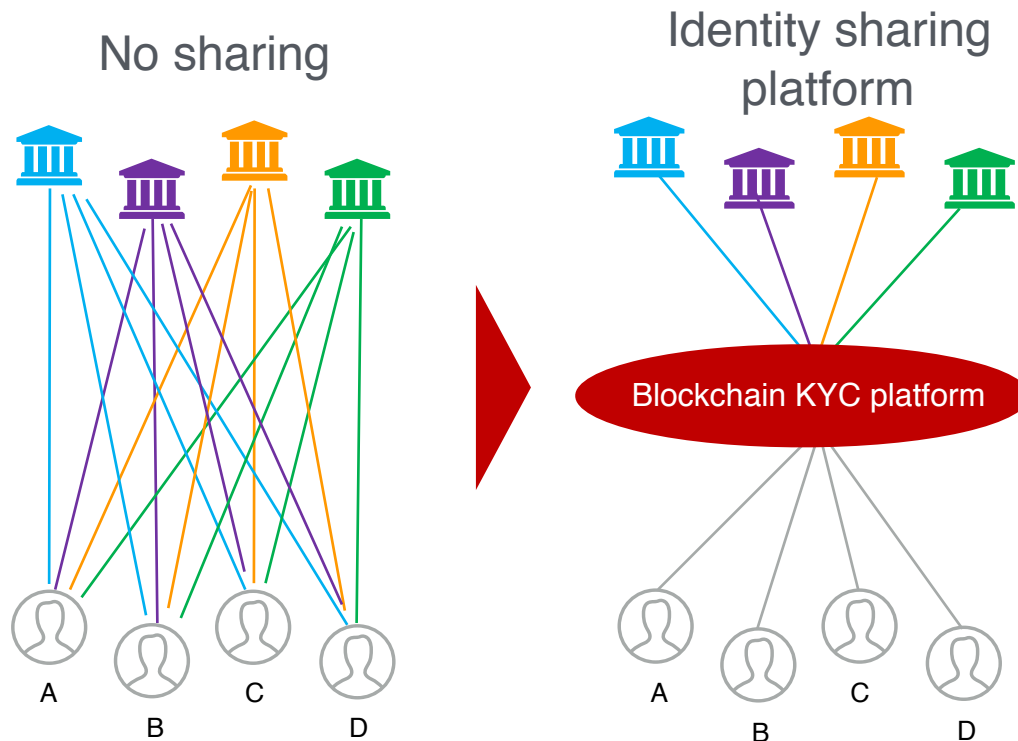
Hyperledger Iroha: Decentralized permission model

- Separation of three powers, but each node have same functions
- Legislative handle domain, assign permissions to each role
- Judicial handle account and signatory
- Executive handle asset



Case study: digital identity

- Using blockchain technology and cryptographic signatures
- Created decentralized identity that can be used programmatically
- This can empower a digital economy



Case study: digital currency (event currency, Moeka)

- With University of Tokyo, University of Aizu, International University GLOCOM
- Research for creation of local ecosystem using Hyperledger Iroha
- A prototype for event currency was created in November in Fukushima

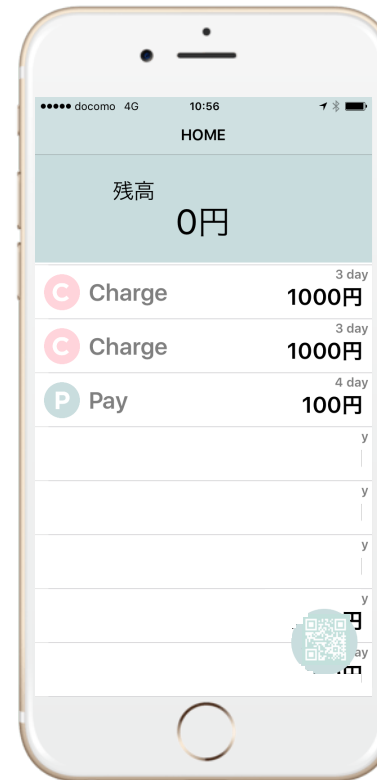


<http://www3.nhk.or.jp/news/>

Case study: digital currency (regional currency, Byacco)

16

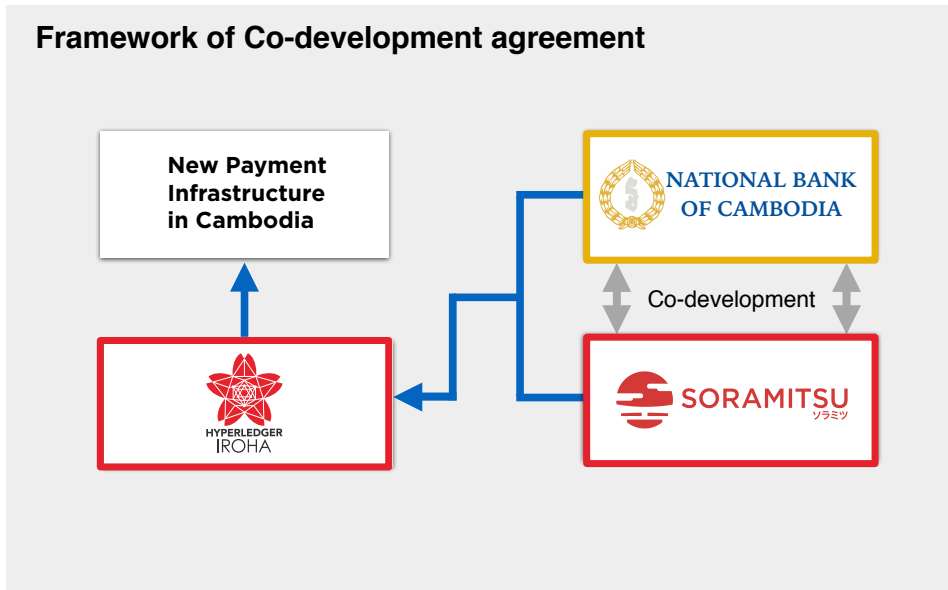
- With the University of Aizu, created campus currency, Byacco
- Used by students in the on-campus store and cafeteria.



http://www.tv-tokyo.co.jp/mv/wbs/market/post_129389

Case study: new payment infrastructure (Nation wide)

From April 2017, Soramitsu and the National Bank of Cambodia started to create a new payment infrastructure for the Kingdom of Cambodia.



A street view of the National Bank of Cambodia headquarters in Phnom Penh. © Heng Chivoan

NBC signs blockchain agreement

Mon, 24 April 2017 Kali Kotoski

The National Bank of Cambodia (NBC) has signed an agreement with a Japanese firm to develop a blockchain-based payment system that could potentially allow for the regulated usage of a cryptocurrency, which would eliminate the use of formal financial institutions to send and receive money.

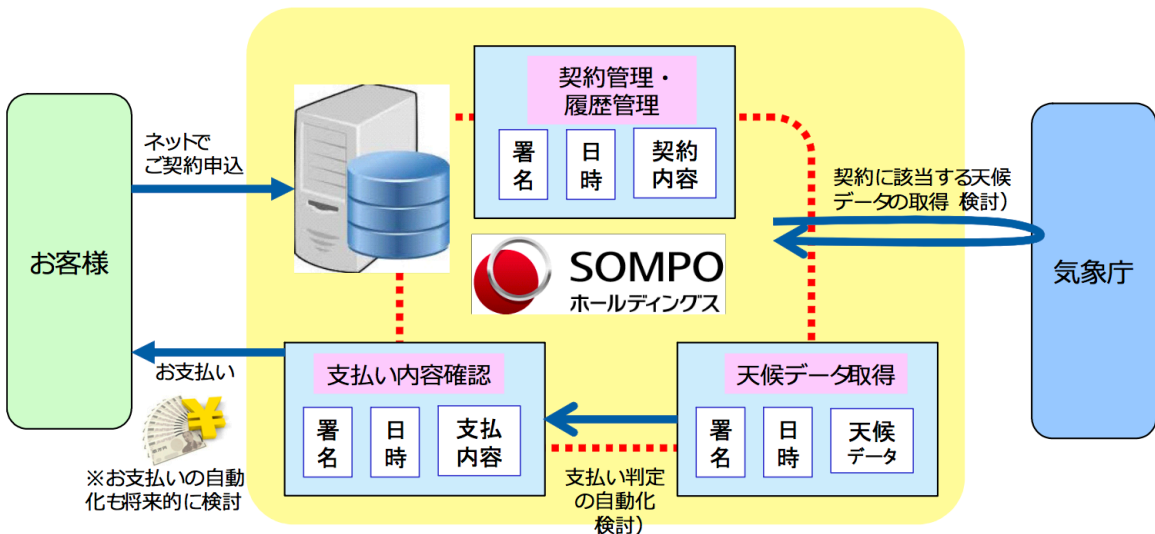
According to an announcement on Friday from the Japanese financial technology firm Soramitsu Co, the company signed a partnership agreement with the NBC to study the possible implementation of a blockchain-based open-development software known as Hyperledger Iroha, a product backed by the Linux Foundation, a US-based company that distributes the ledger technology program.

- **First case where overseas central banks adopt Japanese blockchain technology**
- **Evaluated speed of finality and throughput more than 300 times compared with Bitcoin**

Case study: contract management (weather derivative)

- Contracts can be managed and payment automated using smart contract
- With Sompo Holdings, weather derivative contracts is the first step towards optimizing the workflow for insurance companies

ブロックチェーン技術活用検討範囲



P&C Insurer Trials Blockchain for Catastrophe Coverage

Stan Higgins (@mpmcsweeney) | Published on September 26, 2016 at 19:30 GMT

NEWS

Twitter 335 Facebook f Google+ g+ LinkedIn 30 Reddit 1 Email

One of Japan's largest property insurers is co-developing a prototype blockchain system for insurance derivatives.

Sompo Japan Nipponkoa Holdings announced today that it is working with a firm called Soramitsu to develop a means to purchasing and exchanging insurance policies related to natural disasters and other catastrophic events.



The company said in a statement:

"The Derivative System Using Blockchain Technology (tentative name) that Sompo Holdings and Soramitsu have begun jointly developing aims to create a service that simultaneously shares data such as contract details on the blockchain to accurately and swiftly carry out every step in the insurance process, from managing risk aggregation for derivative products to determining whether or not to pay out on claims and implementing procedures to pay compensation."

<http://www.coindesk.com/pc-insurer-trials-blockchain-catastrophe-coverage/>

Solomitsu and PAL utilize block chain technology to record real time inventory information by RFID and AGV, Drone.

日本経済新聞

2017年7月9日 (日)

Web刊 速報 ビジネスリーダー マーケット テクノロジー アジア スポーツ マネー ライフ 朝刊

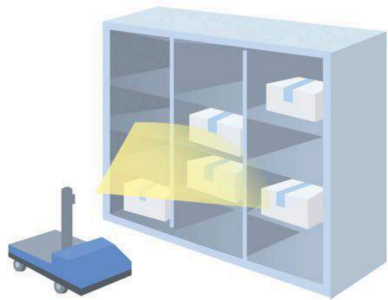
全て 経済 企業 国際 政治 株・金融 スポーツ 社会 その他ジャンル▼ プレスリリース

速報 > プレスリリース > 記事

プレスリリース

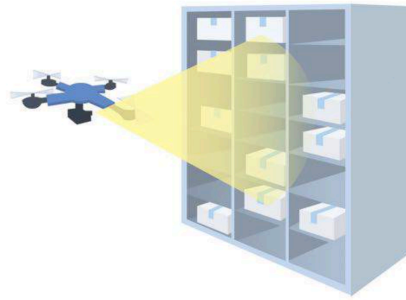
PALとソラミツ、ブロックチェーンを活用したリアルタイム在庫管理システムの開発を開始

2017/7/7 12:25



AGV

AGV(Automatic Guided Vehicle):無人搬送車

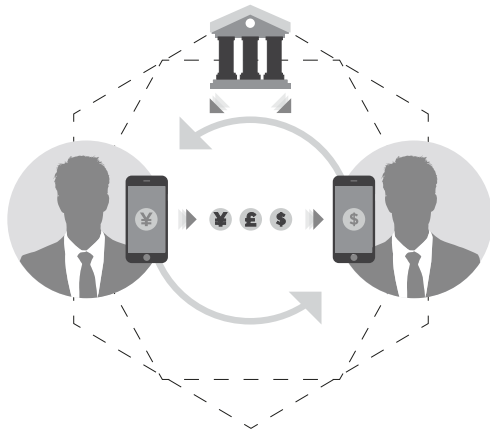


Drone

Benefit :

- Saving manpower and time
- Accurate inventory information on daily, prevent human errors
- Secure, reliable, less risk of tampering
- Inventory movements and transfer of ownership immediately shared
- Settlement can be simplified with digital currency

Digital asset



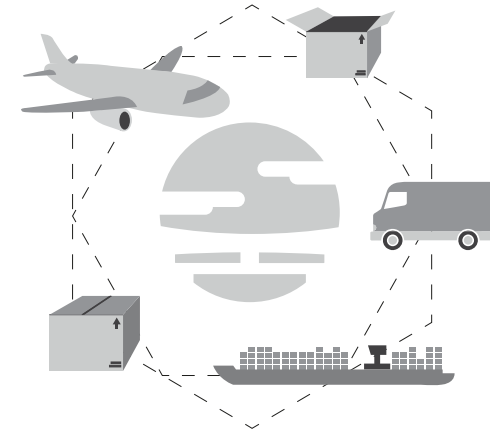
- Payments and settlement
- Contract management
- Securities transactions
- Financial securities management
- Supply chain management
- Smart grid

Digital identity



- Trade finance
- Know Your Customer(KYC)
- Notarization and time stamping
- Sharing economy services
- Medical
- IoT, etc.

Supply chain



Hyperledger Iroha: use case and development partners

- Partnered with a number of institutions to work as use case partners
- Provides free study sessions, technical and use-case consultation

Use case partners:

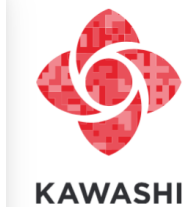


Development partners:



<http://iroha.tech/en/partner.html>

Proposal of standard QR code and Exchange platform



- Standard QR code format and Exchange platform for standardizing the exchange of assets among various platform
- Standard QR code format consist from asset location, account address, embedding commands etc.

Proposal of Standard QR code format

JSON (JavaScript Object Notation)

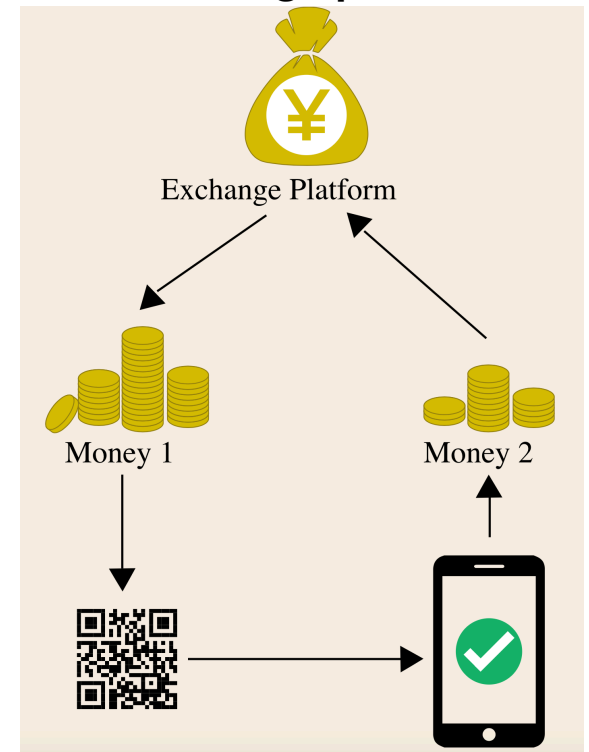
	Key	Value (e.g.)	Detail	Optional
1	"dlt"	{ }	Identifier of "standard QR code for D LT"	No
2	"protocol"	"iroha1.0"	Protocol of D LT: ex. bitcoin, ERC20, iroha1.0, etc.	No
3	"asset"	"YEN#money1.aizu.jp"	Asset location: "asset#domain1.domain2.domain3..."	No
4	"recipient"	"account1@bank.aizu.jp"	Address of the recipient account (to whom)	Yes
5	"sender"	"account2@bank.aizu.jp"	Address of the recipient account (from whom)	Yes
6	"command"	"transfer"	Chain code or command of D LT (how)	Yes
7	"value"	"1000" or "ticket1"	Countable or uncountable value for chain code or command (what)	Yes
8	"description"	"Bill #00743"	Description of sending or billing information	Yes
9	"options"	{ }	For future use	Yes

e.g.

```
{  
  "dlt": {  
    "protocol": "iroha1.0",  
    "asset": "YEN#money1.aizu.jp",  
    "recipient": "account1@bank.aizu.jp",  
    "command": "transfer",  
    "value": "1000",  
    "description": "Bill #00743"  
  }  
}
```



Exchange platform

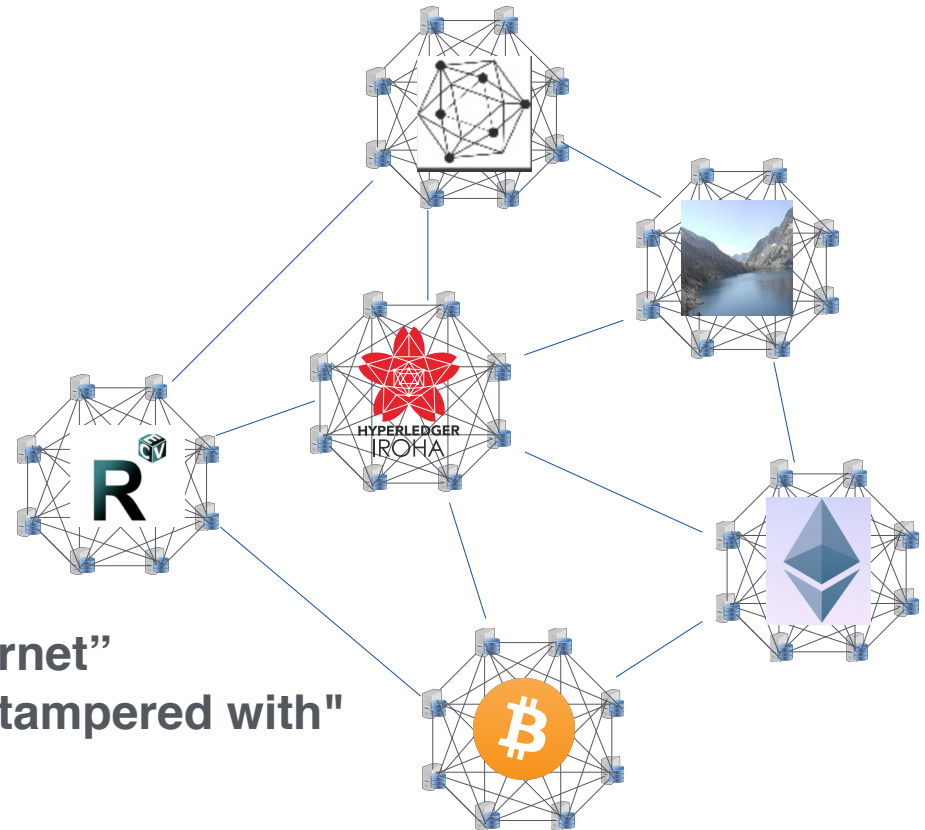


Internet :

- Can sent “Information” all over the world
- but can not send “value that can not be tampered with”

Our vision :

- Interconnect various blockchains like the Internet (InterLedger)
- Aim to realize block chains networks that cover the world
- The blockchain becomes "Trusted Internet" which can send "value that can not be tampered with"



Contact Us

Phone: 03-5843-8914
info@soramitsu.co.jp
Makoto Takemiya / Ryu Okada



Soramitsu Co., Ltd.

Executive Chairman: Ikkei Matsuda

Co-CEOs: Makoto Takemiya, Ryu Okada

COO: Kazumasa Miyazawa

〒102-0084 NihonTV Koujimachi Bld. Nishikan, 4F, 2-14 Chiyoda-ku, Tokyo, JAPAN

© 2017 SORAMITSU All Rights Reserved.

本資料は貴社が本件の検討するためにのみ使用されるものであり、ソラミツ株式会社の事前の書面による合意なしに、複写、引用もしくは第三者の閲覧に供してはならない。