


**digital
currency
initiative**



Cellular structure for a digital fiat currency

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Cellular structure for a digital fiat currency (DFC)

- Goals
- Cellular structure
- Rationale for cellular structure



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- Rationale for cellular structure
- Central bank digital currency



Goals of a DFC



Goals

- **Financial stability/resilience** – Having an alternative infrastructure to make fiat currency payments enhances stability in two ways (a) providing a payment system separated out from the balance sheets of commercial banks and the risks they face, (b) allow a DFC to operate independently of operational failure or cyber attack on the banking system and vice versa.
- **Competition** – Separate infrastructure, service providers and fee structure for a DFC provides competition to existing payment providers, giving merchants and customers a viable alternative. Greater competition lowers costs of payment system, clearing and settlement.
- **Innovation** – A DFC can incorporate innovations from the cryptocurrency system and provide a platform for building new financial services which incorporate fiat currencies.



Backing

- Direct issue by central bank (Central bank digital currency or CBDC)
 - Effect on the existing banking system
 - Wider discussion of credit creation, maturity transformation and how productive enterprise is financed
- Privately issued (Digital fiat currency or DFC)
 - Cash at central bank (no market or credit risk)
 - Government bonds (minimal to no credit risk, market risk)
 - Other assets such as corporate bonds, loans (credit and market risk)
 - Commercial bank money (credit risk, no market risk)



Cellular structure

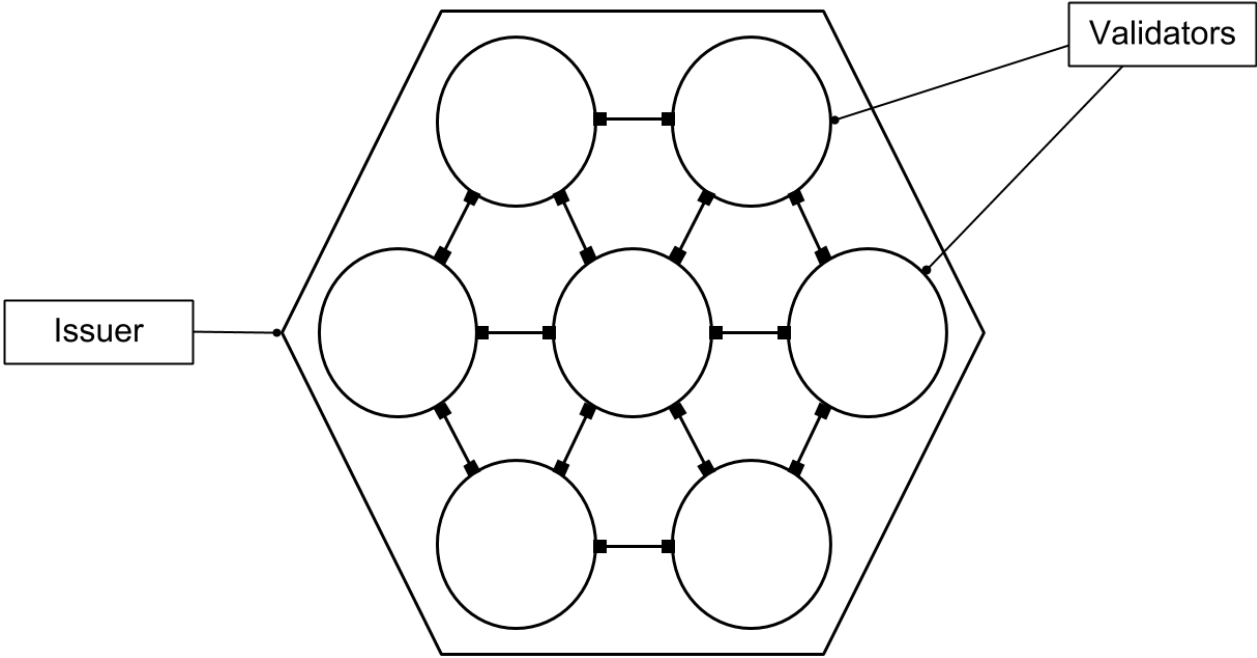


DFC single cell

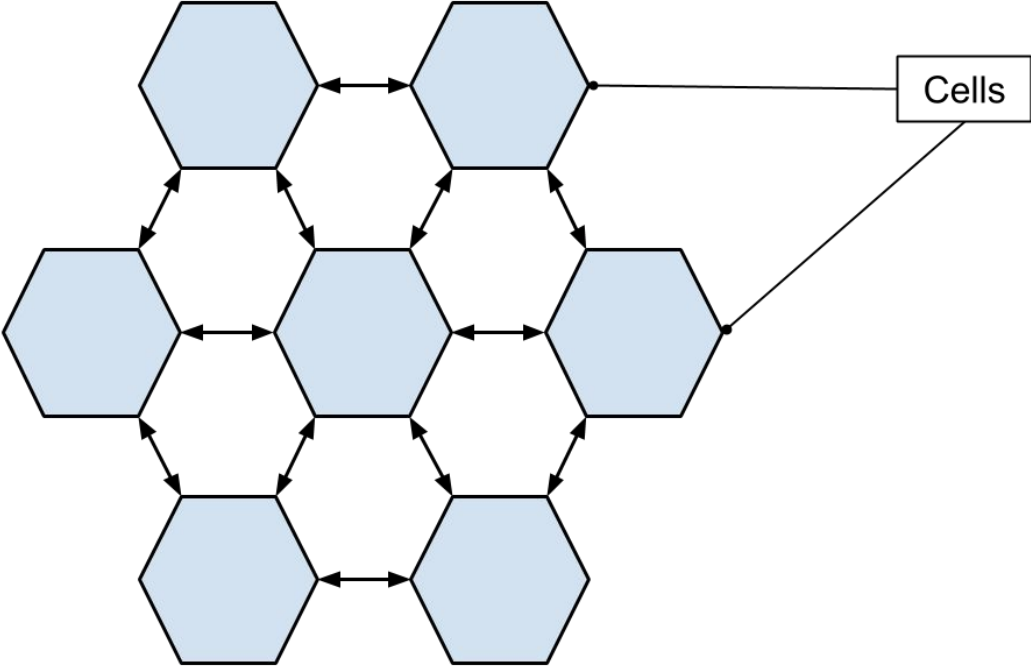
- Issuer
 - Holds cash at the central bank (systemic stability)
 - Simplified version of UK commercial banknotes system
 - One ledger, one cell
 - Decides how the cell functions internally (consensus mechanism, software, validators, fees)
- Validators
 - Order transactions
 - Maintain copies of the ledger



DFC single cell



DFC system - single currency

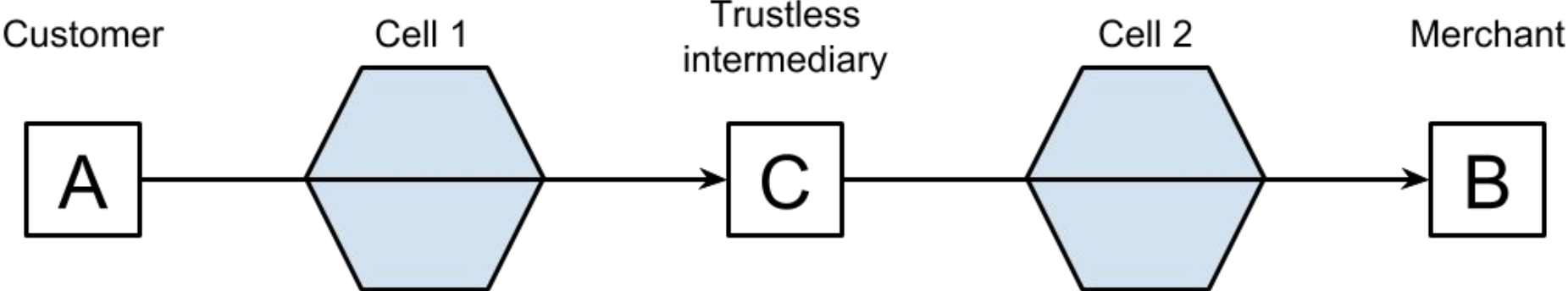


DFC system - single currency

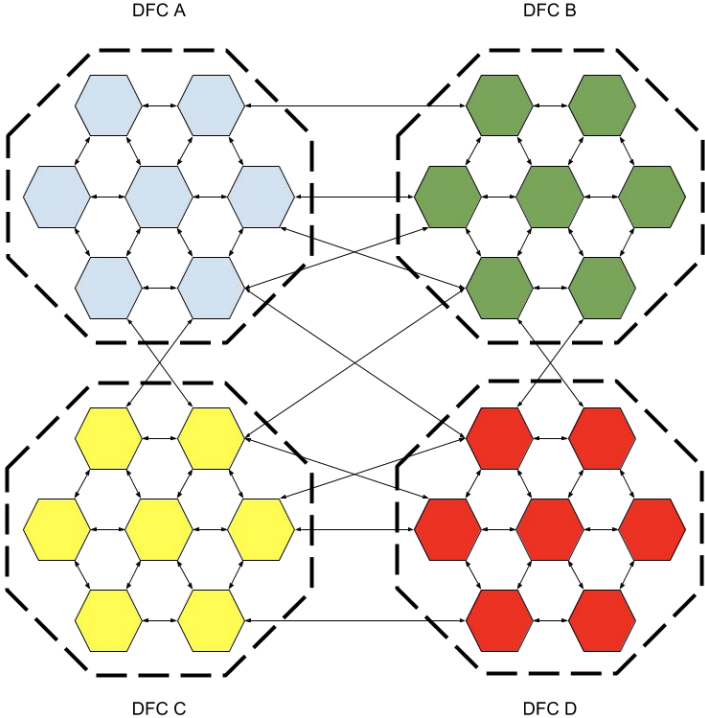
- Holding DFC
 - With a single issuer
 - Across multiple issuers
 - Cost of fragmented liquidity
- Inter-chain transactions
 - Routing payments - multi-hop
 - Trustless intermediaries
 - Lower barriers to entry for intermediation
 - More competitive market for liquidity provision



DFC system - single currency



DFC system - multiple currencies



DFC system - multiple currencies

- Intermediaries
 - Routing payments (payment versus payment)
 - Market making for currency pairs
- Application to other tokenized assets (delivery versus payment)
 - Shares
 - Bonds
 - Commodities



Rationale for cellular structure



Financial stability/resilience

- Existing system
 - Efficiency of matching money and credit (Kashyap et al, liquidity paper)
 - Structural fragility from maturity transformation
 - Deposit insurance, regulation, lobbying, shadow banking
 - Credit and liquidity risks in payment systems - PFMLs
- DFC
 - Parallel system immune from contagion (fully collateralized)
 - Structural elimination of credit risk
 - System can survive failure of individual cells (resilience)



Competition

- Present competition
 - Merchant payments
 - Decline of cash
- Future competition
 - Cryptocurrency strategy
 - Changing the organizational structure



Innovation

- Technological and organizational change
 - Parallel with dynamos in factories
 - Technological change alone did not produce significant productivity gains
- Bitcoin as organizational change
 - Payments without banks
 - Financial system as a set of functions
 - How to extend this concept to the existing financial system
 - Cross chain atomic swaps (PvP, DvP)
 - Discreet log contracts (derivatives)

