

The Digital Dollar Project
Response to Department of the Treasury
Ensuring Responsible Development of Digital Assets¹

Introduction

The Digital Dollar Project (DDP) is a non-profit organization with a mission to encourage research and public discussion on the potential advantages of a U.S. central bank digital currency ("CBDC" or "digital dollar"), convene private sector thought leaders and actors, and help inform national policy.

(A) Adoption to Date and Mass Adoption

(1) What explains the level of current adoption of digital assets? Please identify key trends and reasons why digital assets have gained popularity and increased adoption in recent years. In your responses, please address the following:

- a. Who are the users, consumers, and investors that are adopting digital assets? What is the geographic composition and demographic profile of consumers and investors in digital assets?
- b. What businesses are adopting digital assets and for what purposes?
- c. What are the main use cases for digital assets for consumers, investors, and businesses?
- d. What are the implications for equitable economic growth?

Like many physical infrastructures once state-of-the-art in the 20th century, global financial markets and regulatory structures have started to show their limits in an ever-advancing, digital future. For reference, the regulatory framework for anti-money laundering in the United States originated in the 1970s when floppy disks were the new technology. Private sector innovations have revolutionized how we send and receive money, pay bills, and conduct business. As the world advances and innovations arise at an increasing rhythm, there is a need to modernize the U.S. dollar to keep pace and take advantage of the new architectures of technology and innovation.

Several years ago, the private sector recognized a need for tokenized forms of value (ex. money), which enabled new levels of portability, efficiency, programmability, and accessibility. The world has since moved into the era of the "Internet of Value," where things such as energy, agricultural and mineral commodities, contracts, property titles, and cultural assets like music and art can be stored, managed, transacted, and moved around in a secure private way from person to person, without third-party intermediaries. This era has shifted the medium of trust from large centrally managed institutions with legal authority to person-to-person digital handshakes powered by cryptography, tokenization, shared ledgers, and a network of personal computers and smartphones.

However, technological progress has continued to leave behind those who would benefit significantly from the characteristics such as faster transaction speeds and lower fees that have come with the advent of digital assets. Un-or-underbanked populations often do not have the luxury of taking any actual or perceived risk from price volatility, possible digital security concerns, and conflicting regulatory requirements. Subject to proper design, onboarding, and Know Your Customer (KYC) frameworks, a U.S.

¹ Department of the Treasury, "Ensuring Responsible Development of Digital Assets," <https://www.federalregister.gov/d/2022-14588>

CBDC could expand the ability of currently un-or-underbanked populations to access financial services and e-commerce platforms that do not deal in physical cash.

Finally, a U.S. CBDC is not antithetical to developing private sector payments and stablecoin initiatives. Like today, private sector innovation will build on and around the public infrastructure underpinning the U.S. dollar. The paragraphs below explore some examples of use cases for a U.S. CBDC to be explored through private and public collaboration.

Peer-To-Peer (P2P) Payments

As our economy has moved into a digital era with more transactions occurring virtually, the private sector developed solutions for peer-to-peer (P2P) money transfers that overcame the limitations of physical cash. A new wave of innovative message-based payment systems has created faster transaction methods and improved user experiences. A U.S. CBDC would leverage a fundamentally different architecture that could serve digital P2P transactions without the need for an intermediary to control a centralized ledger. Over the past decade, P2P mobile payment services, such as PayPal, Venmo, and Zelle, have created faster and more direct methods of transferring funds. Despite their greater speed and convenience, such P2P mobile payment systems are still account-based, meaning the transactions are not fully complete or "final" and could still be reversed until their respective debit and credit transactions are recorded, reconciled, and settled. A digital dollar could support a P2P payment system resembling a physical P2P cash transfer. The speed, efficiency, and ability to transfer a token directly allow for reduced time and costs associated with a P2P transfer.

Although a CBDC direct transfer may serve as a substitute for some of the P2P volumes, services stemming from the low-cost (or potentially no-cost) digital wallet could reach a broader population of individuals, including those currently unbanked, given the existing private solutions. Additional business opportunities could be provided to mobile payment providers if they adapt and become wallet providers for CBDC. For instance, the wallet provider could design transactions and wallet sizes based on customer preferences and jurisdictional mandates.

An additional design benefit offered by CBDC is the ability to customize the design options of payment transactions. Through careful and thoughtful explorations of privacy optionality, the U.S. could implement select privacy controls such as anonymizing transactions under a certain value threshold. There is an opportunity for the U.S. government to design a CBDC that protects users' privacy and gives the users control of how and with whom they share their personal data. The programmability and design choices could provide better controls for how user data is collected and leveraged and enable the anonymizing elements of cash transactions digitally in a tokenized digital dollar.

Domestic Retail Payments (Consumer)

A U.S. CBDC could provide dynamic capabilities to the domestic retail payment landscape. The U.S.'s cash, debit, and credit infrastructures are sophisticated and crucial payment channels, but each has its own tradeoffs. Some merchants and consumers prefer cash payments, given that they provide immediate liquidity without the delay multiple intermediaries can add, but physical cash has transport and storage limitations. Electronic credit and debit payments provide broader access and optionality for consumers but create trapped liquidity for merchants bound to multi-day settlement cycles. With a U.S.

CBDC, consumers could pay the retailer directly and instantaneously for lower costs without the need for traditional intermediaries. A digital dollar could provide treasury benefits for small businesses that cash currently offers and electronic access that does not require a banking intermediary to verify and settle the transaction. A digital dollar would thus offer retailers, consumers, and financial institutions a potentially more affordable and efficient payment method over existing cash and card payments. Additionally, the increased speed by which merchants receive and access funds would provide them with working capital benefits.

Domestic Retail Payments (Business)

Immediate, transparent, accessible, and secure methods of making payments to other institutions are necessary for supporting American businesses. Most business-to-business (B2B) payments are made using checks, credit, debit transactions, or systems like Fedwire or Automated Clearing House (ACH).² The innovation of a U.S. CBDC allows businesses to transact in central bank money, which guarantees settlement finality and removes counterparty risk. A U.S. CBDC would unlock a tier of benefits, including a faster, more secure method of B2B payments and instantaneous settlement to a broader participant base. Leveraging a CBDC could unlock an additional tranche of innovation, including improved treasury management, financing analytics, liquidity, and security measures.

For additional consideration, the Digital Dollar Project has published [nine pilot scenarios for testing a U.S. CBDC](#) to explore the challenges faced by different constituent groups, including individuals, businesses, and financial market infrastructure providers³. Some of the most compelling opportunities available with a U.S. CBDC include the development of low-cost (or potentially no-cost) digital wallets as on-ramps to bank-lite products for un- and underbanked populations. DDP encourages continued experimentation, data-gathering, and innovation involving both the public and private sectors to advance the design of a U.S. CBDC and potential use case applications.

(2) Factors that would further facilitate mass adoption

- a. Describe a set of conditions or pre-conditions that would facilitate mass adoption of digital assets in the future. To the extent possible, please cite any public data related to the responses above.
- b. What developments in technology, products, services, or markets account for the current adoption of digital assets? Are there specific statutory, technology, or infrastructural developments that would facilitate further adoption?

Interoperability is vital when designing a U.S. CBDC that integrates the U.S. dollar with global payment options and achieves mass adoption. CBDC interoperability can prevent market fragmentation, increase payment provider competition, and secure the dollar's international position. While many countries are developing CBDCs and stablecoins in silos, the U.S. should consider the dollar's domestic and global

² Linda Bustos, "The state of digital payments in B2B ecommerce", Elasticpath, June 26, 2019, <https://www.elasticpath.com/blog/the-state-of-digital-payments-in-b2b-ecommerce>

³ Digital Dollar Project, "Nine Pilots", https://digitaldollarproject.org/wp-content/uploads/2021/07/PilotScenarios10_12_20.pdf

utility when designing a CBDC to achieve economic efficiencies, as the dollar is a payment mechanism that underpins and provides liquidity across markets. A well-designed U.S. CBDC could enable a translation layer between multiple CBDC networks and technology platforms, creating a shared language domestically and globally. This transferability across traditional and DLT-based networks would streamline transaction data sharing across many use cases. To achieve this level of interoperability, U.S. CBDC development should consider emerging token standards, such as SWIFT's intended use of ISO-20022, as viable future token networks that aim to connect with future CBDC networks. The U.S. can collaborate with corporations, regulators, government agencies, and academics globally to advance technology standards and other layered facets such as identity frameworks and consumer protections. By taking a leading role in ensuring interoperability, the U.S. will be able to set standards in the internationalization of CBDCs and facilitate mass adoption of digital assets while protecting against countries that do not serve U.S. interests and ensuring a U.S. CBDC that upholds our democratic values of freedom, economic stability, and individual privacy.

Domestically, as a starting point, clear national regulations would promote consumer confidence in digital asset adoption. According to Deloitte's 2021 Blockchain Survey, 67% of surveyed respondents viewed data security and privacy as one of the top five areas of regulation in the greatest need of modification to facilitate the adoption of blockchain and digital assets.⁴ The combination of new regulations and the increased public education on consumer rights and protections would provide reassurance to those who may be hesitant to adopt digital assets.

Lastly, access to mobile phones and Internet connectivity are factors that both enable current adoption and are critical to facilitating further use of digital assets among the most vulnerable populations. Likewise, the availability of ease of use, education, and onboarding support will be necessary to encourage adoption among broader populations currently excluded from the digital age. These facets to ensuring an equitable adoption of digital assets will be further elaborated in the responses to subsequent questions. More empirical testing and data collection are essential to properly assess the needs of those currently excluded from the financial system without imposing external assumptions. The Digital Dollar Project will work over this next year to determine assumptions or misconceptions about those currently missing from financial institutions and, more broadly, how the U.S. can bring the benefits of tokenized money to the general public.

(B) Opportunities for Consumers, Investors, and Businesses

(3) What are the main opportunities for consumers, investors, and businesses from digital assets? For all opportunities described, please provide data and specific use cases to date (if any). In your responses, please consider:

- a. Potential benefits of decentralized and disintermediated systems
- b. Creation of new types of financial products and contracts
- c. Potential for improved access to and greater ease of use of financial products
- d. Potential opportunities for building wealth

⁴ Deloitte's 2021 Global Blockchain Survey, <https://www2.deloitte.com/us/en/insights/topics/understanding-blockchain-potential/global-blockchain-survey.html>

- e. Potential benefits of interacting with counterparties, suppliers, vendors, and customers directly
- f. Potential for improved cross-border payments and trade finance

To unlock the benefits and opportunities of a U.S. CBDC, the nature, location, and access protocols of the database tracking transactions will be crucial architectural decisions. Most existing digital currency and payment systems employ a centralized database to manage transactions. This database is maintained by a commercial entity and is accessed using technology and protocols promulgated by that entity. Conversely, some cryptocurrencies, such as bitcoin, employ a distributed ledger blockchain. The blockchain ledger is maintained by anyone willing to invest in the equipment required. Though all transactions are publicly visible for consensus, some anonymity is preserved by the use of anonymized wallet numbers rather than names or other readily identifying data.

While testing is necessary to better understand the technical, operational, and governance implications of underlying CBDC rails, if deployed, a U.S. CBDC could be positioned using a permissioned semi-distributed architecture. This structure would permit only authorized participants to access the underlying payment database. For example, a depository institution that offers custody service may have permission to modify the network, while a payment service provider may only have permission to read the network. Together, the intermediaries could each play a role in validating the authenticity of transactions, possibly complementing a master database. Access to the CBDC network would require authorization from the Federal Reserve or designated financial regulators to help administer the CBDC payment infrastructure. This kind of permissioned system would offer high levels of network security against unauthorized access or cyber-attacks and privacy.

A distributed ledger technology (DLT)-based or -inspired system would ensure uniqueness and prevent double-spending. If designed as a distributed network, such a network would increase system resiliency and functionality, allowing it to continue operating without error if an intermediary is compromised. CBDC could utilize a multi-signature wallet to stop single-channel attacks, and funds could be verified and transacted locally within a wallet. If a CBDC enabled offline payments during low or no network connection, the system would be resilient to operational failures or disruptions such as natural disasters, electrical outages, and other issues.

Furthermore, through CBDC research and testing of technology capabilities, the U.S. could provide greater enablement of individual privacy compared to digital payment systems today and build on existing mechanisms that track illicit financing. The development of U.S. testing and advancement could encourage qualified non-financial institutions to participate in enabling services, including technology partners and payment providers that might reach consumers in ways that banks and credit unions currently do not. U.S. CBDC could help advance the goal of financial inclusion by offering services outside of traditional business hours and eliminating the dependency on physical locations. Features such as having no minimum balance requirements could grant unbanked individuals access to the digital payments system. In this way, U.S. CBDC could serve as an on-ramp, providing underserved populations with more financial services and the ability to begin building wealth. A critical number of people in the

U.S. remain unbanked or underbanked—as of 2021, this accounted for 19% of American households, or approximately 63 million people.⁵

Internationally, payments currently cannot be conducted digitally in U.S. central bank money by non-US institutions. A digital dollar could allow more direct monetary relations to be established, reduce risks, address time delays caused by today's correspondent banking model, enhance competition in international payments, and advance financial market integration. Using a digital dollar in cross-border and offshore transactions would allow digital payments in central bank money to be made for remittances and large value payments, including the possibility of conducting offshore securities settlements.

The Digital Dollar Project believes that these modernizations and new use cases will allow a U.S. CBDC to act as a catalyst for innovation and will not be antithetical to the development of private sector initiatives. In collaboration, the public and private sectors should continue exploring tokenized monies' technological capabilities to unlock opportunities for consumers, investors, and businesses.

(C) General Risks in Digital Assets Financial Markets

(4) Please identify and describe any risks arising from current market conditions in digital assets and any potential mitigating factors. Identify any such responses that directly relate to:

- a. Market transparency, including pre- and post-trade transparency
- b. Accuracy and reliability of market data
- c. Technological risks, including attacks, bugs, and network congestion
- d. Smart contract design and security
- e. Settlement and custody
- f. Jurisdictional and legal conditions

Regardless of whether the U.S. chooses to deploy a CBDC, protecting against rising risks in the digital world will be increasingly essential. While the selected technological infrastructure for a potential U.S. CBDC can address many potential dangers of system attacks, the U.S. should take this opportunity to invest in robust cybersecurity around financial market infrastructure and renewed regulatory structures. Like with other digital assets, CBDC systems may be affected by technological risks such as quantum computing, which possesses the capability to compromise cryptographic encryption—a technology used for securing CBDC accounts as well as in other foundational aspects of the internet economy.⁶ In these cases, technology's inevitable evolution and advancement should encourage architects to design an adaptable CBDC that can scale modularly over time. The foundation of a U.S. CBDC network should set a framework that can evolve as technology changes.

In a similar form, a benefit of digital assets is their programmability. However, this capability, achieved via smart contracts, also comes with associated risks such as logic error, oracle risk, and scaling risk.

⁵ Board of Governors of the Federal Reserve System, “Economic Well-Being of U.S. Households in 2021”, May 2022, <https://www.federalreserve.gov/publications/files/2021-report-economic-well-being-us-households-202205.pdf>

⁶ World Economic Forum, “4 key cybersecurity threats to new central bank digital currencies”, November 20, 2021, <https://www.weforum.org/agenda/2021/11/4-key-threats-central-bank-digital-currencies/>

These smart contract risks exist irrespective of the type of digital asset.⁷ A key question specific to CBDC programmability is when and how this capability should be used instead of other regulatory tools by the government. For example, a CBDC could be configured with the functionality for the token itself to be interest-bearing or not. In this example of programmability, the Digital Dollar Project urges the U.S. to consider a non-interest-bearing CBDC that does not provide FDIC insurance to mitigate any adverse impacts and maintain the existing cash usage model, distributed through a two-tier banking system. To understand and alleviate potential adverse effects of CBDC design and programmability, the Digital Dollar Project encourages the Treasury to work with private institutions and participants to understand how they would use a U.S. CBDC. Regulators can learn more about the implications of a CBDC issuance by performing gaming simulations, pilot programs, and research studies with broad stakeholder involvement. To this end, the DDP intends to facilitate exploratory pilot programs with industry participants to further inform the Treasury and the public on the implications of various CBDC use cases.

Regarding settlement, a tokenized digital dollar could provide atomic delivery, either Delivery versus Payment (DvP) or Payment versus Payment (PvP). These potential approaches could serve as a way to reduce fraud and counterparty risk. In partnership with the DTCC, the DDP has been engaged in building Project Lithium, a prototype that aims to demonstrate the direct, bilateral settlement of cash tokens between participants in a real-time delivery-versus-payment (DVP) settlement⁸. The pilot will also identify how it can leverage DTCC's robust clearing and settlement capabilities to fully realize the potential benefits of a CBDC in areas such as reducing counterparty risk, increasing efficiency, guaranteeing the delivery of cash and securities, and increasing transparency. This pilot will have important implications for informing the future design of settlement offerings and exploring the atomic settlement capabilities of a U.S. CBDC to prevent current risks.

(D) Risks to Consumers, Investors, and Businesses

(5) Please identify and describe potential risks to consumers, investors, and businesses that may arise through engagement with digital assets. Identify any such responses that directly relate to:

- a. Frauds and scams
- b. Losses due to theft
- c. Losses of private keys
- d. Losses from the failure/insolvency of wallets, custodians, or other intermediaries
- e. Potential losses associated with interacting with counterparties directly
- f. Disclosures and amount of fees
- g. Disclosures of other relevant terms
- h. Authenticity of digital assets, including NFTs
- i. Ability of consumers, investors, and businesses to understand contracts, coding, protocols

CBDC is the only instrument that could provide the transactional benefits of digital currency with the stability, trust, and risk weighting of central bank money. This combination of features will play a vital

⁷ Bank of Canada, "The Positive Case for a CBDC", July 2021, <https://www.bankofcanada.ca/wp-content/uploads/2021/07/sdp2021-11.pdf>

⁸ DTCC, "DTCC building industry's first prototype to support digital U.S. currency in the clearing & settlement process as part of Digital Dollar Project effort", April 2022, <https://www.dtcc.com/news/2022/april/12/dtcc-building-industrys-first-prototype-to-supports-digital-us-currency>

role for large institutions seeking to transact and settle in a highly liquid currency with zero commercial risk. Fraud and scams will sadly always be part of our society, but in order to help prevent identity theft, financial fraud, and other types of financial crime, policymakers should look beyond the KYC/AML measures in place today and explore how a US CBDC might unlock new tools and methodologies to root out bad actors. These safety measures should be balanced by protecting individual privacy—such as using privacy-enhancing techniques (PETs) that can confirm critical transaction information without releasing sensitive personally identifiable information.⁹ A U.S. CBDC could also inherently encompass qualities such as instantaneous verification to reduce counterfeit efforts and potential fraud. The U.S. should work with wallet and service providers as well as experiment with cryptographic techniques that allow officials to identify money laundering operations and track illicit funds while protecting personal information and data beyond what is possible today. This experimentation will be vital for the U.S. to ensure that these validation techniques are robust and scalable, especially before deploying a widely used retail U.S. CBDC.

To achieve digital portability and protect consumer privacy, a U.S. CBDC should emulate the qualities of cash by existing only in a single location and being the custodian's responsibility. However, with this innovation, digital custody will inevitably increase security concerns as the responsibility shifts from centralized authority managing account records to managing digital cash asset tokens on behalf of individuals. Security measures would need to bridge the security and depository requirements of managing cash as well as the account-keeping requirements of digital money. Significant exploration into ease of use, technology standards, and participant guidelines can minimize the industry's negligence risk. Public education on the standards of digital assets and CBDCs can also protect users from bad actors. Potential system architectures in which end users access their CBDC through a hosted wallet could limit the risk of loss.¹⁰

Ultimately, to mitigate risks to end users, a U.S. CBDC should be easy to use for the everyday consumer, accompanied by comprehensive education, and be backed by secure architecture. Arriving at the optimal design choices for a U.S. CBDC and architectural structure will require continued collaboration with the private sector and key stakeholders. The Digital Dollar Project is committed to encouraging research and discussion on the potential implications of a U.S. CBDC backed by real-world data and urges the U.S. government to deepen its exploration into this matter.

(E) Impact on the Most Vulnerable

(6) According to the FDIC's 2019 "How America Banks" survey, approximately 94.6 percent (124 million) of U.S. households had at least one bank or credit union account in 2019, while 5.4 percent (7.1 million) of households did not. And roughly 25 percent of U.S. households have a checking or savings account while also using alternative financial services. Can digital assets play a role in increasing these and other underserved Americans' access to safe, affordable, and reliable financial services, and if so, how?

⁹ Daniel Gorfine and Michael Mosier, "Opinion: Stablecoin and other digital assets are falsely framed as a choice between personal privacy and national security. We can have both." MarketWatch, July 23, 2022, <https://www.marketwatch.com/story/stablecoin-and-other-digital-assets-are-falsely-framed-as-a-choice-between-personal-privacy-and-national-security-we-can-have-both-11658206072>

¹⁰ Digital Dollar Project, "Exploring a US CBDC", May 2020, <https://digitaldollarproject.org/exploring-a-us-cbdc/>

- a. In your responses, please describe specific ways in which digital assets can benefit the underserved and the most vulnerable vis-à-vis traditional financial products and services. Address factors such as identify verification process, costs, speed, ease of use, and access.
- b. In your responses, please describe specific ways in which digital assets can pose risks to the underserved and the most vulnerable given rapidly developing and highly technical and nature of the industry. Address factors such as financial and technical literacy and accessibility.

Depending on technical and policy design choices, U.S. CBDC could provide financial institutions and financial technology companies – in partnership with community outreach efforts – with the underlying technology to build inclusive payment and banking services. Regulated institutions can develop digital wallets that provide unique services and cater to distinct user bases. The DDP believes that lower operational, technology and regulatory costs related to offering digital wallet solutions for the custody of tokenized digital dollars may hold advantages over traditional bank accounts in expanding access to underserved populations. However, financial inclusion benefits depend heavily on thoughtful and well-researched design considerations. After all money is above all a social construct and belief in the system is crucial to ensuring mass adoption.

As a U.S. CBDC should align with democratic values, individual privacy will be critical to achieving mass adoption. Some unbanked communities prefer not to place their money in banks due to trust and privacy concerns. These people seem unlikely to transact heavily in a U.S. CBDC unless they are confident that individual privacy is assured. While it is vital to ensure robust KYC and other financial crime protections, it will be critical to ensure these processes do not come at the cost of preventing U.S. CBDC access due to privacy concerns. With intentional thought around policy frameworks and the integration of privacy-enhancing techniques, the U.S. will not have to make a binary choice between privacy and security.

Similarly, it will be necessary for a U.S. CBDC to maintain a cash-like model that provides offline payment abilities, protection of individual privacy, tiered identity verification requirements, and distribution through the two-tier banking system, inclusive of regulated fintech companies. Echoing this, the BIS recently posited that although not a panacea, central banks could use CBDC as a tool to further financial inclusion in "promoting innovation in the two-tiered payment system, offering a robust and low-cost public sector technological basis and novel interfaces, facilitating enrolment and education on CBDC, and fostering interoperability among multiple dimensions."¹¹

Due to the rapidly developing technology and the highly technical nature of the industry, there is a risk that the underserved will be further excluded from the financial system if they do not have access to relevant technical and financial education. In these cases, hardware wallets or increased access to mobile devices would be critical to broadening U.S. CBDC coverage. The private sector may facilitate the distribution of mobile devices and innovate on the range of programs and services for formerly unbanked or underbanked individuals. In situations where private sector solutions are not viable, policy

¹¹ BIS, "Central bank digital currencies: a new tool in the financial inclusion toolkit?", April 2022, <https://www.bis.org/fsi/publ/insights41.htm>

solutions could be developed around public wallet government programs or services that fill the remaining gaps in coverage.

As the U.S. public sector explores a design of a U.S. CBDC in line with real barriers to reaching the unbanked, the DDP is working to collaborate with stakeholders to bridge the communication gap between technologists, policymakers, and the MDIs, CDFIs, and local initiatives on the ground in unbanked communities. We must continue to intentionally elevate these voices in each step of the process by creating a shared language and cohesive approach for initiatives currently in silos and deploying research and retail pilots where there are presently inclusion gaps.

About The Digital Dollar Project (DDP)

A non-profit organization, The Digital Dollar Project, was created to encourage research and public discussion on the potential advantages and challenges of a U.S. CBDC — or a "digital dollar." DDP will identify options for a CBDC solution to help enhance monetary policy effectiveness and financial stability; provide needed scalability, security, and individual privacy in retail, wholesale and international payments; and integrate with existing financial infrastructures, including U.S. Federal Reserve-related projects. Read the DDP [Privacy Principles](#) and "[Digital Dollar Paper: Exploring a Digital Dollar](#)." Visit <http://digitaldollarproject.org>.