Wholesale payments system on a Blockchain using official digital currencies

Project Jasper

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Disclaimer

The views expressed are those of the author and do not necessarily represent that of Bank of Canada or the Bank’s Governing Council.
Wholesale Payments Systems on a Blockchain – A Use Case

- What was achieved in our use case
  - What is the role of participants
  - What is the role of the central bank
  - What is the role of the operator
- What can be said about it when assessed against the PFMIs
- Lessons Learned Overall
Project Jasper
A Wholesale Payment System Blockchain Use Case
What is Project Jasper?

- An ongoing collaboration initiated by Payments Canada and the Bank of Canada to explore the possibility of **issuing, transferring and settling central bank-issued assets on a distributed ledger network**

Membership in project as of June 2016

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Motivation for Project Jasper

- Why DLT?
  - Comprehensive shared data source:
    - Reduce effort/cost of reconciliation
    - Regulatory & Compliance
    - Future Overlay Services
  - No single point of failure
  - Interoperability – Base Layer for future Securities Settlement Systems

- Key Questions?
  - Satisfies relevant PFMIs?
  - Reduces costs?
  - Lower barriers to direct participation?
  - Improves security and resiliency?
  - Increases transparency and access?
  - Better collateral management?
The Jasper Distributed Ledger Settlement Platform

1. Participants pledge T1 cash collateral into a special pooled account held by Central Bank
2. Central Bank converts cash collateral to generate COIN
3. Central Bank transfers COIN to fund participants’ accounts
4. Identifiable, trusted counterparties exchange assets on the COIN platform
5. Participants redeem COIN for T1 cash collateral
6. Central Bank destroys redeemed COIN

Design Assumptions

- Network participants (FIs) each set up a digital currency account as part of a COIN asset registry
- The COIN asset registry is owned by the Central Bank; the digital funds belong to the FI
- The Central Bank issues depository receipts, not tokens
- The COIN shared ledger reflects real-time accurate account balances for each digital currency account
- All network participants are trusted and authorized to perform transactions
Lessons Learned from Project Jasper
Overall Lessons Learned

- A substantial amount of centralization was still required (e.g. key and node management)
- Proof of Work Ethereum system unlikely to be more cost effective than current system
- Most cost savings unlikely to be in core system itself. Most savings likely to come from bank reconciliation efforts no longer required
- Even more savings could come from what could be build on top of a core cash payment distributed ledger system
Oversight Lessons Learned

- Current version of the system has too much information sharing compared to what would be desired in a production system.
- PFMIs concerning collateral, credit risk, money settlement, and liquidity risk met by Jasper DLT.
- Concerns exist with respect to PFMIs for settlement finality, operational risk, as well as access and participation requirements.
- Eleven other PFMIs deemed out of scope because they related primarily to governance and legal aspects of the system.
General Issues with Blockchain

- Proof-of-work burns tons of electricity
- Probabilistic settlement finality only (forking)
- Ends up being centralized in some sense anyway...
  - E.g. bitcoin -> Chinese miners
  - Ethereum -> Ethereum foundation driven hard forks
- Doesn’t satisfy financial services non-functional requirements – Privacy, scalability, etc.
- Different transaction types have varying levels of uniqueness and requirements