CAPCO

UNDERSTANDING DREX - THE DIGITAL REAL

Digitalization is rapidly transforming industries and economies around the world, and Brazil is no exception. The Digital Brazilian Real or Drex initiative sees the Central Bank of Brazil embracing the potential to improve the efficiency of the retail payments market and promote competition and financial inclusion, particularly for population still underserved by banking services[1]. The Drex promises to revolutionize the way the country conducts its business and boost the Brazilian economy.

As a central bank digital currency (CBDC), the proposed Drex will be an electronic form of sovereign money that serves as an extension of traditional fiat money such as banknotes and coins. When announcing the Digital Real in May 2021, the Central Bank of Brazil (BCB) cited four priorities:

- Keeping up with the dynamic technological evolution of the Brazilian economy
- Enhancing the efficiency of the retail payments system
- Fostering new business models and other innovations based on technological advances.
- Encouraging Brazil's participation in regional and global economic scenarios through increased efficiency in cross-border transactions.

The BCB added: "Any developments stemming from this environment of innovation will be consistent with the BCB's mission of ensuring the stability of the currency purchasing power, fostering a sound, efficient and competitive financial system, and promoting the economic well-being of society."[2]

In March 2023, the BCB confirmed nine updated guidelines for the CBDC project. The first guideline (described "as the most important of all") reiterated an emphasis on the development of "innovative business models with the incorporation of technologies – such as smart contracts and programmable money – compatible with the settlement of operations through the internet of things (IoT)".

The second guideline reconfirmed the "issuance of the Drex as a means of payment to support the provision of retail financial services that will be settled through deposit tokens, necessarily issued by regulated entities of the National Financial System (SFN) and the Brazilian Payments System (SPB)."

CBDCs typically utilize distributed ledger technology (DLT) – which can include blockchains – to ensure transparency, security, and traceability of transactions. Unlike cryptocurrencies such as Bitcoin, CBDCs are centralized and regulated by monetary authorities, allowing for greater control over money supply and demand in the economy.

The Drex initiative involves establishing a centralized system that connects government agencies, businesses, and citizens, allowing for information sharing and the execution of electronic transactions. The Drex also establishes security and privacy standards to protect user data.

The Drex will be pegged to the value of the Brazilian Real itself, and its value will accordingly be linked to the policies of BCB and the country's economic conditions and will also be subject to the same fluctuations as the physical Real on the international currency markets.

In practice, when paying a service bill, a retail consumer will use their digital wallet or bank app to make the transaction in Drex. The transaction will be instant, with reduced costs to facilitate, and available 24/7, unlike traditional fiat currency where banks' operational costs are higher. As another example, if a Brazilian export company sells its products to international customers and receives payments in Drex, currency conversion will occur quickly, with reduced fees and greater traceability compared to traditional foreign exchange transactions.

Advantages of Drex

As a CBDC, Drex is expected to offer a range of advantages compared to physical cash:

- **Agility:** Transactions and payments with Drex can be processed instantly, unlike traditional fiat money.
- **Availability:** Drex allows for 24/7 transactions, without relying on the bank's operating hours.
- **Financial inclusion:** The digital currency will bring financial services to people who lack access to traditional banking institutions, as it can be accessed anytime and anywhere, providing there is an internet connection.
- **Security and traceability:** The tokenization of the Real in the form of a CBDC for retail banking operations allows for

greater control and traceability of transactions, helping to combat illicit activities.

- **Data protection:** By reducing the number of intermediaries involved in transactions, there's a potential decrease in the points of vulnerability where data breaches can occur.
- **Monetary sovereignty:** Drex will strengthen the trust in the national currency and the Central Bank's control of the national economy, countering the adoption of decentralized cryptocurrencies.
- **Enhanced interbank settlement:** The implementation of Drex will optimize the speed and efficiency of clearing and settlement operations between banks, reducing the associated costs and risks.

Key differences between CBDCs and cryptocurrencies

CBDCs are digital currencies issued and regulated by central banks, while cryptocurrencies are decentralized digital currencies not regulated by a central authority. Both may use similar technologies, but have distinct purposes, features, and levels of stability.

- **Issuance and control:** CBDCs are issued and controlled by a central bank, while cryptocurrencies are decentralized and not controlled by a single entity. This means that CBDCs are subject to a country's regulation and monetary policy, while cryptocurrencies operate independently of central authorities.
- **Value and stability:** CBDCs have their value pegged to a country's fiat currency and are considered stable as they are backed by the central bank. Cryptocurrencies, on the other hand, are not guaranteed by a central authority and their value can be subject to extreme volatility.
- **Technology:** While they can use blockchains, CBDCs can also adopt different forms of distributed ledger technology according to the central bank's needs. Cryptocurrencies, however, are typically based on public and decentralized blockchains.
- **Traceability and control:** Cryptocurrencies are known for offering a certain degree of anonymity in transactions. CBDCs, being regulated, tend to have traceability and user identification mechanisms, ensuring greater control and prevention of illicit activities.
- **Purpose:** CBDCs are designed to improve efficiency of the monetary system and facilitate financial inclusion, while cryptocurrencies emerged as alternatives to the traditional financial system, offering greater autonomy and decentralization.

Current status of Drex

In March, the President of the BCB, Roberto Campos Neto, confirmed that the Drex pilot project is ready to be launched and will be integrated with Pix and Open Finance, allowing the three systems to work together to offer a wide range of digital financial services. The CBDC will not completely replace physical money, but does aim to decrease the amount in circulation.

Inspired by Ethereum, the Digital Real is being developed on the blockchain and will enable the tokenization of deposits by banks. It will be a hybrid model, in which banks act as intermediaries between the Central Bank and the population. Banks will have direct access to Drex at the Central Bank and will offer consumers tokens corresponding to bank deposits, like stablecoins. This approach is praised for preserving the role of banks and is adopted by several other countries.

The project aims to enable the national financial system for the application of internet of things and to study the connection between public blockchains such as Ethereum, Binance Smart Chain, and Cardano. The integration strategy for Drex with other initiatives aims to promote a more efficient and innovative financial system in Brazil.

Pix and Open Finance

Pix, the Brazilian instant payments system, facilitates fast and secure transactions between users. Integration with the Digital Real will allow users to carry out transactions with CBDCs in addition to conventional currencies.

Open Finance, on the other hand, is an initiative that aims to promote interoperability between financial services and allow customers to share their financial data with different service providers. Integration with Drex will provide users with access to innovative digital financial services such as loans, investments, and payments, using digital currencies.

The integration of Drex with the internet of things is also an important part of the BCB's strategy.[3] By enabling connected

devices to carry out transactions with Drex, the Central Bank hopes to create a more inclusive and accessible financial ecosystem, in which people can make payments and receive financial services through a variety of devices.

The Central Bank further seeks to offer new services to consumers with the Digital Real, such as programmable money, making it compatible with smart contracts. This aims to offer a new generation of financial services, bringing the advantages of decentralized finance (DeFi) to consumers.

Fábio Araújo, the Central Bank Economist responsible for the project stated: "More than allowing participants in the payments system (banks, cooperatives, and IPs) to issue digital currency backed by the Central Bank's currency, the Drex platform is based on these tokens for the provision of consumer services. Thus, the tokens will fulfil the function that stablecoins currently fulfil in the decentralized finance environment on the Drex platform."[4]

Drex pilot

The Drex pilot guidelines set out in the BCB's April 2023 presentation[5] address the context, objectives, and technical aspects of developing the Drex pilot platform to support a 'tokenized' economy that promotes efficiency, programmability, interoperability, and composability, as well as maintaining regulatory parity.

The goal of the pilot is to develop the Drex platform, with a focus on privacy and infrastructure. The multi-asset DLT platform includes:

- **Drex (wholesale)** – applied to manage Bank Reserves and Central Bank Settlement Accounts, allowing financial institutions to conduct high-value transactions quickly and securely.
- **Tokenized Real (retail)** – used for issuing and managing sight deposits and accounts in payment institutions, enabling end-users to conduct retail transactions efficiently and securely.
- **Federal public bonds** – applied in the issuance, trading, transfer, and redemption, to ensure greater efficiency and transparency in the public debt market.

Simulated wholesale and retail transactions involve issuance, trading, transfer, and redemption, as well as Delivery versus Payment (DvP) at the end-user level.

The guidelines address access to services through financial institutions, centralization of technological and business decisions in the Central Bank, and consultation in a forum with representative entities. The technical objective of the pilot is to assess the permissioned network DLT technological solution under aspects of decentralized architecture, privacy, and potential programmability gains.

Participation in the pilot will be limited, and the technological architecture must adhere to the general Drex guidelines. Hyperledger Besu has been chosen as the platform to validate the solution, with the involvement of the BCB, the National Treasury, the Securities and Exchange Commission, other regulators and institutions supervised by the BCB.

The timetable of the Drex pilot includes development, testing, evaluation, and incorporation of participants, with events such as workshops and discussions of other protocols planned.

The tokenized Real, which includes Sight Deposits (DVt) and Electronic Currency (Met), is within the pilot's scope, focusing on transfers between clients. The main difference between DVt and Met lies in the nature of the institutions that issue and manage these tokens and the balances they represent. While DVt are issued by commercial banks and represent sight deposits, Met are issued by payment institutions and represent balances in payment accounts. Services offered to end-users outside the DLT network are not part of the scope.

Federal public securities are treated similarly to Drex[6], with creation, primary placement, purchase and sale among participants, and redemption. The process is compared to the 'Pix of financial services' with fast and secure transfers. Atomic operations are emphasized to ensure that all parts of the transactions occur securely and efficiently, both for the tokenized Real and for the TPFt.

Pilot participants will be selected based on criteria such as DLT experience, access to the National Financial System network, and a track record in IT projects coordinated by BCB. Participant diversity is important, such as variety of segments and financial institutions. The project aims to promote convergence of interests and a collaborative environment, focusing on technological risk, maturation of technical-scientific knowledge, and potential impacts. There will be approximately 10 participants in the first stage, with the possibility to accommodate more later.

Participants must bear the expenses associated with their part in the Drex pilot, allocate qualified teams, and comply with the delivery schedule established by the BCB.

Digitalizing with Drex

Drex presents many opportunities. Some were presented at the recent event held in celebration of five years of success by the Laboratory of Financial and Technological Innovations (LIFT). The LIFT day, held in late April 2023 and co-ordinated by Fenasbac Institute and the BCB, highlighted the LIFT's efforts in developing innovative product prototypes, supported by Brazil´s Central Bank.[7]

The event brought together Fenasbac's initiatives aimed at digitalization with Drex, including:

- Enabling interoperability between Drex and public blockchains
- Reducing costs and complexity in using Bank Credit Notes (CCBs) by using smart contracts and stablecoins
- Using Pix for credit granting and promoting financial inclusion
- Near field communication (NFC) Pix and offline QR codes
- "G10 Bank" (a bank launched by Brazil's ten biggest slums)
- DeFi liquidity pool
- Decentralized credit protocol and decentralized microcredit.

In the private sector, TecBan and Capitual have developed a pilot project8 called Smart Lockers, which integrates the Digital Real and the internet of things technology. The solution uses a private Ethereum Blockchain network for smart contracts and ensures that payments are performed only when the buyer collects the delivered product and completes the operation. Smart Lockers act as safes that release payment after the user enters the purchase code and retrieves the parcel. The initiative aims to facilitate the arrival of goods in hard-to-reach locations, such as rural communities. The project will reach Brazilians indirectly through the country's banks.

The Smart Lockers project is likely to influence the Digital Real guidelines and features in several areas, including security, authentication, blockchain integration, tokenization, digital identity and KYC.

Conclusion

The Digital Real or Drex, Brazil's proposed central bank digital currency, is poised to transform the nation's economy by improving the efficiency of retail payments as well as fostering innovation and financial inclusion. The initiative emphasizes the development of innovative business models, incorporating technologies like smart contracts and the internet of things. It will be regulated and centralized by the Central Bank of Brazil, enhancing the traceability of transactions while providing security and privacy of user data.

The CBDC will enable instant transactions, improve interbank settlement and strengthen the Central Bank's control over the national economy. Importantly, it will integrate with existing financial systems, like Pix and Open Finance, facilitating a wide range of digital financial services. The integration of Drex with public blockchains and IoT devices will allow for a more efficient and innovative financial system in Brazil.

The Drex pilot project aims to develop a platform that supports a tokenized economy and assesses the potential of distributed ledger technology. The success of the project will be determined by its ability to achieve these objectives while preserving the stability and integrity of Brazil's financial system.

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