

# bitt



Banks Begin to Embrace  
Digital Currencies

2021 has seen a dramatic uptick in financial technology innovation, with new narratives and valuable enterprises growing to service an evolving market.

The emergence and growth of private digital currencies, extreme volatility in the markets, and an increasing number of sizable institutions incorporating digital offerings or taking positions in digital asset markets, point to a different future for the way people transact, save, and invest.

The conspicuous prominence of these broad trends throughout the financial system have caught the gaze of central banks and financial institutions across the globe who, keen to keep up with and capitalize on the unfolding technological innovations, are evolving at an increased pace and seeking new means of adopting, fostering and developing the next generation of online payment solutions.

In May 2021 Federal Reserve Governor Lael Brainard succinctly summarised the mood and motivations underpinning the advancements being made in Central Bank Digital Currencies (CBDC): “...the growing role of digital private money, the migration to digital payments, plans for the use of foreign CBDCs in cross-border payments, and concerns about financial exclusion—are sharpening the focus on CBDCs.”<sup>1</sup>

These movements are being considered in the (virtual) boardrooms of commercial banks in the US and across the world. Giants such as Visa have already made headway in incorporating digital currency solutions into their service offerings, and now enable their many crypto partners<sup>2</sup> to settle obligations in the US dollar stablecoin USDC. Without

doubt there are innumerable innovation teams at other such institutions busy exploring how to integrate digital currency services and operations into their offering, while marketing and public relations offices analyze how to evolve their brand ethos to accommodate or incorporate digital currency.

“...the growing role of digital private money, the migration to digital payments, plans for the use of foreign CBDCs in cross-border payments, and concerns about financial exclusion—are sharpening the focus on CBDCs.”

## CONVERGENCE

The internet has already transformed numerous analog tools of human society. Currency in true digital form, accessible by the masses via internet-native payment networks, represents a convergence moment in monetary history. The programmatic and digitalization possibilities have the potential to transform a fractured infrastructure into an efficient network of monetary networks, connecting economies and individuals from all over the world. The evolution of financial infrastructure leads towards the convergence of many different components onto interoperable internet-native networks, including:

- Monetary infrastructure (currency minting and issuance, reserve management, etc.)
- Payments infrastructure (payments and settlement systems)
- Financial product infrastructure (credit, exchange, etc.)
- Market infrastructure (instrument exchange and settlement systems)

<sup>1</sup> Brainard, Lael. "Private Money and Central Bank Money as Payments Go Digital: An Update on CBDCs." Board of Governors of the Federal Reserve System, 24 May 2021, [www.federalreserve.gov/newsevents/speech/brainard20210524a.htm](https://www.federalreserve.gov/newsevents/speech/brainard20210524a.htm).

<sup>2</sup> Visa currently has dozens of digital currency partners, with notable names like Coinbase, Blockfi, Crypto.com, Xapo, Circle, Fold and more. See <https://usa.visa.com/solutions/crypto.html>

## Shifting Regulatory Landscape Opens For Experimentation

It is no surprise that American financial regulators are beginning to embrace the inevitable future of internet-native payment rails.

Last year, Former Head of the Office of the Comptroller of the Currency (OCC) at the US Treasury Department, Brian Brooks, was quoted saying “...three to five years from now, banks will be connecting to blockchains the same way that they connect to SWIFT and ACH and other networks.”<sup>3</sup>

It is this vision that must have guided the OCC’s [Interpretive Letter 1174](#), released in January, that greenlit the use of stablecoins by American commercial banks. The letter further acknowledged the momentum trend: “The emergence of new technologies to facilitate payments, support financial transactions, and meet the evolving financial needs of the economy has led to a demand for banks to use INVNs (Independent Node Verification Networks) to carry out their traditional functions. The changing financial needs of the economy are well-illustrated by the increasing demand in the market for faster and more efficient payments through the use of decentralized technologies, such as INVNs, which validate and record financial transactions, including stablecoin transactions.”

The incoming Comptroller of the Currency, Michael Hsu, wasn’t as bold in his [testimony](#) to the Senate Committee for Financial Services in May 2021. He mentioned the fact that under the previous administration, the OCC “...created an Office of Innovation, updated the framework for chartering

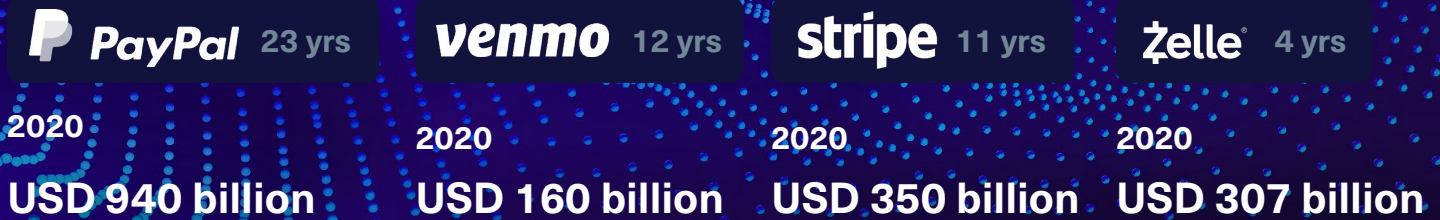
national banks and trust companies, and interpreted crypto custody services as part of the business of banking. I have asked staff to review these actions.” He did, however, recognize that distributed ledger and other emerging technologies would continue to impact the financial system: “I believe these trends cannot be stopped. They bring great promise, but also risks. Banks and the regulatory community must adapt to them.”

Hsu isn’t the only high-ranking American regulator to recognize the trends impacting the evolution of the global financial system. Federal Reserve Governor, Lael Brainard, gave a speech at Consensus 2021, stating: “Advances in technology, including the use of distributed ledgers and smart contracts, may have the potential to fundamentally change the way in which payment activities are conducted and the roles of financial intermediaries and infrastructures.” While Governor Brainard spoke extensively about the considerations of issuing a digital USD in the US and beyond, showcasing that the Fed has been active with respect to CBDCs, she also recognized that “If widely adopted, stablecoins could serve as the basis of an alternative payments system oriented around new private forms of money.” Comments from Brooks, Hsu, and Brainard indicate a recognition of the growing trend of internet-native payment networks which will be quantified later in this article.

“...three to five years from now, banks will be connecting to blockchains the same way that they connect to SWIFT and ACH and other networks.”

<sup>3</sup> Circle. “Episode 15: Digital Dollar Stablecoins in the US Financial System.” Youtube, uploaded by The Money Movement, 13 Aug. 2020, [www.circle.com/en/the-money-movement/episode-15-digital-dollar-stablecoins-in-the-us-financial-system](https://www.circle.com/en/the-money-movement/episode-15-digital-dollar-stablecoins-in-the-us-financial-system)

## Total Payments Processed in 2020



### The Pioneers of Internet-Native Payment Applications

While previous payment, clearing, and settlement networks have been operated by small groups of sanctioned entities, the past few generations have seen an increase in the amount and type of payment networks and applications - beginning with the Americard credit card network of six decades ago. Credit cards have grown to play a significant role in the payments system, totalling 44.7 billion payments with a value of USD 3.98 trillion in 2018<sup>4</sup>. Following credit card networks, the evolution of payments systems underwent rapid acceleration after the dotcom boom with the launch of internet-native payments applications, the most popular of which (in America) being PayPal. This payment company offered a purely online payments experience with an email-based accounts system and seamless integration with eBay, the most popular online marketplace in the early 2000s. PayPal has gone on to process over USD

940 billion in transaction volumes in 2020<sup>5</sup>, up from USD 233 billion six years ago, and up from USD 70 billion in 2009<sup>6</sup>.

Following PayPal, fintech companies brought a variety of internet-native payments applications to market throughout the early 2000s and 2010s. Each of them offered a specific value proposition tailored to users' evolving needs in digital transactions. Stripe, founded in 2010, was built on the value premise of a simple integration process for online merchants; 'all you need are seven lines of code to become e-commerce capable'. Venmo, which was founded one year prior, focused on social payments and bill-splitting functionality to gain new users. Each of these services was designed to fulfill various online transaction use cases, while still utilizing the legacy financial system for settlement. In 2020, Venmo and Stripe would go on to process over

USD 160 billion<sup>7</sup> and USD 350 billion<sup>8</sup> in payment volumes, respectively. While these numbers represent a small fraction of the value of payments cleared through the ACH system (over USD 60 trillion in 2018<sup>9</sup>), they are significant enough to indicate a growing trend towards internet-native payment services.

Perhaps this is why the major American commercial banks have pursued their own internet-native payments product Zelle (formerly clearXchange, founded in 2011), offering clients the ability to send money to members of other financial institutions using their own institution's banking application or online banking services. This effort was designed to retain banking clients in a co-owned entity instead of giving up market share to the likes of Revolut, N26, Monzo, and others who offer a similar service.

<sup>4</sup> "The 2019 Federal Reserve Payments Study." Board of Governors of the Federal Reserve System, 6 Jan. 2020, [www.federalreserve.gov/paymentsystems/2019-December-The-Federal-Reserve-Payments-Study.htm](http://www.federalreserve.gov/paymentsystems/2019-December-The-Federal-Reserve-Payments-Study.htm)

<sup>5</sup> "PayPal Fourth Quarter and Full Year 2020 Results." PayPal, 3 Feb. 2021, [s1.q4cdn.com/633035571/files/doc\\_financials/2020/q4/Q4-FY-20-PayPal-Earnings-Release.pdf](https://s1.q4cdn.com/633035571/files/doc_financials/2020/q4/Q4-FY-20-PayPal-Earnings-Release.pdf).

<sup>6</sup> "eBay Inc. Form 10-K 2009." EDGAR, Securities and Exchange Commission, 2010, [www.sec.gov/Archives/edgar/data/1065088/000119312510033324/d10k.htm](http://www.sec.gov/Archives/edgar/data/1065088/000119312510033324/d10k.htm).

<sup>7</sup> "Total Payment Volume (TPV) of Venmo from 1st Quarter 2017 to 1st Quarter 2021." Statista, May 2021, [www.statista.com/statistics/763617/venmo-total-payment-volume](https://www.statista.com/statistics/763617/venmo-total-payment-volume).

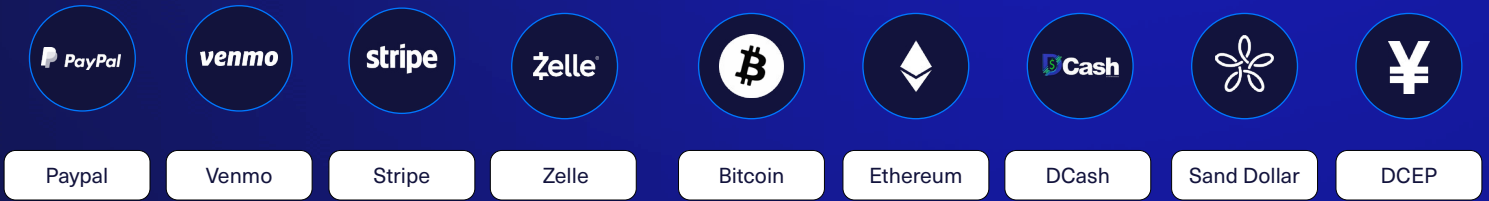
<sup>8</sup> "Stripe Teardown: How The \$36B Payments Company Is Supercharging Online Retail." CB Insights, 25 Feb. 2021, [www.cbinsights.com/research/report/stripe-teardown](https://www.cbinsights.com/research/report/stripe-teardown).

<sup>9</sup> The 2019 Federal Reserve Payments Study, 2020; Total ACH payments are estimated to have reached 28.5 billion with a value of \$64.16 trillion in 2018, an increase of 4.6 billion and \$12.08 trillion since 2015.

# Internet-Native Payment Applications vs Networks

## Internet-Native Payment Applications

## Internet-Native Payment Rails



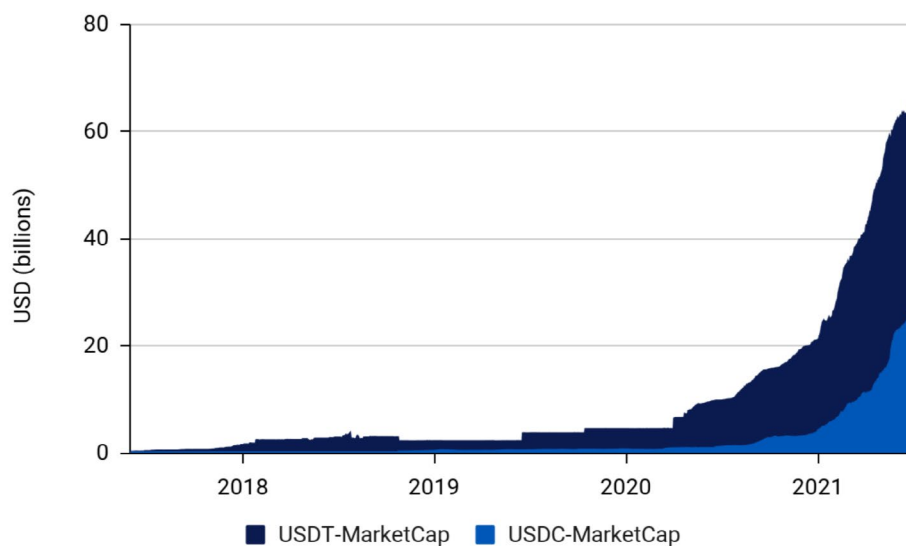
It may be a good time to clarify the differences between internet-native payment applications and internet-native payment networks or rails. Payment applications like PayPal, Venmo, Stripe, and Zelle offer a digital-first payment service to their clients. However, they require traditional banking rails to settle transactions, which carry cost and latency, especially if the counterparties are in different countries and transact across different currencies. If Zelle represents a fast and cost-effective way of transacting across American banking institutions, transacting in INVN stablecoins and crypto represents a fast

and cost-effective way of transferring value to anyone with an internet connection - largely due to their nature of being internet-native payment rails.

Internet-native payment networks like Bitcoin, Ethereum, and the emerging CBDC networks, like DCash, SandDollar, and DCEP, settle transactions in a purely online environment and constitute their own rails. In this sense, CBDCs and crypto are all considered digital bearer instruments, which means each transaction includes the settlement. Stablecoins have also come to be used by many market participants as

digital bearer instruments. Even though stablecoins generally represent a claim on a reserve account held at a financial institution, many users transact in stablecoins as a means of exchange and a store-of-value without ever redeeming them from the reserve account. This is certainly evident in the growth of the market capitalizations of the major USD stablecoins, USDT and USDC, which are both tokenized and transacted on the Ethereum network and others (see Figure 1, below).

**Figure 1: USDT and USDC Stablecoin Market Capitalization: June 2017-Present**



Source: <https://www.coingecko.com/en>

Figure 1 shows a rapid increase in the amount of USDC and USDT in circulation beginning at the start of 2021 and continuing into Q2. The chart indicates that businesses and individuals are exchanging deposits, and other traditional methods of holding currency, for stablecoins at an accelerated pace so far in 2021. A summary of the growth in market cap of the two largest stablecoins follows:

**USDT MktCap:** Jan 2016: USD 952K | July 2021: USD 62.3B

**USDC MktCap:** October 2018: USD 128M | July 2021: USD 25.6B

Figure 1 reflects the amount of USDT and USDC currently in circulation globally, indicating a clear interest in transacting in and holding USD using internet-native rails. The market caps of the two largest Independent Node

Verification Networks have also grown substantially, with Bitcoin currently sitting around ~USD 650B, and Ethereum at ~USD 250B (as of July 5, 2021). Similarly, transaction volume has grown substantially—two charts below

are included to show transaction volume for USDT and USDC, both transacted on the Ethereum network, and bitcoin (BTC) and ether (ETC), transacted on the Bitcoin and Ethereum networks, respectively.

Figure 2A: USDT and USDC On-Chain 24hr Transaction Volume

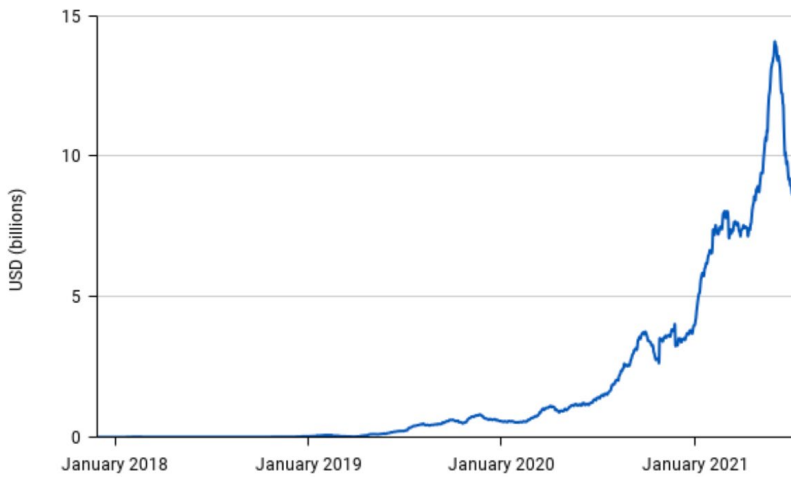


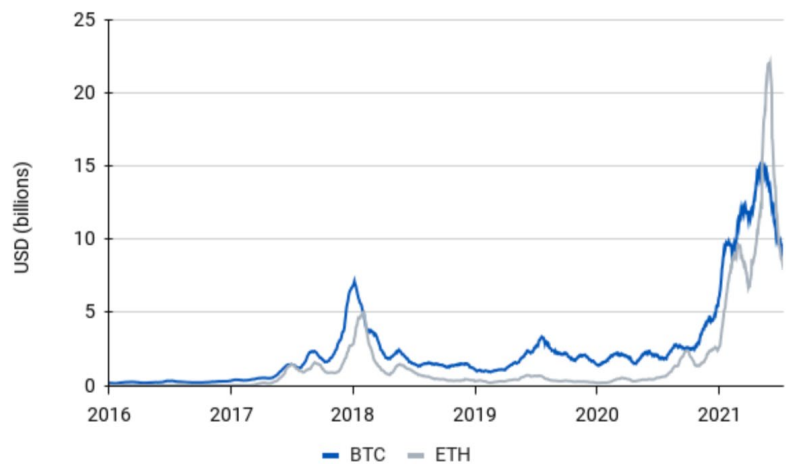
Figure 2A showcases the growth in USD stablecoin transactions with USDT and USDC 24hr transaction volume currently at ~USD8.4B. While the majority of USD stablecoin transaction activity is associated with trading private digital currencies on a large number of exchange platforms, more and more businesses are opting for stablecoin payments as a result of the ease of use and low latency of the systems, amongst other factors.

Source: <https://coinmetrics.io>

Figure 2B: BTC and ETH On-Chain 24hr Transaction Volume

Figure 2B tells a similar story of increasing transaction volumes on the two largest INVNs, Bitcoin (blue) and Ethereum (grey). BTC and ETH 24hr transaction volume currently sits at ~\$8.3B and \$7.9B respectively, recently down from all time highs for both networks.

Source: <https://coinmetrics.io>



## Independent Node Verification (Decentralized) Networks (INVN)

It's now necessary to touch on the nature of internet-native payment rails in the context of decentralized networks, also known as INVNs.

When the OCC refers to Independent Node Verification Networks (INVN), as in Interpretive Letter 1174, they are acknowledging the fact that hundreds

of thousands of individuals and firms worldwide are independently running hardware and software that enable the continuous operation of distributed

Figure 3: Ethereum Nodes Map



Source: <https://matallo.carto.com/builder/e70677d5-111>

Another excerpt from the letter captured some key information about the potential of decentralized networks:

“Among the potential benefits is the fact that INVNs may enhance the efficiency, effectiveness, and stability of the provision of payments. For example, they may be more resilient than other payment networks because of the decentralized

nature of INVNs. Rather than relying on a single entity (or a small number of parties) to verify payments, INVNs allow a comparatively large number of nodes to verify transactions in a trusted manner. Simply put, these networks may be more resilient because they have no single point of failure and can continue to operate even if a number of nodes cease to function, for some reason,

and may be more trusted because of their consensus mechanisms requiring more nodes to validate the underlying transactions. In addition, an INVN also acts to prevent tampering or adding inaccurate information to the database. Information is only added to the network after consensus is reached among the nodes confirming that the information is valid.”

The end result for users is that they can now send and receive payments - denominated in BTC, ETH, and USD stablecoins - across internet-native rails, by simply using a wallet application on an internet-capable device. For the more technically inclined, the network is open-source thereby providing the opportunity for anyone to run a node, and write their own wallet software to participate in signing transaction messages on the network. The accessibility and transaction capabilities are arguably the main driving forces behind the massive growth experienced in the Defi space over the past year. However, there is likely more growth to come once more risk-averse customers have trusted (regulated) service providers to interact with to access Defi products. While the

nature of INVN-based or decentralized finance implies open networks accessible to all, with no need for an intermediary, many customers still prefer having assurances that their capital is safe, access to customer support, and the other luxuries associated with quality financial service providers. This presents an opportunity to financial institutions and fintech companies of all shapes and sizes.

### Configuring for Purpose: Delegated Node Verification Networks

An important qualification to bear in mind, however, is that not all internet-native rails operate using INVNs. Central banks,

alongside academics and private sector technology companies, are currently determining optimal configurations for CBDC networks, and how various user applications will authenticate and interact with such networks. While it is possible for central banks to utilize INVNs to tokenize and issue their own CBDC, most central banks currently prefer to commission and operate their own CBDC network in collaboration with financial institutions and technology service providers. While the debate on whether or not to leverage distributed ledger technology (DLT) continues, most of the CBDC pilot projects to date have used DLT for the underlying CBDC network, the most common of which are Corda, Quorum, and Hyperledger. Such networks offer central banks the ability to delegate node hosting responsibility and configurable functionality across central bank departments and/or external financial institutions, regulators, or other stakeholders.

In this sense, CBDCs could be thought of as Delegated Node Verification Networks (DNVNs) vs INVNs. The emergence of central bank digital currencies over the past few years is indicative of the fact that the monetary authorities of the world recognize that national currencies require a systems upgrade to keep pace with technological evolution. These upgrades will enable direct transaction and settlement in central bank money for a wider user base, and will take the form of internet-native payment rails. While the upgrades do not address the decentralization of governance as INVNs do, they will offer many advancements over the legacy payment and settlement processes that were born of a pre-internet era, and have not yet transformed to make the best use of the technological advancements of the 21st century.

## Opportunities

Financial institutions are preparing and collaborating with their regional central bank in testing and experimenting with CBDC use-cases, design features, operating models, and more. Should a CBDC not be on your region's roadmap, your institution could pilot its own stablecoin.

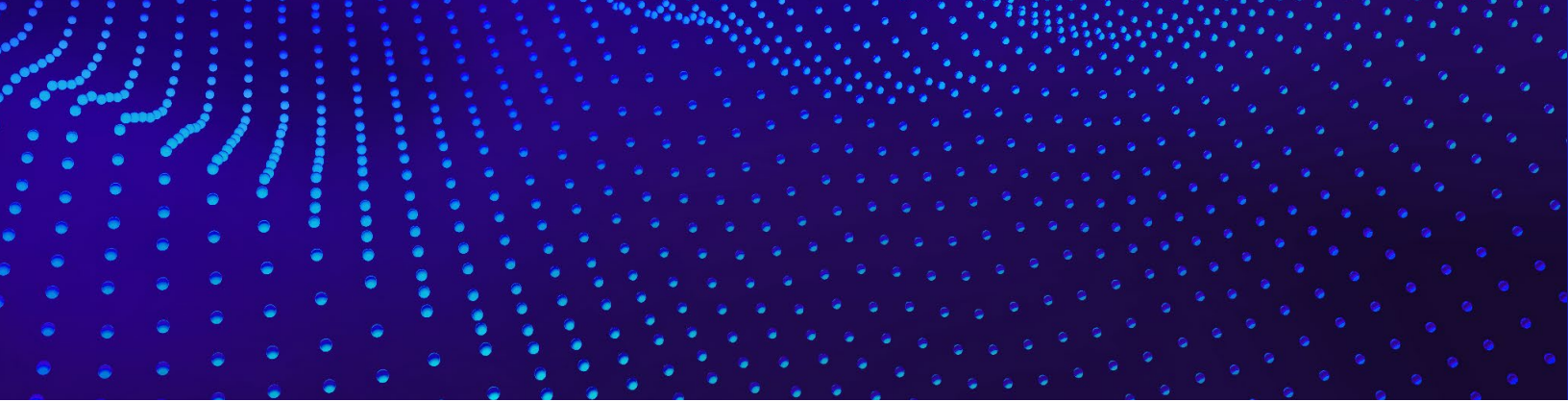
Financial institutions are offering new and attractive products such as:

1. Multi-currency wallets and accounts; combining traditional banking with internet-native payment networks
2. Cross-currency/asset exchange services
3. Defi products via regulated front ends

Financial institutions are able to integrate with the networks that best suit their own needs, and the needs of their clients, including:

1. Stablecoins
2. Cryptocurrencies, and
3. CBDCs





Legend: No development yet (light blue), Research (orange), Pilot (red), Development (teal), Inactive (light blue), Cancelled (dark blue), Launched (blue)

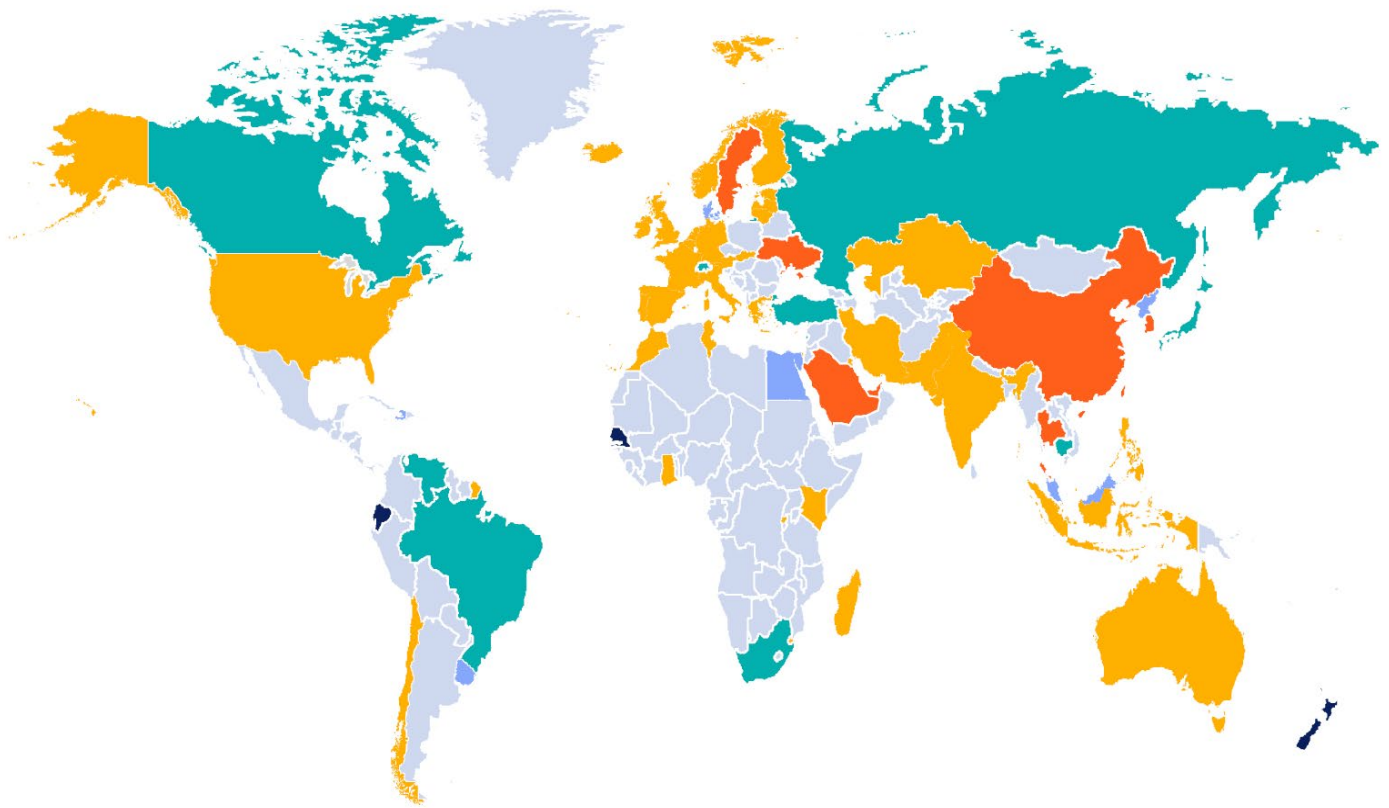


Figure 4: Atlantic Council CBDC Tracker Map

Atlantic Council tracks the progress of all CBDC projects worldwide. Check out their [CBDC Tracker](#) for details on each project.

Source:

<https://www.atlanticcouncil.org/blogs/econographics/the-rise-of-central-bank-digital-currencies/>

The growth of INVN and stablecoins has also seemingly prompted large corporations such as Facebook to implement strategies for deploying new internet-native payment networks, also in the form of DNVNs (with many high profile members<sup>10</sup>). It is no wonder why Facebook's Diem faced severe backlash<sup>11</sup>, given the fact that neither Facebook, nor the Diem foundation, held a payments or banking license in the US. (It has been reported that, in May 2021, Diem applied for a license as a payments provider in the US.<sup>12</sup>) The same OCC Interpretive Letter 1174 provided more clarity for institutions seeking to engage in such a strategy by clarifying that "a bank may use stablecoins to facilitate payment

transactions for customers on an INVN, **including by issuing a stablecoin**, and by exchanging that stablecoin for fiat currency. In this context, stablecoins function as a mechanism of payment, in the same way that debit cards, checks, and electronically stored value (ESV) systems convey payment instructions." It is worth noting that the current OCC administration is still reviewing such guidance.

The growth of INVNs, the adoption of stablecoins, and the emergence of CBDCs point to a very near future where commercial banks, and public and private enterprises, will need to be equipped to integrate with internet-

native payment rails. Commercial banks will be required to execute and manage payments on such networks both for their own institutional needs, and the needs of their clients. In speaking about commercial banks integrating with INVNs, Brian Brooks further stated "once they do that, the nature of banking will begin to change. While banking will always be the key on-ramp and key value-added service provider, they will not be the bottleneck of the transaction of financial services; instead they will be nodes on a network along with a lot of other nodes, many of which won't be banks. That will allow banks to focus on what they're best at, and what we really need them to do."

## Insights

- Prepare now: assess how your institution can integrate with internet-native payment networks, collaborate with other stakeholders, and increase knowledge and experience.
- Activate internal working groups and pilot projects to identify elements of your offering that could benefit from - or be disrupted by - internet-native payment networks.
- Learn, test, integrate, and collaborate with other stakeholders in the monetary, payments, financial, and market ecosystems.
- Determine how the client onboarding process could be impacted by the introduction of new financial technologies.
- Don't wait for your country's CBDC to be ready. Participate in its design, use case definition, and other aspects with your regional central bank. If a CBDC isn't on the roadmap, consider deploying your own stablecoin.
- You'll likely be integrating with more than one internet-native payment network; plan your architecture accordingly.

"While banking will always be the key on-ramp and key value-added service provider, they will not be the bottleneck of the transaction of financial services; instead they will be nodes on a network along with a lot of other nodes, many of which won't be banks. That will allow banks to focus on what they're best at, and what we really need them to do."

<sup>10</sup> [https://www.diem.com/en-us/association/#the\\_members](https://www.diem.com/en-us/association/#the_members)

<sup>11</sup> "Facebook CEO to Testify Before Financial Services Committee." U.S. House Committee on Financial Services, 9 Oct. 2019, [financialservices.house.gov/news/documentsingle.aspx?DocumentID=404479](https://financialservices.house.gov/news/documentsingle.aspx?DocumentID=404479)

<sup>12</sup> Browne, Ryan. "Facebook-Backed Crypto Project Diem Abandons Swiss License Application, Will Move to the U.S." CNBC, 13 May 2021, [www.cnbc.com/2021/05/12/facebook-backed-diem-is-moving-from-switzerland-to-the-us.html](https://www.cnbc.com/2021/05/12/facebook-backed-diem-is-moving-from-switzerland-to-the-us.html)

# How Bitt Can Help Your Institution

For over five years, Bitt has been engineering digital currency solutions for central banks and financial institutions that enable them to harness the power of digital currencies - both for their own organizations and for their customers. We are a financial software company that catalyzes the **transformation from traditional to digital currency systems**. Our solutions are critical for the **operationalization of CBDC and digital currencies** for all ecosystem participants. **The Bitt Digital Currency Management System (DCMS)** enables central banks to efficiently deploy a CBDC

of their own, while also enabling financial institutions to integrate with internet-native payment rails (CBDCs, stablecoins, and cryptocurrencies), manage their treasury operations, and provide powerful payment services to retail and enterprise clients. Working with international organizations like the OECD, World Economic Forum, ITU, Stanford University, and others, Bitt is at the forefront of digital currency solutions design, and is dedicated to providing clients with software solutions that will meet their current and future needs in this evolving space.

Bitt also offers a host of professional services to ensure clients are fully prepared for their journey into internet-native payment rails, including:

- Customer journey and use case workshops
- Technical integration plan and specification
- Customization plan and specification
- Operational training and support
- Go-to-market strategy, and more

For financial institutions seeking to integrate with stablecoins, issue their own stablecoin, or prepare for CBDC, Bitt provides the following software products:

- Digital Currency Operations Manager
- Digital Vault
- Minting Solution

Governments

Central Banks

DCMS by Bitt

Financial Institutions

Merchants

Consumers

For financial institutions seeking to offer stablecoin, crypto, and CBDC payments solutions to their existing clients, or new users, Bitt offers the following software products which can be branded per your institution's guidelines:

- Merchant Point-of-Sale App
- E-Commerce Plugin
- Enterprise Currency Operations Manager
- Mobile Wallet



**Simon Chantry**

Co-Founder & CIO



bittglobal



info@bitt.com



www.bitt.com

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