



CEDEFI FOR BANKS

MAKING SENSE OF A DECENTRALIZED WORLD

FOREWORD

Capgemini is pleased to present this report which offers a taxonomic reference model to familiarize banks with the definition of decentralized finance (DeFi). It aims to help centralized organizations adopt a pragmatic perspective to overcome what may be their instinctive reaction to consider decentralization as something scary and necessary to avoid.

Developed by Aite-Novarica Group, research findings also suggest initial steps a financial institution (FI) can take to preserve its centralized strategy and yet leverage the features and capabilities achievable with DeFi. A series of use cases help validate that a centralized bank can decentralize some of its functions and deliver elements of its portfolio more effectively without necessarily losing control, thus creating a new category—centralized/decentralized finance (CeDeFi).

As described within the report:

- Payments, Central bank digital currencies (CBDCs), Digital assets and tokens, Decentralized finance, Nonfungible tokens (NFTs) / Metaverse, and Web 3.0 are the elements of a robust DeFi taxonomy.
- Financial market infrastructure, Custody, Cross-border payments and Interoperability are a few examples of core portfolio capabilities that a bank can transform through CeDeFi.

We hope these insights will help guide you in your digital transformation journey.



Sudhir Pai

Chief Technology and Innovation Officer
Capgemini Financial Services



Nilesh Vaidya

Global Head of Banking and Capital Markets
Capgemini Financial Services

INTRODUCTION

Within a decentralized world, transactions are conducted peer to peer and intermediaries are replaced by smart contracts based on distributed ledger technology (DLT).¹ The decentralized construct is ideal for those who understand the potential of a blockchain-based financial supply chain and want to avoid inherent threats presented by the high volatility and speculative nature of the cryptocurrencies that often constitute the backbone of decentralized transactions.

Banks are entities with a naturally centralized structure, and so when presented with the prospect of decentralization, they become understandably concerned about disintermediation and a loss of control. However, the market is pushing for the greater flexibility that decentralized structures can offer; as a result, forward-looking FIs are preparing to close the centralized versus decentralized gap. Their first step is to accept that a fully centralized organization is not the only structure that can ensure regulatory compliance.

Banks that want to be at the forefront of innovation should actively shape the future of regulated markets by taking some of the interesting things happening in the decentralized world and finding ways to bridge them with centralized perspectives and practices. But the two worlds will not, and need not, converge in the foreseeable future.

“Taking part” in decentralization does not require fully embracing DLT-based solutions; there is no need for a bank to become a blockchain company. Rather, the question is how traditional centralized finance can coexist with decentralized finance and still interoperate effectively.

Effective discussion and decision-making require a common taxonomy and related terminology that allows everyone to speak the same language. Only with a clear understanding will bankers be in a position to determine the essentials of the DeFi value proposition appropriate for their institution, engage with the most appropriate FinTech partners, and decide together where to begin the appropriate CeDeFi journey.

Aite-Novarica Group research has identified areas within the world of decentralized solutions that overlap nicely with a bank’s centralized portfolio: payments, custody, financial market infrastructure, DeFi, and interoperability. From this list, the bank must create priorities and get organized internally to avoid the risk of not having the necessary awareness, preparation, and skill set to select and collaborate with a DeFi partner.



DEVELOPING A TAXONOMY FOR DEFI

In the last 18 months, Aite-Novarica Group advisors have seen significant market traction for DeFi among FIs. Even so, there is still significant confusion about the differences between digital assets, DLT, and DeFi. When these terms are brought up in conversations with business executives, many don't really engage because they don't know the subject or understand the related business implications.

Every component of the decentralized ecosystem must be seeded in a digitized environment. The more a bank works to modernize, digitize, automate, and create new experiences in its solutions portfolio, the more it becomes fertile and ready to grow innovative ideas such as open banking, sustainability, and quantum computing. As digitization evolved and specialized, the first decentralized bud sprouted: digital tokens. While still new, their effect on the financial supply chain can already be appreciated, considering how these decentralized items are starting to overlap with payment transactions. It started with bitcoin in 2009, which were soon followed by CBDCs and NFTs. Smart contracts are the engine underneath; they challenge more traditional players with the assertion that some parts of today's finance system structure could soon be replaced and kick off the digital transformation to decentralization.

Aite-Novarica Group suggests that using a taxonomy as a point of reference is the most effective way to prevent any loss in translation, and help all participants join and understand a conversation on decentralized financial solutions.

A taxonomy enables users to unpack the terms in a structured way and thoroughly explore the level of maturity of its components. Most importantly, a taxonomy allows users to evaluate potential impacts on a company's business. For example, there is continued press coverage on the metaverse and what it might mean for the future; but without a common understanding of the metaverse, any considerations on this innovation and which elements are more applicable than others would be useless.

These are intellectually challenging conversations that are not readily consumable from a bank's perspective. A taxonomy builds categories of items with consensus definitions, examples of use, business flows, industry relevance, and client context that can help bank executives to construct a point of view and decide how and when to launch pilot tests and proofs of concept.

A taxonomy on DeFi must refer to traditional banking products. Aite-Novarica Group anticipates that the separation between centralized and decentralized finance will not be all or nothing for the foreseeable future. No bank will decide to do nothing with DeFi or do everything with it — and nor should it. There will be several intermediate stages, each driven by specific business and technology decision factors.

To move from theory to practice, Aite-Novarica Group reviewed existing works from market players that could best suit the need for a taxonomy for decentralized finance. The elements of Capgemini's proposed taxonomy² are a good starting point.

Capgemini's proposed taxonomy for decentralized finance



Cryptocurrencies and Payments
Total market capitalization of Cryptocurrencies stood at just over US \$1 trillion as of June 2022



Decentralized Finance
The total value locked in DeFi fell to a little less than US \$80 billion in June 2022



CBDC
Nine out of 10 central banks are experimenting with digital versions of fiat currencies



NFTs and Metaverse
NFT market size is expected to grow at a CA GR of 35% from 2021 to 2026 to become a US \$200+ billion market by 2030



Digital Assets and Tokens
Tokenization of equity post-trading alone could result in gains of 4.6 billion euros by 2030



Web 3.0
Web 3.0 will necessitate a trustless system with borderless exchange powered by an always-on KYC

Source: Capgemini

Cryptocurrencies and payments

A cryptocurrency is a digital currency with a decentralized system that uses cryptography to verify transactions and maintain records. This digitized form of currency has become mainstream with bitcoins—a digital cash payment system meant to replace the fiat currency payment system.

Banks should not just watch this space, because cryptocurrencies are booming and generating models that are very different from their initial goal of transferring value without centralized third-party authentication.

Nor should banks rush to create new cryptocurrencies to increase adoption: inventing new forms of cryptocurrency does not add value to a bank's business. Still, the existence of thousands of cryptocurrencies suggests something significant is happening—certainly in the retail space.

The corporate world accepts that cryptocurrencies are a medium of exchange that has evolved for use in transactions in the form of crypto-investments, crypto-based trading services, and crypto-enabled digital payments and wallets. So, an FI decision maker must take action and do something before its bank loses business to someone else. A few options for decision-makers include setting up crypto-exchanges, typically "members only," starting with wealthy customers to capture investment opportunities. Many FIs have started to provide trusted custody services for crypto assets. Eventually, the goal is to introduce tokenized digital assets (e.g., bonds, sustainable tokens) for customers, over and above public crypto assets.

One interesting example of cryptocurrency is stablecoins. As the name implies, stablecoins are still crypto coins but with a feature that makes them the perfect fit for investment purposes: they are tied to the value of another asset and will hold the same value with that asset through time. The asset can be any commodity: a price index, a real asset, and even other crypto coins. However, to make their use scalable and appealing, they are mostly pegged to fiat currencies, such as the U.S. dollar or the euro. A stablecoin pegged to the U.S. dollar means that one unit of that cryptocurrency will always be equal to one U.S. dollar.

Market differentiation is the main reason organizations use cryptocurrency-based payments. An important aspect is the mechanics behind cryptocurrency, which allow a cryptocurrency to transfer value via cryptographic algorithms that run on a blockchain infrastructure. Intercompany payments, in-house banking, and cross-border payments are the areas of potential for crypto payments in the next few years.

Cryptocurrencies have garnered significant industry attention and investment dollars, but certain challenges must be addressed before institutional adoption can reach the next level. The lack of a standardized classification of cryptocurrencies, global regulatory uncertainty, and other trading-related issues pose serious impediments to the growth of this emerging asset class.

Central Bank Digital Currency

A CBDC is a tokenized representation of a nation's fiat currency. Unlike decentralized cryptocurrencies, CBDCs are issued, regulated, and controlled by a nation's central bank and backed by reserves of the national fiat currency. CBDCs are still in very early stages, mostly in sandbox and design phases. Some central banks have experimented with CBDCs and are in different stages of maturity.

CBDCs can be classified into retail, wholesale, or hybrid, with the decision on retail versus wholesale depending on country-specific needs. The need for retail CBDC is arising to increase financial inclusion and programmability features, such as automatic tax payments, and improve financial well-being.

Wholesale CBDCs mainly support efficiencies in financial market infrastructure, focusing on intra- and inter-bank transactions. T+1 settlement services are the need of the hour for the future of digital business.

There is a discussion in the U.S. about the real need for a retail CBDC. Yet, U.S. banks lead the correspondent banking area, so they might start considering executing transactions using the mechanics of digital tokens. In Southeast Asia, there may be a need for retail CBDC to support the distribution of direct government benefits and foster financial inclusion. Creating a CBDC is a multifaceted, complex endeavor that will not happen just because a central bank has to do it or wants to do it.

Digital assets and tokens

Digital tokens refer to the digital representation of a real asset (physical or nonphysical) on a distributed ledger. The market is experiencing the convergence of real-world tangible assets with the virtual equivalent of blockchain-based digital tokens. This convergence gives rise to a decentralized token economy. Banks are focusing on nonbankable assets and are exploring ways to increase customer loyalty by tokenizing assets, using digital asset exchanges, and providing custody for these assets in cryptographically protected digital wallets.

A CBDC is a prime example of a digital token. It is a digital object with a given value expressed in a national currency and is a claim on the respective central bank.³ Its use can be quite appealing to banks, as a CBDC can take the form of a cash-like (i.e., account-based) CBDC versus a deposit-like (i.e., token-based) CBDC. In the latter instance, the token serves as an interest-generating instrument for deposits, requiring banks to establish new rules of engagement for all lending dynamics, including examining capital and liquidity, and how to treat deposited interest.

Digital assets are an appealing proposition for treasury operations, too, as innovative vehicles for trade payables and receivables finance, inventory finance, carbon credits, and sustainability-linked finance.

Decentralized finance

DeFi refers to a financial system built on a public decentralized blockchain network that lets users interact and transact in a peer-to-peer fashion without an intermediary. Transactions are carried out using decentralized peer-to-peer applications and executed through smart contracts. Verifiable credentials combine the trust and immutability of cryptography with physical/digital credentials to decentralize digital identity; these factors play a major role in accelerating the institutional adoption of DeFi.

DeFi creates a composable, borderless, transparent, and trusted financial system that can operate without any central authority. This scenario can appeal to multiple parties or external entities coming together: an example would be a bank running treasury operations with its remote entities to access a pool of funds and clearing transactions. That pool could be reduced once all parties can manage its transparency. Or as another example, running trade finance on DeFi could enable the bank to utilize the network and optimize its supply chain financing operations, thanks to a better view across the different supply chain constituents.

The DeFi market is still relatively small compared to the overall size of traditional financial markets, but its connections with centralized finance (CeFi) are increasing because of an overlapping investor base. It might be tempting to dismiss the role of traditional financial service providers in the DeFi world, but centralized exchanges could play an effective role in governing DeFi and enabling an ecosystem where DeFi and CeFi can coexist.

Nonfungible tokens and metaverse

NFTs are unique digital identifiers that cannot be copied, substituted, or subdivided. An NFT is recorded in a blockchain to certify authenticity and ownership. NFTs are attractive digital assets because their ownership, recorded in a blockchain, can be transferred by the owner, allowing the NFT to be sold and traded in a peer-to-peer fashion like any other blockchain-based digital asset.

Several marketplaces to trade NFTs have emerged in recent years. These marketplaces are exchanging NFTs outside the world of finance: digital art, music space, collectibles, and photographic legacy. NFTs open up traditionally illiquid markets and create a new platform for ownership and exchange, but it is yet to be seen how financial services firms might move into this space. The metaverse offers one possible opportunity.

The metaverse can be defined as a simulated digital environment that mimics the real world using augmented reality, virtual reality, and blockchain to create spaces for immersive user interaction. The metaverse requires new technologies to create the digital twin of a person to simulate real-world presence, which raises concerns about data privacy, security, diversity, and ethical behavior.

Case study: The NICE project ⁴

The Monetary Authority of Singapore (MAS), in collaboration with international partners, launched a global challenge in 2021 to identify innovative solutions that realize the potential of a retail CBDC without making significant compromises to other principles, including security, privacy, financial inclusion, efficient cross-border flow of funds with stringent safeguards, speed, and finality.

ANZ Bank partnered with Capgemini to present the National Integrated CBDC Ecosystem (NICE) pilot to prove how a retail CBDC can be designed and distributed using existing national digital infrastructure and a two-tier monetary system .

United States Code digital guidelines have emerged⁵ to confirm identity and distributed identity. Banks and insurance firms are wondering how the metaverse will comply with these rules on data protection, identity, and Know Your Customer (KYC) risk.

The metaverse could open up a new economy where wealth could be created, traded, and enhanced using currencies distinct from but related to the real world. The metaverse may be the domain in which NFTs find their own space.

Web 3.0

There are several signs that a new generation of DLT is emerging: decentralized applications (dApps); protocols that focus on scalability, security, interoperability, and sustainability; decentralized payments and lending; and new revenue models, such as staking pools and yield farming. And when an entirely new internet stack is being built, with seamless execution of smart contracts and dApps, Web 3.0 has given rise to alternative FIs, referred to as decentralized autonomous organizations, that can run several banking functions, including lending and deposits, without intermediaries.

The advent of Web 3.0 and the proliferation of the metaverse will further accelerate the adoption of digital assets for transactions, including CBDCs, cryptocurrencies, NFTs, and other tokens. Web 3.0 will play a key role in accelerating the decentralization of the financial services industry and the convergence of CeFi and DeFi. Web 3.0 is set to make its influence felt in financial services areas such as capital markets, asset management, consumer banking, and insurance.

WHERE TO BEGIN

Moving from the nontrivial premise that not everything must become decentralized, banks want to know what to do next—to move from the terms and definitions the taxonomy offers, to the capabilities and opportunities of decentralization that an FI can apply to the different elements of its portfolio. One immediate question is which items to prioritize based on their relative level of maturity. This next section of our report offers a view of several foundational capabilities that can be built using a decentralized approach that a centralized organization can transition to and benefit from.

The taxonomy is the starting point for the journey to CeDeFi, considering that things will evolve across multiple dimensions — tokens, technology, new blockchain protocols, and new ways of sharing information and value. Advancements will continue to happen, and the taxonomy is the most appropriate decision-support tool a centralized organization can use to build capabilities and move toward decentralization.

If banks don't want to lose their way on their journey to CeDeFi, they need a compass that always directs them to shape the regulated industry into the DeFi context without creating another silo of regulated markets. This potential risk is apparent from countries launching particular CBDC designs or commercial banks launching cryptocurrencies, where first movers are already creating their own silos. More intermediation is required as more silos are created; More intermediation requires more centralized control, and the circle is closed.

The core capabilities below are the milestones along the way to CeDeFi.

Payments

Payments represent the first area that banks address when they want to reduce costs or increase sources of revenue. DLT-based tokens provide the perfect solution to streamline transactions, execute peer-to-peer exchange of value, and remove unnecessary friction from intermediaries.

Stablecoins and CBDCs represent the first CeDeFi test cases for payments: these DLT-based tokens build a mix of functional capabilities and the ability to work on existing payment rails. For example, the MAS has ensured that CBDC-based payment transfers get converted into fiat and then work with the existing commercial banks on ordinary rails to settle those payments.⁶ Payments based on CBDCs (or alternatively, on stablecoins) can connect to the last mile with existing central payment and clearing systems because both can run on the existing rails.

The one thing necessary to ensure token-based payments become a mainstream CeDeFi instrument is that network and data exchange standards are harmonized so banks can interoperate.

The next milestone is to create interoperability that prevents banks from losing their way in the regulated markets.

Interoperability

When banks execute intrabank or interbank settlements following a DLT-based payment, that settlement must happen in the banks' respective core systems. Multichain interoperability allows numerous institutions worldwide to operate together, each from its own and often proprietary blockchain protocol, and interlink in a common environment. Ensuring interoperability between decentralized and centralized finance is a technical challenge that requires significant engineering. The objective is to enable FIs to transact with multiple blockchains, monitor those chains, and manage valid transactions across them.

Interoperability is the next step toward CeDeFi, as it connects distributed ledgers with bank account ledgers, some of which may be part of a cloud architecture. For example, JPMorgan partnered with Visa to streamline global payments using their respective private blockchain networks, Liink and B2B Connect.⁷

Interoperability also allows central banks to exchange their respective CBDCs, extending their reach to international cross-border payments. In 2020 the Banque de France tested applications designed to explore new ways of exchanging financial instruments for central bank money and settling in central bank digital currency to improve the executing conditions for cross-border payments.⁸ DLT tokens, such as a CBDC, can be programmed for government payments to reach the exact beneficiary. Tax payments could be processed directly at the point of use: one would pay for a coffee bill, with part of the payment going directly to the government tax department account.

Interoperability in the new CeDeFi world makes it possible for banks to transfer value instantly through dedicated smart contracts. In a traditional, centralized environment, the automatic process halts if one bank tries to issue a currency using two decimal points while the other's bank currency has only one decimal point. A smart contract can resolve the situation, ensure smooth execution of the exchange, and, if needed, still convert in fiat the final settlement. Banks may also consider partnering with players that run a smart contract factory. Banks and their FinTech partners have built APIs; it will not be surprising to see partnerships that build portfolios of smart contracts.

Stablecoins, CBDCs, and smart contracts can run and be exchanged on interoperable centralized/decentralized networks. The possibility that banks could drive the execution of the transactions back to the regulated (i.e., centralized) rails whenever needed decreases the perceived risk of cryptocurrencies allows banks to continue to explore them as another component of the CeDeFi strategy.

Case study: Interoperability for cross-border CBDC⁹

In a recent pilot, SWIFT and Capgemini achieved CBDC-to-CBDC transactions between different distributed ledger technology networks, as well as fiat-to-CBDC flows between these networks and a real-time gross settlement system.

The experiment showed that the blockchain networks could be interlinked for cross-border payments through a single gateway, using SWIFT's new transaction management capabilities to orchestrate all inter-network communication.

Cryptocurrency

Banks and capital markets players are considering the strategic relevance of covering a market powered increasingly by cryptocurrencies. They can assist customers in selecting the right cryptocurrencies to invest in, explore cryptocurrency trading services, offer crypto-enabled digital payments and transactions, and manage cryptowallets.

Aite-Novarica Group anticipates that the foundational element of blockchain—securing trustless peer-to-peer transactions—will allow banks to service multiple parties whose main concern is to build a trusted relationship with their counterparts. Once FIs and their FinTech partners can interoperate using their respective blockchain protocols, they can offer services for digital identity in a federated way—providing real assurance to all parties that that identity is properly managed, and that data is secure on top of a trusted data exchange network. CeDeFi utilities for KYC, with information stored in one place by various parties and accessible based on user permission, is a first use case for banks that want to turn CeDeFi into business practice and move away from a siloed approach while still controlling the execution from their “control towers.”

The mechanics that run cryptocurrency exchanges are also instrumental in operating the category of crypto assets that represent an investable asset class worthy of institutional participation. The crypto asset market continues to march forward.

While still dominated by crypto-native players, the interest of traditional banks has gradually increased, driven by growing demand from their private wealth clients and corporate treasury offices to access and invest in digital assets. Traditional institutional players know that crypto assets are not an aberration or a fad but very much part of the changing economic and digital landscape. Commodity trading advisors and macro hedge funds gradually entering the market are also becoming interested.

Despite the numerous benefits of cryptocurrencies in multiple areas of the payment and asset management value chain, their volatility remains a key challenge. Stablecoins and CBDCs help set the standards needed to bypass this roadblock to CeDeFi.

Custody

Buy-side and sell-side parties are interested in investment options, and crypto assets represent opportunities that asset managers and investors are starting to include in their portfolios. Irrespective of the assets to transact, their custody is the common denominator and a key service provided by specialized institutions. Vendors and service providers have designed platforms to help market participants navigate the crypto-asset trading landscape and achieve better trade execution.

Various crypto-native custodial and prime brokerage services have also emerged to provide much needed market infrastructure to entice institutional participation.

This is one of the core areas where banks may find support in CeDeFi—custody platforms built with a user interface layer, an authorization layer, and an asset orchestration layer for peer-to-peer trade executions, all interoperable with managed security through private-public cryptographic keys.

Financial Market Infrastructure

Transaction banks, treasury managers, institutional asset managers, and investors attracted by appealing CeDeFi solutions must be prepared to redefine the constructs of nostro/vostro accounts, and create parallel accounting structures, new liquidity pools, and new financial exchange (FX) markets for cross-border payments that deal with cryptocurrencies and assets. Managing the growing influence of cryptocurrencies requires new design and business models for innovation in financial market infrastructure.

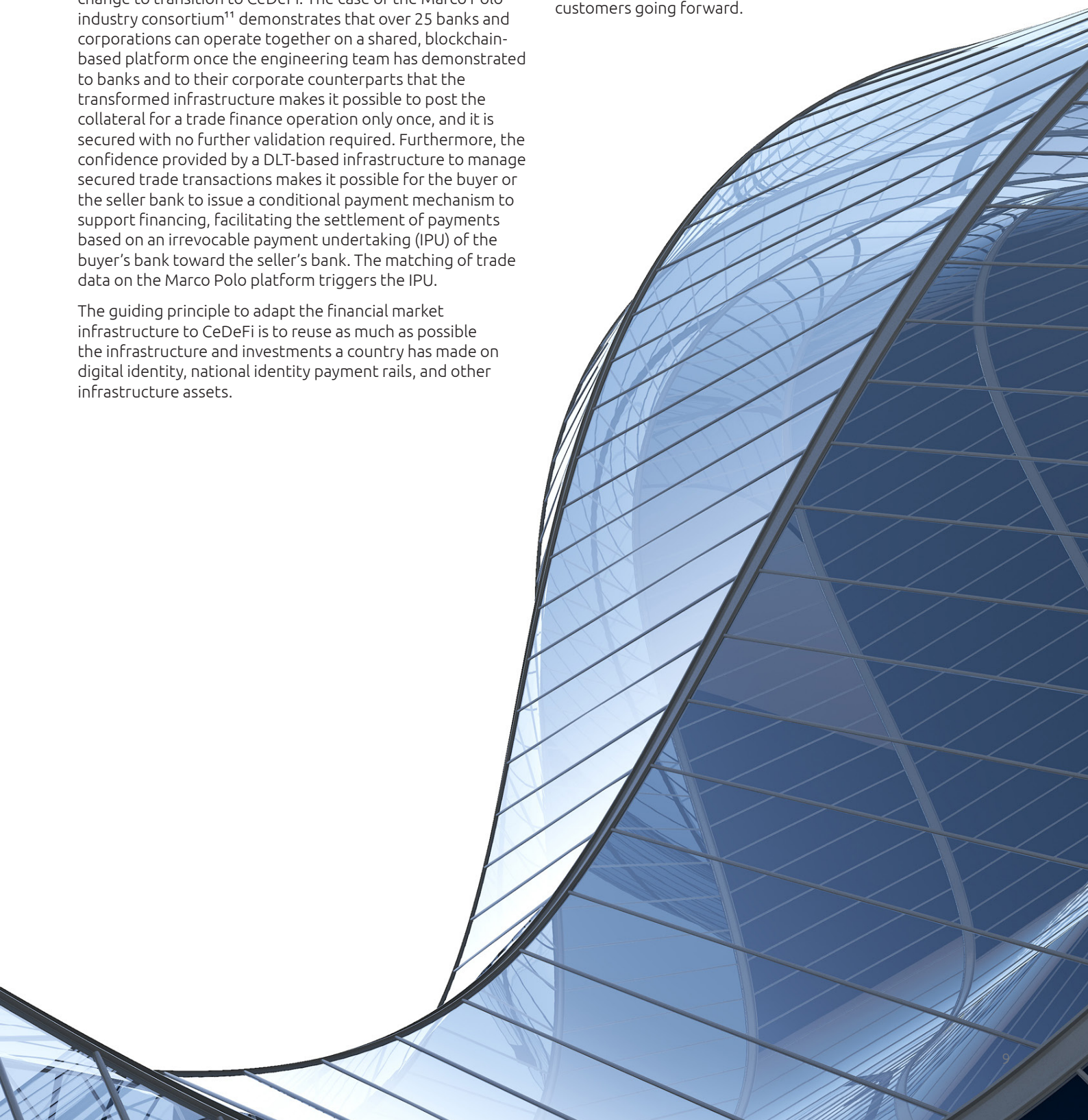
Real use cases confirm that clearing and settlement have already been transferred into the CeDeFi world,¹⁰ thanks to their natively digitized structure and established digital trading platforms. The result is a very important part of the success and a testament to the importance of designing a new currency (or a new stablecoin) that can be subsequently accessed using the correspondent liquidity on the back of it. The design must also cater to the authorization entity,

which takes the responsibility in case that currency is lost, to the regulated liability on commercial banks and tokenized deposits. Authorization and regulatory activities anticipate that significant effort must be dedicated outside the pure technology remit.

Distributed trade finance platforms offer another good example of how the financial market infrastructure must change to transition to CeDeFi. The case of the Marco Polo industry consortium¹¹ demonstrates that over 25 banks and corporations can operate together on a shared, blockchain-based platform once the engineering team has demonstrated to banks and to their corporate counterparts that the transformed infrastructure makes it possible to post the collateral for a trade finance operation only once, and it is secured with no further validation required. Furthermore, the confidence provided by a DLT-based infrastructure to manage secured trade transactions makes it possible for the buyer or the seller bank to issue a conditional payment mechanism to support financing, facilitating the settlement of payments based on an irrevocable payment undertaking (IPU) of the buyer's bank toward the seller's bank. The matching of trade data on the Marco Polo platform triggers the IPU.

The guiding principle to adapt the financial market infrastructure to CeDeFi is to reuse as much as possible the infrastructure and investments a country has made on digital identity, national identity payment rails, and other infrastructure assets.

The appearance of a CBDC doesn't require throwing everything out and starting anew with blockchain and other disruptive technologies. By leveraging the national infrastructure, it is possible to use the same monetary system where the central bank issues the currency, the commercial banks and third-party providers keep forming the integration layer, and all parties commonly agree on how they can best use a two-tiered CeDeFi model to attract and service their customers going forward.



HOW BANKS CAN DO IT

Each FI wants to know where it can play in the CeDeFi value chain, which use cases to deploy with the help of blockchain, and how to extend its existing business model to DLT to offer new products and services. Another facet of the decision-making is whether to adopt a greenfield strategy or to partner with existing players in the decentralized space. Deutsche Börse and Commerzbank suggest that the second option is the most conducive to immediate results. Both institutions entered a strategic partnership with the FinTech player 360X to develop new blockchain-based digital marketplaces and ecosystems for existing real, physical asset classes (e.g., art, real estate).¹²

Banks can also find candidate companions for their the CeDeFi journey among consulting firms with history in the existing centralized market and which demonstrate the ability to solve new problems by orchestrating process reengineering, solution design, breadth of delivery capability, and technical implementation skills. Aite-Novarica Group recommends that FIs prioritize a consulting firm's industry focus as a key evaluation criterion for partnership.

Reliable partners must help a bank look at distributed ledgers as a technology to prepare for. The FI may not be ready to enter the DeFi market and create a new business. Yet, it must aim to constitute a small group coached by a partner who understands this technology, prepares a few pilots to run, and builds the basic awareness and technology skills to accompany the FI to the next level. The CeDeFi foundation is then established and ready to solve some of the problems in the overlapping centralized/decentralized domains while spotting the practical, revenue-generating (or cost-reduction) areas.

The next step is to plan for and eventually launch new business models that the DLT-based technologies make possible. One example is the JPMorgan Coin (JPMC). Despite the name, JPMC is not a crypto coin; it is a permissioned system that serves as a payment rail and deposit account ledger, allowing participating JPMorgan clients to transfer U.S. dollars held on deposit with JPMorgan within the system, facilitating the movement of liquidity funding and payments in real time. Where current infrastructure proves inadequate, coin systems technology solutions leveraged for JPMC can support advanced payment types, such as delivery-versus-payment, payment-versus-payment, and machine-to-machine payments. This technology can help solve common hurdles of traditional cross-border payments. Using JPMC for variable payments, JPMorgan is developing an infrastructure that has not existed before.

Suggested supporting tools

Aite-Novarica Group research finds that banks that are advanced in their approach to CeDeFi are seeking partners that share practices and tools for innovation, and are constantly tracking the players, the technologies, the upcoming news, and anything that helps FIs stay ahead of the

curve. Good partners will also help banks to prepare for expected changes and to step back from no longer applicable items. Each bank must create a CeDeFi focus group that helps the institution's executive management to forecast the areas of attention (and of defocus) for the upcoming quarters and years. Such attention must be continual, preferably on a rolling quarterly basis, to stay ahead and better manage investments and resources. The focus group must monitor FinTech vendors, keep them continually engaged, understand the people and technology behind their products, and find the best way to add and utilize them in the bank's solutions portfolio.

Aite-Novarica Group suggests a layered approach for DLT protocol partnerships. The first layer is the foundation layer that operates on the chosen blockchain protocol(s). The second layer consists of industry-specific protocols (e.g., Corda, Quorum). The third is a partners layer; the partners must have used these protocols previously to build ad hoc solutions (e.g., custody). This method ensures that players become well-informed and aware of the strategic relevance of open protocols.

Players once wanted protocols to be specific to a regulated industry, but now they want open protocols, because the openness is similar to that of experience with the cloud. When the cloud first started, everyone wanted to build their own private cloud. Soon, however, use of a public cloud became the accepted and normal solution across the industry. When the cloud started, everybody tried to do private cloud. Soon, however, the public cloud became the de facto.

Aite-Novarica Group recommends that CeDeFi focus groups engage regularly in the following:

- Market research on DLT progress and innovation
- Content creation on industry-specific use cases, concepts, technologies, and vendorsOperational resilience, regulatory mandate, and hybrid working environments
- Regular updates of the research database
- Knowledge sharing

And in short, a bank moving toward CeDeFi must operate along the following dimensions:

- Pure DLT technology
- Consulting suppliers or software vendors for supporting services and applications
- Use cases specific to targeted industry verticals

At the time of publication of this report, three sectors appear most promising for CeDeFi: financial services, healthcare, and retail for consumer packaged goods.

CONCLUSION

The Aite-Novarica Group recommends a series of tangible steps for banks and solutions providers to follow as they embark on a CeDeFi journey. These actions will help the players with successful implementation of CeDeFi innovation within previously wholly centralized enterprises.

For banks:

- Adopt a taxonomy reference model of decentralized solution definitions and take a pragmatic perspective to overcome the instinctive reaction to reject decentralization
- Look for partners with deep experience in the existing centralized market that also demonstrate the ability to solve new problems by orchestrating process reengineering, effective solution design, breadth of delivery capability, and technical implementation skills
- Create a CeDeFi focus group that helps the institution's executive management to prioritize areas of attention
- Manage the growing influence of cryptocurrencies by developing new design and business models for innovation in the financial market infrastructure
- Reuse existing infrastructure and investments as much as possible.

For solution providers:

- Use a taxonomy as a reference point to prevent any loss in translation and engage clients in conversations on decentralized financial solutions
- Be a good companion to banks along the CeDeFi journey by sharing practices and tools for innovation, and constantly tracking the players, the technologies, the upcoming news, and anything that helps FIs stay ahead of the curve
- Understand solutions for decentralized technology, prepare pilots to run, and help partner banks build the basic technology skills.

Sources

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Aite-Novarica Group is an advisory firm providing mission-critical insights on technology, regulations, strategy, and operations to hundreds of banks, insurers, payments providers, and investment firms - as well as the technology and service providers that support them. Comprising former senior technology, strategy, and operations executives as well as experienced researchers and consultants, our experts provide actionable advice to our client base, leveraging deep insights developed via our extensive network of clients and other industry contacts.

CONTACTS

Research and consulting services

Aite-Novarica Group Sales

+1.617.338.6050

sales@aite-novarica.com

Press and conference inquiries

Aite-Novarica Group PR

+1.617.398.5048

pr@aite-novarica.com

For all other inquiries, contact

info@aite-novarica.com

Global Headquarters

280 Summer Street, 6th Floor

Boston, MA 02210

www.aite-novarica.com

AUTHOR

Enrico Camerinelli

+39.335.52.96.042

ecamerinelli@aite-novarica.com

Capgemini experts

CONTACTS

Muhammed Ahmed

Lead - Emerging Tech, CTIO Office Financial Services SBU
muhammed.ahmed@capgemini.com

Sunder Raghavan

Lead - Innovation, CTIO Office Financial Services SBU
sunder-raghavan.balasubramanian@capgemini.com

CONTRIBUTORS AND SMES

Sudhir Pai

CTIO, Financial Services SBU
sudhir.pai@capgemini.com

Nilesh Vaidya

Head - Retail Banking & Wealth Management
nilesh.vaidya@capgemini.com

Sankar Krishnan

Head - Digital Assets & Fintech
sankar.krishnan@capgemini.com

Rishabh Shah

Product Head - Open Banking & DeFi
rishabh.shah@capgemini.com

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