CBDCs

Hyperledger Fabric for Central Bank's Digital Currency

Nitu Choudhary
Akshat Srivastava
Tushar Tiwari
Milankumar Patel

BCDV 4025

Prof. Lawrence Ley

CBDCs

CBDCs, which stands for Central Bank Digital Currencies, are a new type of digital money issued by a central bank, similar to traditional fiat currencies (like the US dollar or Euro) but existing in electronic form. Here's a breakdown of key points about CBDCs:

What are they?

- Digital versions of a country's fiat currency, issued and backed by the central bank.
- Not the same as cryptocurrencies like Bitcoin, which are decentralized and not controlled by any single entity.
- Why are they being explored?

Features	Cryptocurrency	CBDCs
Issuance & Control	Typically decentralized and not controlled by an entity	Issued and regulated by a country's central bank
Purpose & Design	Designed to operate as alternative forms of money, independent of traditional financial system	Designed to complement existing fiat currencies, integrating with existing financial system
Anonymity & Privacy	Provides varied levels of anonymity and privacy	Less anonymity and can be traced

Why Hyperledger Fabric?

- **Permissioned Networks:** Ensures that only authorized participants can join the network, aligning with regulatory requirements for CBD
- **Customizable Smart Contracts:** Allows central banks to tailor the digital currency's functionality to their specific needs.
- **High Throughput:** Capable of handling large volumes of transactions, essential for national-scale digital currencies.
- **Private Channels:** Provides customizable and private channels for peers to communicate securely and privately

Key Features of CBDCs (Central Bank Digital Currencies)

CBDCs, while still under development and exploration by many countries, offer some potential features that could revolutionize how we use and think about money. Here's a breakdown of some key features to consider:

1. Digital Form:

- Unlike traditional fiat currencies (paper bills and coins), CBDCs exist solely in digital form.
- This allows for faster, more efficient transactions and potentially reduces reliance on physical cash.

2. Central Bank Issuance and Backing:

- Just like traditional fiat currencies, CBDCs are issued and backed by a central bank, ensuring their stability and value.
- This is in contrast to cryptocurrencies like Bitcoin, which are decentralized and not controlled by any single entity.

3. Legal Tender Status (Potential):

- Depending on the specific implementation, CBDCs could be designated as legal tender, meaning they would be recognized as a form of payment for debts and obligations.

4. Potential for Offline Use (Limited):

- Some CBDC models might allow for offline transactions in certain situations, providing convenience even without an internet connection.
- However, full functionality likely still requires online interaction with the central bank system.

5. Security:

- Central banks are likely to leverage advanced encryption and digital identity solutions to make CBDCs secure and resistant to counterfeiting or theft.

6. Transparency and Traceability:

- Transactions involving CBDCs might be more transparent to central banks compared to cash.
- This could potentially aid in tax collection, crime prevention, and money laundering investigations.

7. Programmability (Potential):

- Some CBDC models explore the possibility of programmable features.
- This could allow for targeted spending (e.g., only for specific goods or services) or expiry dates, potentially supporting specific fiscal policy goals.

8. Interoperability (Future Goal):

- Enabling smooth cross-border transactions between different CBDCs could be a future objective.
- This would facilitate international trade and foster a more integrated global financial system.

9. Two-Tiered System (Possible Model):

- A possible model involves a two-tiered system:
  Wholesale CBDC used by financial institutions for interbank settlements.
  Retail CBDC accessible to the public for everyday transactions.

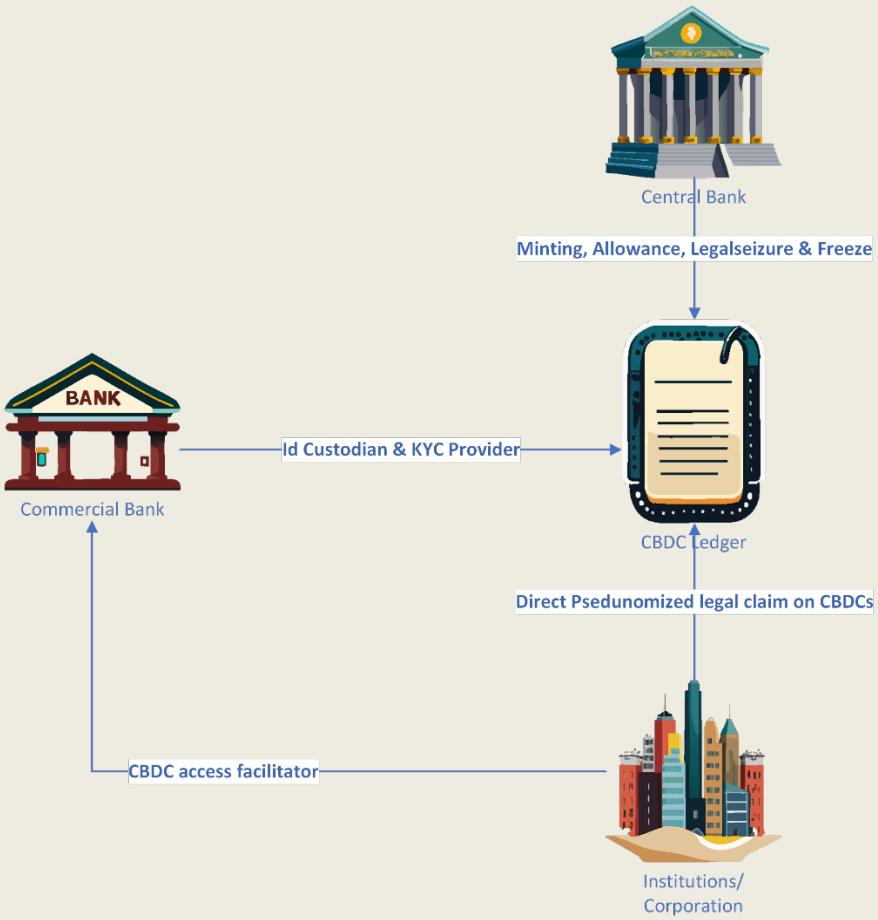
10. Privacy Considerations:

- While transparency is a potential benefit, concerns exist about central banks having access to detailed transaction data.
- Robust data protection regulations and user consent mechanisms will be crucial to address privacy concerns.

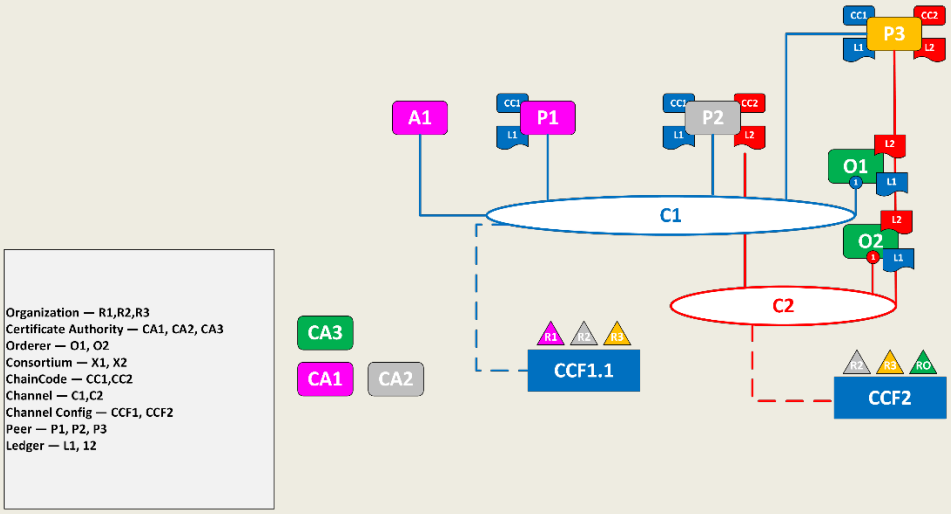
Potential benefits include:

- Increased financial inclusion for those without access to traditional banking systems.
- More efficient and faster payment processing.
- Greater transparency and control over the money supply.
- Potential to reduce reliance on cash and the associated costs.

Logical Architecture



Technical Architecture



Challenges and Concerns:

- Potential for increased government control over individual finances.
- Privacy concerns, as central banks may have access to detailed transaction data.
- Technical challenges in developing secure and efficient CBDC systems.
- Impact on existing financial institutions and the broader economic system.

Current Status:

- Many countries are exploring CBDCs, but few have fully implemented them.
- Examples of countries conducting trials or developing CBDCs include China, Nigeria, Sweden, and the Bahamas.

Future Considerations

Technological Advancements:

- **Scalability:** Developing infrastructure that can handle large transaction volumes efficiently is crucial.
- **Security:** Continuous advancements in encryption and digital identity solutions are essential to combat evolving cyber threats.
- **Offline capabilities:** Improving offline functionality will enhance usability and broaden accessibility.
- **Interoperability:** Creating standardized protocols for seamless cross-border transactions between different CBDCs is a long-term goal.

Regulatory Considerations:

- **Data privacy:** Developing robust data protection frameworks and ensuring user consent for data collection are critical.
- **Anti-money laundering (AML) and Combating the Financing of Terrorism (CFT):** Building safeguards to prevent illicit activities within the CBDC ecosystem.
- **Competition and financial stability:** Regulations must ensure fair competition with existing financial institutions and safeguard the stability of the financial system.
- **Consumer protection:** Providing adequate safeguards and dispute resolution mechanisms for CBDC users is essential.

Public Policy Considerations:

- **Financial inclusion:** Ensuring equitable access to technology and infrastructure required for CBDC use is key.
- **Monetary policy:** Understanding how CBDCs can be used for more effective monetary policy implementation.
- **Social implications:** Considering the potential impact of CBDCs on cash usage, social interactions, and economic behavior.

International Cooperation:

- **Standardized protocols:** Developing internationally agreed-upon standards for CBDC design and operation will facilitate interoperability and global financial integration.
- **Coordination on regulations:** Harmonizing regulations across countries can help mitigate risks and foster a stable global financial environment.
- **Sharing knowledge and expertise:** Collaboration among central banks on technological innovations and best practices will accelerate CBDC development.