# What Can we Learn from UBIN

**Mohan Satyaranjan**

February 1, 2019

# BLOCKCHAIN 2.0 SUMMIT
## BANGALORE

Discussing how blockchain is changing lives.

Clavent

# Agenda

- **What is UBIN?**

- **Motivations & Priorities of Stakeholders**

- **Key Innovations**

- **What is in it for us?**

- **Similar efforts**

# What is UBIN?

- **Collaborative Project of MAS**

- **Objective: Explore use of DLT for clearing and settlement of payments and securities**

- **Main Players:**

  - **Consortium of financial institutions**

  - **R3**

  - **BCS Information Systems**

# UBIN Timelines

- **Announced in Nov. 2016**

- **Objective: PoC for "interbank-payment" using Blockchain**

- **Phase-1 completed in March 2017**

  - **Must read report "[Project Ubin: SGD on Distributed Ledger](#)"**

- **MAS & ABS announced  successful development of 3 prototypes in Oct. 2017** (for decentralised inter-bank payment and settlements with liquidity savings mechanisms)

# UBIN Timelines contd.

- **Objective: PoC for "interbank-payment" using Blockchain**

- **Phase-1 completed in March 2017**

  - **Must read report "Project Ubin: SGD on Distributed Ledger"**

- **MAS & ABS announced successful development of 3 prototypes in Oct. 2017 (**for decentralised inter-bank payment and settlements with liquidity savings mechanisms)

# UBIN Timelines contd.

- **Consortium grows: 11 financial institutions, and 5 tech. partners:**

  - **Bank of America Merrill Lynch, Citi, Credit Suisse, DBS Bank Ltd, HSBC Limited, J.P. Morgan, Mitsubishi UFJ Financial Group, OCBC Bank, Singapore Exchange, Standard Chartered Bank, and United Overseas Bank**

  - **Accenture, IBM, R3, IBM, ConvenSys, Microsoft**

- **Nov. 2017: Source Code & Documentation Open Sourced**

# UBIN DvP

- **Settlement of tokenised assets across different blockchain platforms (successfully completed in Nov. 2018)**

    ○ **Improve operational efficiency, and**

    ○ **Reduce settlement risks.**

- **Accomplishments: Settlement finality, Interledger interoperability, and Investor protection**

# BLOCKCHAIN Platforms

| Characteristics | Ethereum | Hyperledger Fabric | R3 Corda |
|---|---|---|---|
| Programming Language | Solidity | Go, Java | Kotlin |
| Governance | Distributed among all participants | Linux foundation and organisation in the Chain | R3 and organisations involved. |
| Smart Contract | Not legally bounded | Not legally bounded | Legally bounded |
| Consensus Algorithm | PoW. Casper implementation PoS. | PBFT | Notary nodes can run several consensus algorithm |
| Scalability | Existing scalability issue | Not prevalent | Not prevalent |
| Privacy | Existing privacy issue | Not prevalent | Not prevalent |
| Currency | Ether | None Can be made using chaincode | None |

# UBIN Resources

📄 **Project Ubin Phase 1 Report: SGD on Distributed Ledger**

Download PDF(2.55 MB)

📄 **Project Ubin Phase 2 Report: Re-imagining RTGS**

Download PDF(3.57 MB)

🌐 **Project Ubin Phase 2 Source Codes**

📄 **Project Ubin DvP Report: Delivery versus Payment on Distributed Ledger Technologies**

Download PDF(5.85 MB)

📄 **Cross Border Interbank Payments and Settlements: Emerging Opportunities for Digital Transformation**

Download PDF(4.40 MB)

# Similar efforts elsewhere

- **Bank of Canada: Project Jasper (2016)**

  - **Payment Settlement**

  - Maintaining the privacy of the market participants

  - **Corda R3 platforrm**

  - Bank of Canada (BoC), Payments Canada, TMX Group & Accenture

  - **Cross-border payment settlement system:** BoC, MAS, BoE, HSBC. Toronto-Dominion Bank, the Overseas-Chinese Banking Corporation, the United Overseas Bank, KPMG and Payments Canada

  - **Collaborating with UBIN**

# Similar efforts elsewhere

- **Bank of Japan Japan & the European Central Bank: Project Stella (2016) ;** HyperLedger Fabric Network

- **South African Reserve Bank: Project Khokha (2018); Quroum**

- **Bank of Thailand: Project Inthanon (2018); Corda R3**

- **Sweden's Riksbank: e-krona (2017)**

- **Venezuela, Iran, Russia (crypto currencies)**

# Significant Projects in India

- **Many startups & Enterprises**

- **AP piloted Blockchain Technology in two departments;**

- **NITI Aayog working on a strategy paper (**exploring the use of blockchain and AI technologies in areas such as education, health and agriculture; in partneship with Google, and AP)

- **FM in last budget: BLOCKCHAIN Key for e-governance**

- **Maharashtra: Pilot projects to ramp-up e-governance, and transparency (financial inclusion, Land records, and Supply-Chain financing..)**

# BLOCKCHAIN@IITK

- **Prof. Sandeep Shukla & Prof. Manindra Agrawal (CS)**

- **Pof. Shweta Agrawal from IITM**

- **$5M (24M) project sponsored by the National Cyber Security**

- **Goal: Develop 'indigenous blockchain architectures for e-governance'**

- **2M; 24M; 36M**

- **20-25 member team**

- **Aadhar, land records, RTO transactions**

- **Permissioned, Private, and Public Frameworks**

# THANK YOU!

# Different Types of Consensus Algorithms



Similar to PoS but the difference is that it depends on various other factors called weights.

When a user initiates a transaction, 'miners' or supercomputers try to solve a problem or puzzle to verify it.

A user is encouraged to spend more until he/she becomes a validator to create a block .

Users send the coins back into their wallet that they can't recover from will get rewards based on the amount.

Same as PoS but users with more coins will get to vote and elect Witnesses.

Using this protocol you can utilize the capacity or storage space of user's hard drive.

Users will be able to make customized tokens and use it on their farms for better security.

User that frequently send and receive transactions will get paid for that.

Similar to PoW but the difference is that it focuses more on consumption.

Uses both PoS and PoW to ensure the reward points are on time.

Byzantine used a particular sequence to keep the rouge users at bay.

DAGs don't have blockchain data structure and can handle transactions asynchronously.

Focuses on a gamified way of a block verification among the professional node controllers.

A single validator can bundle proposed transactions and create a new block.

**Proof Of Work (PoW)**

**Proof Of Stake (PoS)**

**Proof of Weight (PoWeight)**

**Proof of Burn (PoB)**

**Proof of Capacity (PoC)**

**Proof of Importance (PoI)**

**Proof of Activity (POA)**

**Directed Acyclic Graphs (DAG)**

**Delegated Byzantine Fault Tolerance (DBFT)**

**Simplified Byzantine Fault Tolerance (SBFT)**

**Practical Byzantine Fault Tolerance (PBFT)**

**Proof of Elapsed Time (PoET)**

**Leased Proof Of Stake (LPoS)**

**Delegated Proof Of Stake (DPoS)**

**Consensus Algorithms**