
Central Bank Digital Currency

Helping central banks deliver a more inclusive, efficient, resilient and diverse payments system



Creating a more inclusive, efficient, resilient and diverse payments system

nChain works with central banks to explore the drivers behind Central Bank Digital Currency (CBDC) and the role blockchain plays in delivering an optimal design. CBDCs help address the threat of private money and cryptocurrencies and provide a digital form of central bank money to drive both financial and societal inclusion.

A CBDC is a pioneering solution. It is a stable form of central bank money that respects the privacy of citizens and guarantees security, transparency and traceability for the central bank. At nChain, our approach to developing a CBDC enables low-cost scaling to suit the needs of nations and low environmental impact to protect the world we share.

We believe blockchain can and will create positive impact for countless people, helping preserve sovereign governance while providing credit-free, non-interest bearing and inclusive currency.

“At nChain, we believe everyone should have access to their money, no matter where in the world they are. We are working with governments and central banks to create a digital form of central bank currency that will improve lives and progress society.”

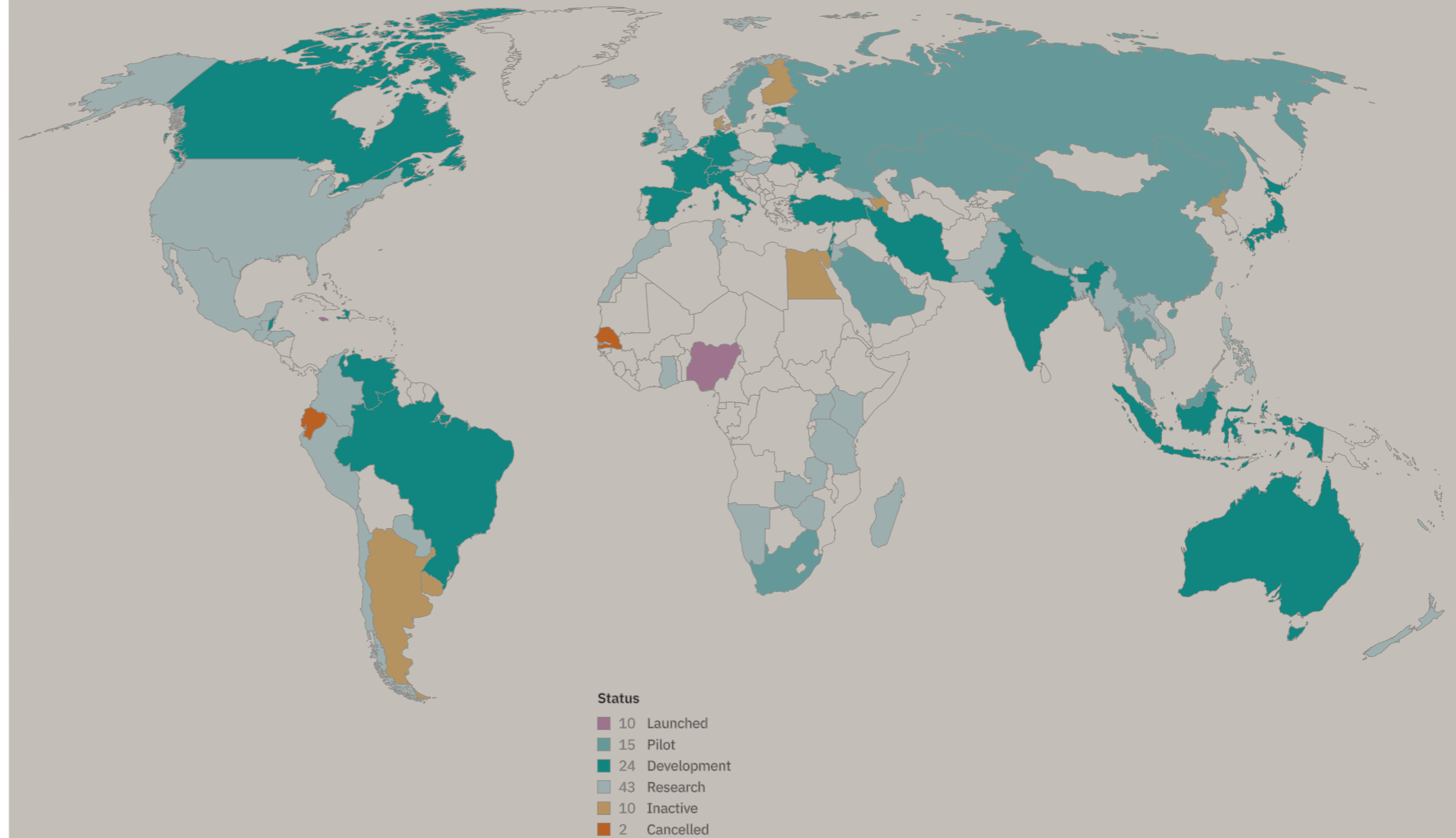
Hakan Yuksel, CEO, nChain

The current state of CBDC adoption

The accelerating pace of change

Cryptocurrency adoption and increasing technological disruption across the financial sector are pushing central banks to take a much more proactive stance in researching and developing their own CBDCs. Private forms of money have already begun to transform our monetary landscape, and pioneering central banks are moving to ensure their continued relevance and control in a world that shifts increasingly away from cash.

More than 86% of global central banks, representing the bulk of global GDP, are conducting research on CBDCs¹. However, while there is consensus on the need for research, there is a striking lack of consensus on the correct way to implement and issue a CBDC.



1. Codruta Boar and Andreas Wehrli, *Ready, steady, go? Results of the third BIS survey on central bank digital currency*, Bank for International Settlements, BIS Papers, number 114, January 2021, bis.org.

Source: www.atlanticcouncil.org/cbdctracker/

Regional variations

The reason for CBDC research varies by government, but can broadly be categorised into four key drivers:

1. With software powering the world, the use of physical cash is in decline, making it a less useful financial instrument.
2. As cryptocurrencies and private money grow in popularity, they threaten central bank authority and national security.
3. Countries are increasingly at risk of a weakened and obsolete monetary authority to properly govern and support their economies.
4. Corporations and FinTech companies are developing their own globally accessible digital currencies, which places greater pressure on central banks to innovate and maintain relevance.



Why CBDC is the future

Evolution, not revolution

The Bank for International Settlements (BIS) lists a variety of compelling motivations for CBDCs as well as their associated challenges and risks. The BIS rightly emphasises that the common motivation for a general-purpose CBDC is as a means of payment. However, our analysis suggests that a programmable CBDC (highly interoperable financial and data value exchange system) also offers other important benefits that jurisdictions should consider.

Improved payments

Enabling near-instant global payments for a fraction of current costs, CBDCs are an unquestionable improvement on current payment rails. They provide greater access to citizens, better recovery tools if funds are lost or stolen, offer unmatched reliability, and much more. The list is seemingly endless, which explains why so many governments are currently investigating the matter.

Outside of the more obvious benefits to payments, CBDCs also unlock opportunities that are impossible with current cash systems.

Improved monetary policy

By giving the central bank atomic data on transactions, they gain real-time insights on their economic situation and the impact of policies they set. More than just knowing, CBDCs also create the means for immediate action, such as the ability to program cash and modify the currency in response to economic challenges, such as inflation. They are a step towards optimal monetary policy that can improve the lives and economic outcomes of every citizen.

2. BIS, Central bank digital currencies: foundational principles and core features, 9 October 2020
<https://www.bis.org/publ/othp33.htm>

Improved fiscal policy

CBDCs can enable frictionless real-time taxation and rebates, improving experiences for citizens and creating much more effective governance.

Improved innovation

The strengths of CBDCs are not just how they solve today's challenges, but also how they lay the foundation for future innovation. They will enable new industries built on micropayments, create meaningful ways to integrate Internet of Things (IoT) into the economy and improve compliance across the board. It is fair to say that the true scale and scope of the innovation they will unlock cannot be imagined today.

Improved opportunity

Governments that adopt CBDCs will be able to build greater resilience to shocks, such as inflation, recession and the impact of events like a global pandemic. Also, by providing a transparent and traceable economic system, CBDCs can help increase external investment by giving investors more trust in the movement of money across the country.



Our unique approach to CBDC

A token-based solution for digital cash

Our approach to CBDC delivers the purest form of digital cash and, by using a highly scalable public ledger, we can offer new economic tools to support central banks even further.

For a CBDC to be successful, scaling is paramount. It is possible, today, to process 50,000 transactions per second on our platform. That number will soon grow to 100,000+. As scale increases, transaction costs decrease, providing a low-cost and robust system.

Respecting privacy

There is a tension between citizens' right to privacy and the valuable data that governments need to inform effective monetary policy. Our system provides both, without compromise.

In our approach, the central bank has full oversight into an anonymised view of the data, while citizens maintain complete control over their personal information and how much they personally wish to disclose.

Prioritising resilience

Using a public ledger, our approach achieves resilience by:

- Reducing the number of participants required to validate transactions
- Simplifying transaction validation
- Reducing payment to a single atomic event

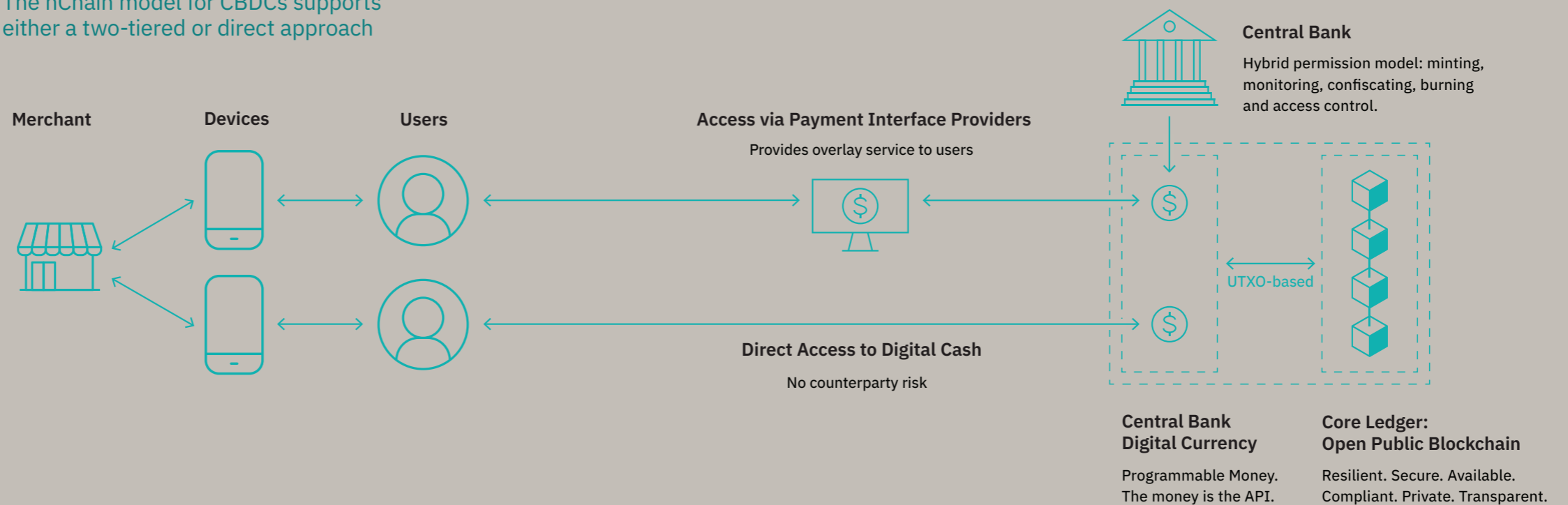
The distributed nature of a public ledger provides unrivalled resilience. This is not just technical resilience, but also economic, since a public ledger's economic model incentivises resilience.

Enabling frictionless payments

It is critical that a CBDC can be used seamlessly, even without connection to the network. That is why our solution uses simple payment verification (SPV). This allows merchants and individuals to accept payments even without internet connectivity, which is key to supporting true peer-to-peer payments without requiring intermediaries.

Using SPV, merchants can see if a transaction is validated by the network and they can continue to accept payments with reasonable credit risk, similar to cash and current offline contactless payment.

The nChain model for CBDCs supports either a two-tiered or direct approach



**Our approach
makes issuing
a CBDC simpler
and using a CBDC
more powerful.**

Overview – a token-based approach

Features

- Peer-to-peer retail digital cash CBDC that does not require bank accounts
- Scalable architecture that supports unrivalled transactions per second
- Transaction costs that are a fraction of a cent, supporting micro and nanopayments
- Resilient CBDC built on a distributed system that runs independently of existing payment infrastructure
- Support for offline payments to safeguard financial inclusion
- Ability to capture payment metadata to support faster economic policy decisions and a real-time view of cash usage
- Built-in privacy model for citizens balanced with end-to-end traceability for central banks

To ensure full control over the use of tokens, the central bank will remain as the issuer, responsible for defining digital cash tokens and managing the entire workflow of issuance, distribution and monitoring.

Benefits

- Using public blockchains as part of our infrastructure, we can significantly reduce the costs for central banks in minting, securing, and distributing cash across the country
- Our token-based approach safeguards financial inclusion by enabling citizens to hold cash directly, eliminating the need for 3rd parties or intermediaries to hold cash
- We facilitate competition and innovation by lowering the barrier to entry and providing native digital payment rails that support micro and nanopayments
- Our system enhances transmission of monetary policy by implementing new economic tools made possible by micro and nanopayments
- This approach encourages market discipline by introducing transparency and broad accountability in the use of money
- The overall result is greater resilience and stability to the wider payment landscape by using a publicly distributed ledger and operating a CBDC alongside the existing payment systems and physical cash

Our Product Suite: Making CBDC a reality

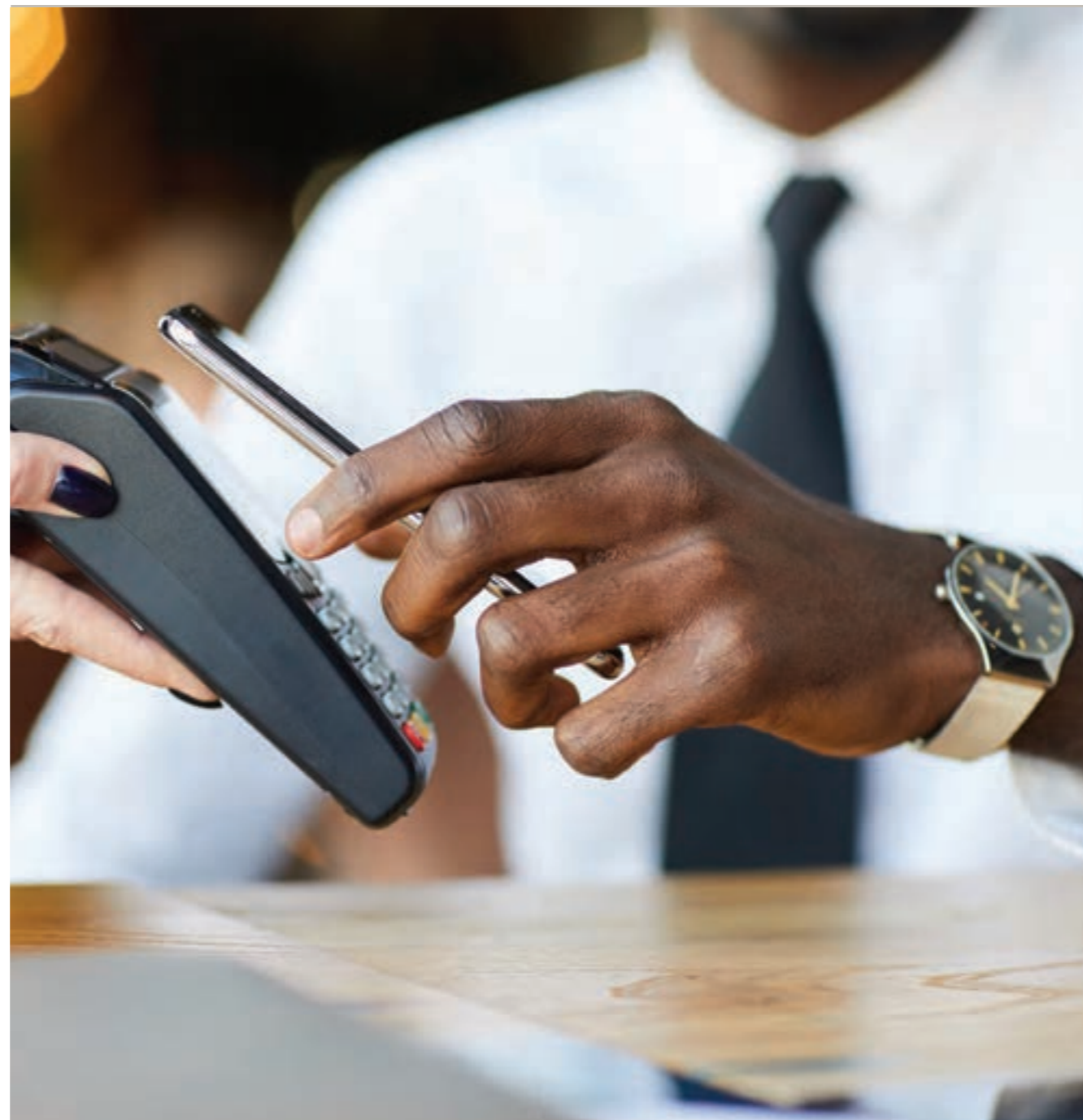
Digital Cash

Financial inclusion for the modern economy

Digital cash is token based and has many of the properties of physical cash. It is a peer-to-peer payment platform that facilitates faster and cheaper cash payments, eliminating the need for an intermediary to facilitate payments. We achieve this by providing a token-based solution that allows cash to be held directly by the user without relying on a bank account.

A digital form of cash provides a far more effective method for central banks to distribute cash, as well as delivering enhanced cash monitoring and ensuring accessibility and inclusivity of cash for all citizens.

Our digital cash product also enables us to address some of the challenges with cash today, in particular, the high cost of minting, issuance, distribution, security and monitoring.



Digital Money

Faster and cheaper payments and remittances for wholesale CBDCs

Digital money is account based, with those accounts being maintained by a central bank or payment intermediaries. It is a blockchain-enabled approach to managing assets, accounts and ledgers across different financial institutions and money transmitters. It provides a platform for creating interoperability between account-based CBDCs and money, in addition to supporting the convertibility of token-based CBDCs to account-based CBDCs and money.

Our digital money platform also facilitates a faster and cheaper way to make digital payments and cross-border remittances, tokenise commodities or other assets, and execute interbank clearing and settlement. We also introduce the ability to support cross-asset settlements.

This product can be combined with our digital cash product to provide a comprehensive set of features for central banks and financial institutions.

FAQs

Is continued access to central bank money possible with the nChain approach?

Yes, our approach provides a mechanism for citizens to hold digital cash directly, ensuring continuous access. It is also possible for central banks to work with 3rd parties to provide access and/or additional services to citizens, thereby operating a two-tiered model.

Is the nChain solution for CBDCs resilient and reliable?

Since its inception 11 years ago, our public ledger has demonstrated 100% uptime. That reliability is possible because of both the technical features and the economic incentives of our technology. This creates a remarkably resilient system that is well suited for the needs of CBDCs.

How can a CBDC encourage payment diversity?

By creating a lower barrier to entry, our approach to CBDCs encourages innovation and competition, leading to increased payment diversity.

Does a CBDC promote financial inclusion?

Since digital cash can be held directly by citizens without the need for financial institutions or accounts, our approach enables a greater percentage of the population to participate.

Would a CBDC improve cross-border payments?

By building on a global interoperable network, our approach offers low fees and high throughput, which results in a highly effectively and highly cost effective international payment system.

How can a transparent financial system also provide individual privacy?

Our digital cash solution is pseudonymous, designed to maintain the privacy of users, without full anonymity. This approach satisfies both the needs for individual privacy and government oversight.

Would a CBDC facilitate fiscal transfer?

Digital cash is a cost-effective, direct mechanism for payments. As it is peer-to-peer in design, central banks can use it to send cash directly to citizens.

Would a CBDC lead to the disintermediation of commercial banks?

Digital cash is cash. Therefore, like cash, there are limitations on the functions it can provide. A role for commercial banks would still exist, particularly to provide monetary services and access to credit.

Does a CBDC require the creation of a new form of money?

A CBDC does not create new forms of money. It can co-exist with physical cash and notes. Our solution simply facilitates the creation of a digital form of notes and coins using a distributed network and interoperates with money and digital money.

Would a CBDC protect monetary sovereignty?

We believe that a CBDC is key in ensuring the financial stability of the economy in response to the increase in the use of cryptocurrency, stablecoins and other forms of private and/or synthetic money. With a CBDC built on a public ledger, it becomes possible to introduce a payment service that lowers barriers to entry, substantially lowers costs and forms the basis of a more effective peer-to-peer cash system.



Work with us

An independent report by LexisNexis has named nChain as a Global Top 100 innovator alongside companies such as Alphabet, Ant Group, Apple, Pfizer, Meta, Samsung and Tencent. It is our commitment to developing and deploying impactful solutions in the blockchain space that has made us an industry leader.

We are experts in delivering peer-to-peer digital cash payments, and we bring that expertise to help central banks explore and issue CBDCs. We welcome the opportunity to discuss these topics in more detail in person and encourage you to reach out to schedule a meeting with a member of our accounts team.

The world of CBDCs is undeniably complex, but through that complexity lies immense opportunity, and we're here to help you discover it.

For more information and to schedule a meeting, contact:

Simit Naik
Director of Commercial & Strategy
s.naik@nchain.com

nchain.com



nChain has four central offices and a worldwide presence.

POWERED BY

nChain

nchain.com

Copyright © 2015-2022 nChain Licensing AG. All rights reserved. nChain Licensing AG has sought trademark protection for "Kensei", the nChain logo and Kensei logo in Switzerland and other countries. All other trademarks are the property of their respective owners. Technical changes and differences from the illustrations are reserved; errors are excepted.