



# Central Bank Payments News

## Transforming Payments for the Real World: Industry Insights in 2024

A CBPN Special Supplement





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## FOREWORD from CBPN Editor in Chief Brianna Erban



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Welcome to the third annual Central Bank Payments News supplement! This insightful collection features perspectives from six leading players in the global payments ecosystem who are working closely with central banks to spark genuine transformation in payments.

Through strategic partnerships and collaboration, central banks are increasingly harnessing the strengths and ingenuity of private sector innovators. These efforts are helping to enhance the efficiency, security, and accessibility of payment systems, while also tapping into new avenues for digital transformation and financial inclusion. Guided by the theme Transforming Payments for the Real World, the contributions in this year's edition showcase a range of timely use cases and creative solutions for central banks from **Crunchfish** (Sweden), **EMTECH** (USA), **ProgressSoft Corporation** (Jordan), **RTGS.global** (UK), **Unifits** (Germany), and **Visa** (USA).

We invite you to explore this snapshot of how the payments industry is actively working together to find fresh answers to new and existing challenges, with valuable analysis on topics ranging from privacy considerations in CBDC, the need for regulatory innovation, and cross-border payments disruption in emerging markets to fostering innovative CBDC use cases and meeting the needs of end users to solve real-world problems.

The CBPN team extends much gratitude to our industry supporters for these contributions and, moreover, for their ongoing commitment to innovating for the benefit of payment users worldwide. We hope the insights presented here will inform and inspire readers, and help drive meaningful dialogue and further transformation in the global payments industry.

Warm regards,  
Brianna Erban

Editor in Chief  
Central Bank Payments News



## Privacy Considerations in CBDC Systems

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The choice of security protocol is a highly relevant design choice that will impact the privacy features of the offline payment system.

*By Joachim Samuelsson, CEO,  
Crunchfish*

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Privacy is an area that has not been explored deeply for CBDC systems, yet it is key for public adoption of digital currencies. In this article, Crunchfish CEO Joachim Samuelsson outlines practical considerations for how privacy may be implemented in CBDC systems and presents an innovation that balances the public's need for privacy with regulatory requirements for transactional traceability.<sup>1</sup>

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<sup>1</sup> This article is a revised version of the whitepaper Privacy Considerations in the series Enabling Offline Payments in an Online World by Lipis Advisors, sponsored by Crunchfish. [https://www.crunchfish.com/wp-content/uploads/2023/05/Lipis\\_WP3\\_Crunchfish\\_Enabling-offline-payments\\_FINAL.pdf](https://www.crunchfish.com/wp-content/uploads/2023/05/Lipis_WP3_Crunchfish_Enabling-offline-payments_FINAL.pdf)

Increased payments digitalization has undoubtedly had numerous benefits for millions of people across the world. The adoption of faster and more convenient digital payment services (e.g., mobile wallets, real-time payments) has unlocked new economic opportunities and served as an engine for financial innovation in many societies. At the same time, it has led to the gradual displacement of cash, the most anonymous form of payment that exists today.

Cash is not only preferred by criminals; individuals may have a legitimate need for greater anonymity around the types of transactions they make given their personal situation or because they lack the typical documentation required to use other types of digital payment methods.<sup>2</sup>

This raises numerous questions regarding how to best safeguard user privacy in a world that is increasingly digitalized. The demand for alternative digital payment instruments with cash-like privacy features is one of the most compelling reasons for the development of central bank digital currencies (CBDCs). In a public consultation that the European Central Bank carried out in April 2021, a plurality of respondents considered “transaction confidentiality” to be the most important parameter in the design of the digital euro.<sup>3</sup>

Enhancing the privacy features of existing payment methods, such as real-time payments, also has numerous advantages. For example, it can help prevent the unauthorized use of consumer data in the event of a cyber-attack or data breach and can help mitigate the commercial exploitation of data without user consent. This is important as many studies have shown that privacy concerns can have a significant impact on users’ willingness to use or adopt digital payment methods or services.<sup>4</sup>

**“ Offline functionality can offer some enhanced privacy benefits depending on the type of implementation, but must also be balanced against other needs.**

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<sup>2</sup> <https://www.bankofcanada.ca/2023/02/staff-analytical-note-2023-2/>

<sup>3</sup> [https://www.ecb.europa.eu/pub/pdf/other/Eurosystem\\_report\\_on\\_the\\_public\\_consultation\\_on\\_a\\_digital\\_euro~539fa8cd8d.en.pdf](https://www.ecb.europa.eu/pub/pdf/other/Eurosystem_report_on_the_public_consultation_on_a_digital_euro~539fa8cd8d.en.pdf)

<sup>4</sup> <https://ieeexplore.ieee.org/abstract/document/6339927>

Over recent years, both the private and public sectors have responded to increased digitalization with new tools and strategies for safeguarding user privacy. Encryption and tokenization have become important tools for protecting user data; they serve the function of securing data that is transmitted during payment processing, thereby making it less vulnerable to criminal or commercial exploitation in the event of a cyber-attack or data breach. Tokenization has become very popular in the cards space, where tokens (a unique string of numbers or characters) are used to substitute the cardholder's Primary Account Number (PAN).<sup>5</sup>

Services such as Apple Pay, Samsung Pay, and Google Pay, etc., use tokenization for online and (contactless) in-store transactions. The fact that the PAN is not transmitted during the transaction reduces the risk that criminals, merchants, and/ or other third parties will be able to successfully exploit sensitive data if it is hacked or stolen. Using encryption during payment processing offers the same types of benefits, though the data transformation that occurs is reversible using a corresponding encryption key.<sup>6</sup>

Alongside the adoption of these technologies, the development of data privacy legislation aimed at strengthening legal protections for individuals has emerged across the globe. According to UNCTAD, 137 out of 194 countries tracked have legislation in place aimed at protecting user data.<sup>7</sup> Examples include the General Data Protection Regulation (GDPR) in the EU, Lei Geral de Proteção de Dados (LGPD) in Brazil, and Thailand's Personal Data Protection Act (PDPA), to name a few. These types of legislative initiatives are another important tool in mitigating against criminal and commercial exploitation of user data and ultimately ensuring trust and adoption of digital payments.

While the use of tokenization and encryption combined with better legal protections for consumers can help increase the security of user data in the hands of merchants, their benefits are limited to certain types of payments and use cases. For CBDCs, however, it is important to have anonymity in relation to the payment providers (e.g., system operator, intermediaries such as banks and payment service providers) as well. This underscores the need for new tools and solutions for enhancing the privacy options of existing payment instruments through innovations such as offline payments.

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<sup>5</sup> <https://www.pwc.in/industries/financial-services/fintech/dp/tokenization.html>

<sup>6</sup> <https://csrc.nist.gov/glossary/term/encryption>

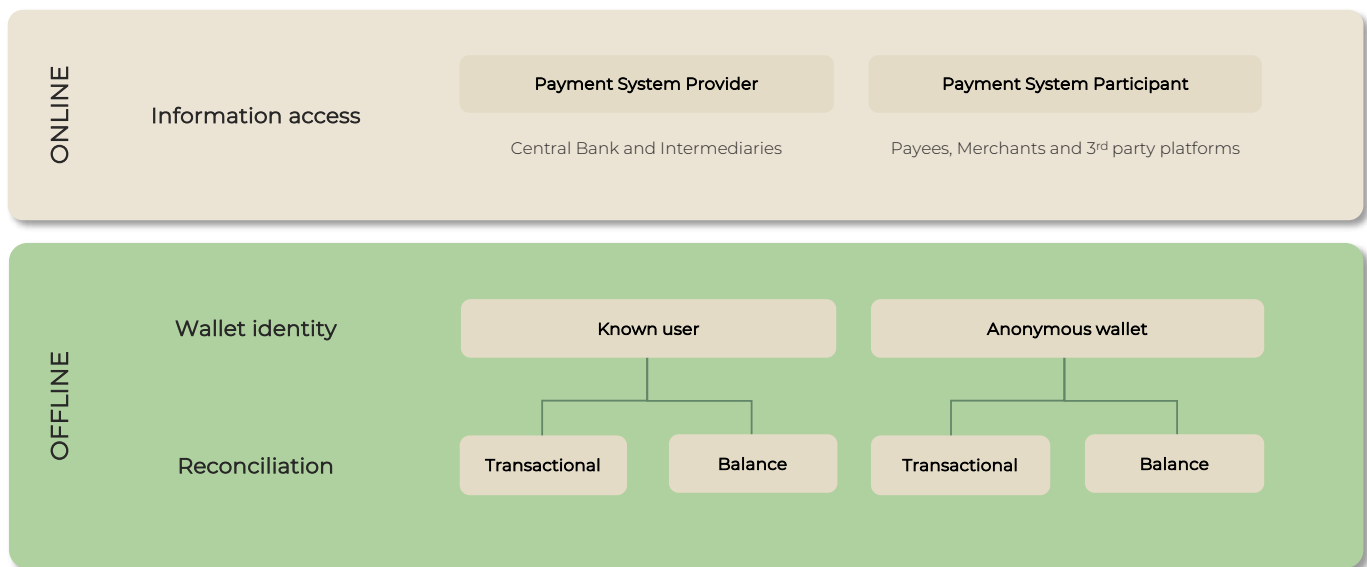
<sup>7</sup> <https://unctad.org/page/data-protection-and-privacy-legislation-worldwide>



# Offline Functionality as a Privacy-Enhancing Tool



There are various options available to system operators, central banks, and regulators regarding the privacy features of offline payment systems. They may differ according to who has access to the information, whether the identity of the wallet holder is known, and what kind of data is reconciled with the online ledger. For example, do providers (system operator, payment service provider, etc.) and/or participants (merchants, beneficiary, and other third parties privy to a transaction) have access to the information? Is the identity of the wallet holder anonymous or is KYC required? What type of data is shared with the online ledger, i.e., transaction data vs. balance adjustments? These considerations are summarized in the visual below.

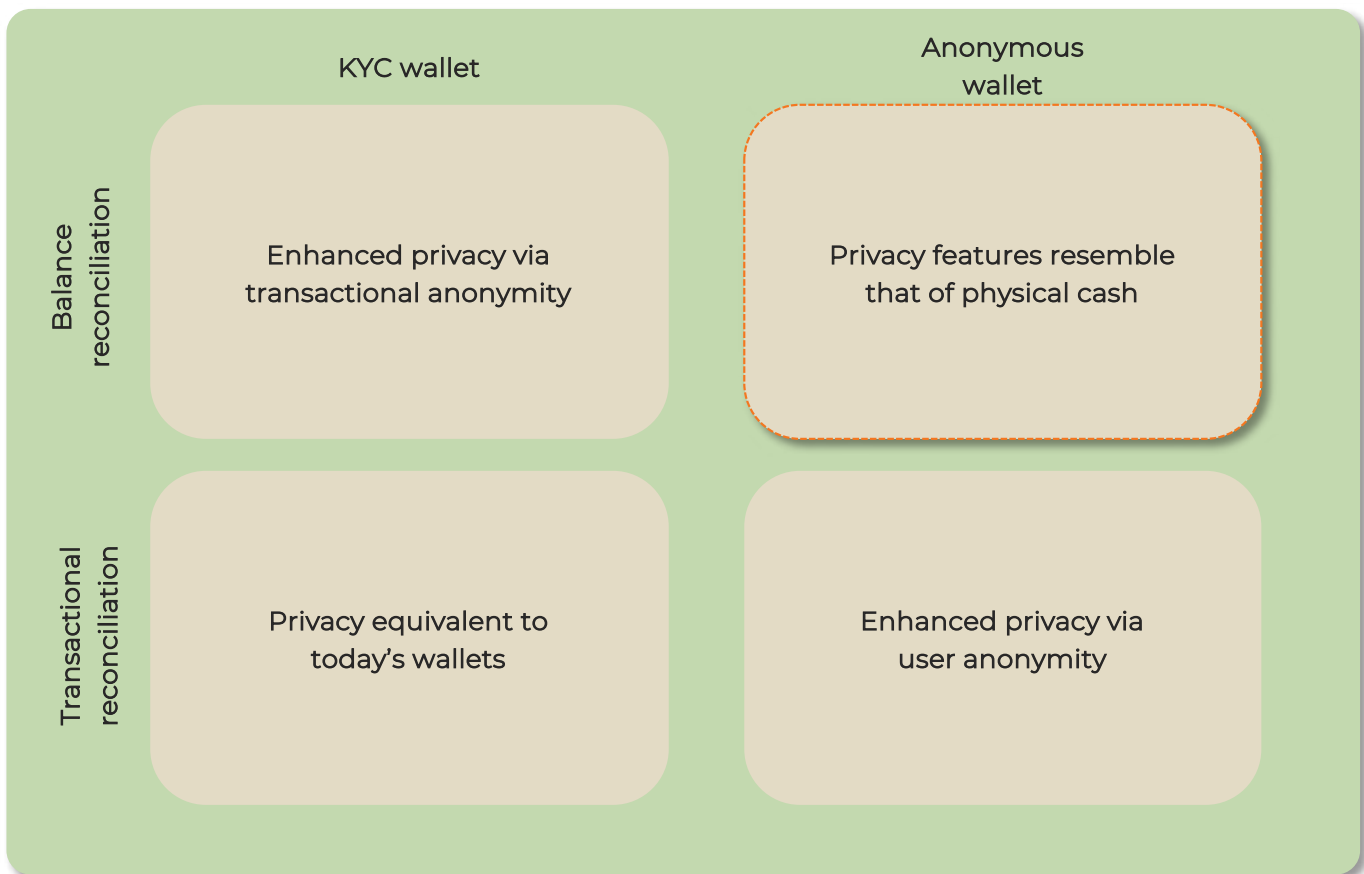


*Privacy considerations for offline payment system design*

With transactional reconciliation, offline transaction data is fully shared with the system operator once connectivity with the online ledger occurs. Even though the transaction data is shared fully with the system operator, the time delay between when the offline transaction occurs and when it is shared with the system operator offers some additional privacy for the transaction.

In contrast, balance reconciliation is where offline transaction data is kept off the shared online ledger, though adjustments to balances would be reflected once reconciliation with the online ledger occurs. This therefore offers greater privacy with respect to the transaction data but still a degree of transparency for the system operator.

The 2x2 matrix below shows how the privacy features of different offline payment implementations can offer different levels of privacy depending on the choice of wallet design and the nature of reconciliation with the online ledger.



*Privacy features of different offline implementations*

It should be noted that there is also the possibility of no reconciliation with the online ledger for each of the previous cases. In a fully offline model, neither offline transaction data nor adjustments to balances are reconciled with the online ledger or a third party. This would allow for completely anonymous payments, with cash-like user privacy. However, fully anonymous offline payments would pose numerous challenges from a compliance perspective, as even CBDCs would still need to comply with existing KYC/AML regulations. This could potentially be mitigated through the introduction of third-party service providers that could offer funding and defunding services for offline CBDC wallets. Such a model could enable greater anonymity for the user and their transactions.

# Design Considerations for Enhancing the Privacy of Offline Payment Systems



Our analysis in the previous section illustrates the unique and novel aspects of using offline functionality to enable privacy. Specifically, it can enable a model through which the system operator or payment service provider has a more limited ability to observe users' transactional data. This can be done by restricting the type of data that is shared with the online ledger at the time of reconciliation to include only balance adjustments rather than transaction-level data. However, from the perspective of the system operator, achieving greater levels of privacy for offline payments inevitably results in trade-offs, such as greater operational complexity and higher costs resulting from the increased amount of data that must be secured.<sup>8</sup> This underscores the need for smart design choices that maximize efficiency and scalability.

There are a range of design choices that can support the various privacy implementations available for offline payments. In the first two white papers in the series *Enabling Offline Payments in an Online World*,<sup>9</sup> the three most relevant aspects of offline payment system design were outlined: the online payment rail (account-based or token-based), security protocol (native layer-1 or non-native layer-2), and trusted environment (hardware or software-based). In this section, how the choice of security protocol can impact the privacy features of offline payments is discussed.

The purpose of the offline security protocol is to preserve the integrity of the payer as well as the offline payment data to prevent double-spending and protect sensitive data.<sup>10</sup> A native layer-1 security protocol for offline payment systems is defined as one that uses the same security protocol as the underlying online payment rail; in contrast, a native layer-2 security protocol uses as a separate scheme from the online rail.

The choice of security protocol is a highly relevant design choice that will impact the privacy features of the offline payment system. In building an offline payment system designed to complement an account-based online rail, for example, a layer-1 offline protocol may limit privacy from the system operator as offline transactions would be subjected to the same degree of transparency as the online transactions.

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<sup>8</sup> <https://www.bankofcanada.ca/2020/06/staff-analytical-note-2020-9/#:~:text=Privacy%20in%20a%20CBCDC%20goes.requires%20consultation%20with%20external%20parties>

<sup>9</sup> <https://www.crunchfish.com/offline-payments-online-world/>

<sup>10</sup> [https://www.crunchfish.com/wp-content/uploads/2023/03/Lipis\\_WP2\\_Crunchfish\\_Enabling-offline-payments\\_FINAL\\_.pdf](https://www.crunchfish.com/wp-content/uploads/2023/03/Lipis_WP2_Crunchfish_Enabling-offline-payments_FINAL_.pdf)

In contrast, offline payments based on a non-native layer-2 protocol would allow for greater privacy for users given that the security protocol is separate from the online payment scheme. In this instance, the level of privacy would be comparable to withdrawing money from an ATM; the sender signs out funds through the debiting of a locally held offline balance. Only adjustments to balances are reflected on the online ledger.

## Balancing Enhanced Privacy with the Need for Regulatory Transparency and KYC



While it is certain that offline functionality can offer some enhanced privacy benefits depending on the type of implementation, it must also be balanced against other needs, such as the need to mitigate against fraud risks.<sup>11</sup> Typically, stricter frameworks for KYC can be associated with lower privacy levels while higher levels of privacy can be associated with less strict KYC requirements. In nearly all markets, this trade-off is determined by the need to comply with existing regulations covering KYC as well as other areas such as Anti-Money Laundering (AML) and Counter-Terrorism Financing (CTF), which usually involve collecting and verifying information about the identity of the parties involved in a transaction.

While privacy features can help protect the confidentiality of this information, it does not negate the need to comply with the existing legal framework, particularly for real-time payment systems. In the debate around the appropriate degree of privacy for CBDCs, regulators and payment system operators around the world have been inclined toward tiered KYC models with restrictions to prevent criminal exploitation and misuse, which is also likely to apply for offline use. For instance, an offline wallet may be subject to caps on the value of holdings, or limits can be imposed on the number of consecutive offline transactions that can occur without connecting to the online ledger. Different limits for different levels of KYC compliance could also allow for some privacy flexibility, with fully KYC-compliant wallets providing the least restrictions on holdings and services.

Exploring new forms of privacy for CBDCs may also require reassessing the existing legal frameworks. In the case of a digital euro, the European Data Protection Board (EDPB) recommended developing a specific legal framework for the digital euro that would address data protection and AML/CTF aspects, having deemed that the current legal framework on electronic payments does not seem to be appropriate for a tool like the digital euro, which is likely to have different characteristics from other means of electronic payments.<sup>12</sup>

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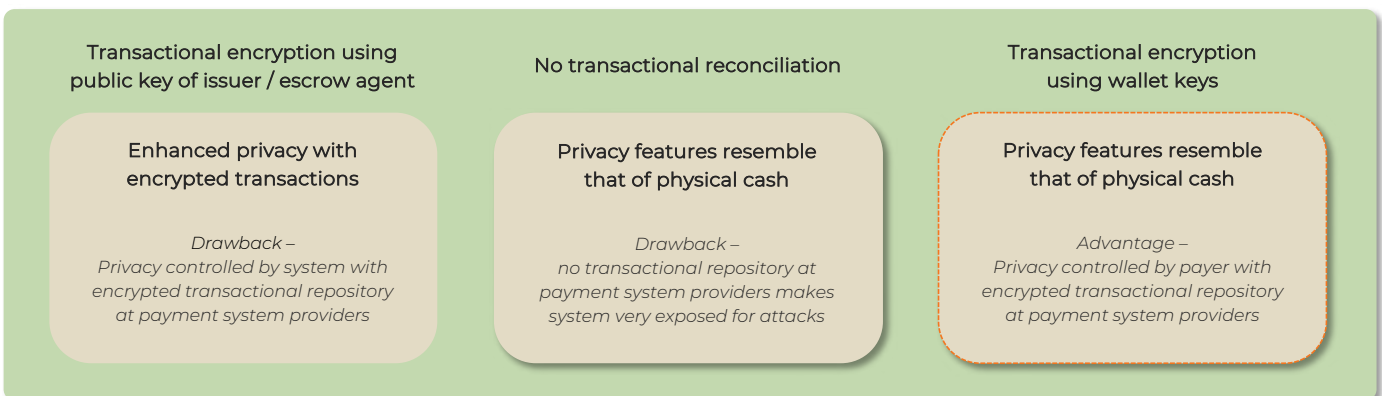
<sup>11</sup> [https://www.crunchfish.com/wp-content/uploads/2023/05/Lipis\\_WP2\\_Crunchfish\\_Enabling-offline-payments\\_v5.pdf](https://www.crunchfish.com/wp-content/uploads/2023/05/Lipis_WP2_Crunchfish_Enabling-offline-payments_v5.pdf)

<sup>12</sup> [https://www.edpb.europa.eu/system/files/2022-10/edpb\\_statement\\_20221010\\_digital\\_euro\\_en.pdf](https://www.edpb.europa.eu/system/files/2022-10/edpb_statement_20221010_digital_euro_en.pdf)

Additionally, balance reconciliation for offline payments may offer an attractive middle ground within existing regulatory frameworks as well by providing some confidentiality around transactional data while still providing a degree of transparency to the system operator and other involved parties.

There are several implementation options in CBDC systems with balance reconciliation to allow for private transactions less than a specified amount. One way would be to simply debit the balance of the payer and credit the balances of the payee and allow them to defund their wallets considering the present balance without sending up the transactional data to the central ledger at all. Such an implementation system would be blind to attacks as transactions below the privacy limit would never be invisible to the system.

An alternative approach that has been suggested is to rely on balance reconciliation, but the payer encrypts the transactional data that may trace the transaction back to the payer with the public key of the issuer. This means that the transaction is private in relation to the merchant as well as the system if the transactional data is not decrypted. In this way, the private transactions are encrypted when they are registered in the online ledgers of the payer and the payee, allowing the system to decrypt them with the issuer's private key in case there is a suspected attack. The drawback of this approach is that the payer is not in control of the decision to decrypt its transaction and the decryption would happen without the payer even knowing about it.



*Balance reconciliation with different ways of concealing transactions*

“ The demand for alternative digital payment instruments with cash-like privacy features is one of the most compelling reasons for the development of CBDCs.

Crunchfish has recently implemented and patented a novel approach with balance reconciliation. Private transactions are encrypted and sent to the backend, but where the keys used for the transaction are wallet keys,<sup>13</sup> in contrast to prior art using public keys controlled by either the issuer or an escrow agent. In this way the payer is in full control of the privacy of their transactions even if all private transactions are sent to the online ledger encrypted.

In this innovative way, regulatory requirements for transactional traceability are balanced with requirements for privacy where the payer is in full control of the encrypted transactional data for amounts below defined thresholds, defined by the issuer and the regulator. If the issuer suspects an attack by the payer, the issuer can contact the payer for permission to decrypt the data. In case the payer is not willing to grant access, the issuer may decide to lock the wallet or disallow any more private transactions.



At the Central Bank Payment Conference<sup>14</sup> in Kuala Lumpur on June 10–12, Crunchfish CEO Joachim Samuelsson will present technical ways to guarantee true privacy in CBDC systems and discuss security and scalability issues for hardware- and software-based CBDC mobile wallets.

“ While it is certain that offline functionality can offer some enhanced privacy benefits depending on the type of implementation, it must also be balanced against other needs, such as the need to mitigate against fraud risks.

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<sup>13</sup> <https://www.crunchfish.com/crunchfish-provides-and-patents-digital-cash-privacy/>

<sup>14</sup> <https://currencyresearch.com/the-central-bank-payments-conference/>

## About the Author<sup>1</sup>

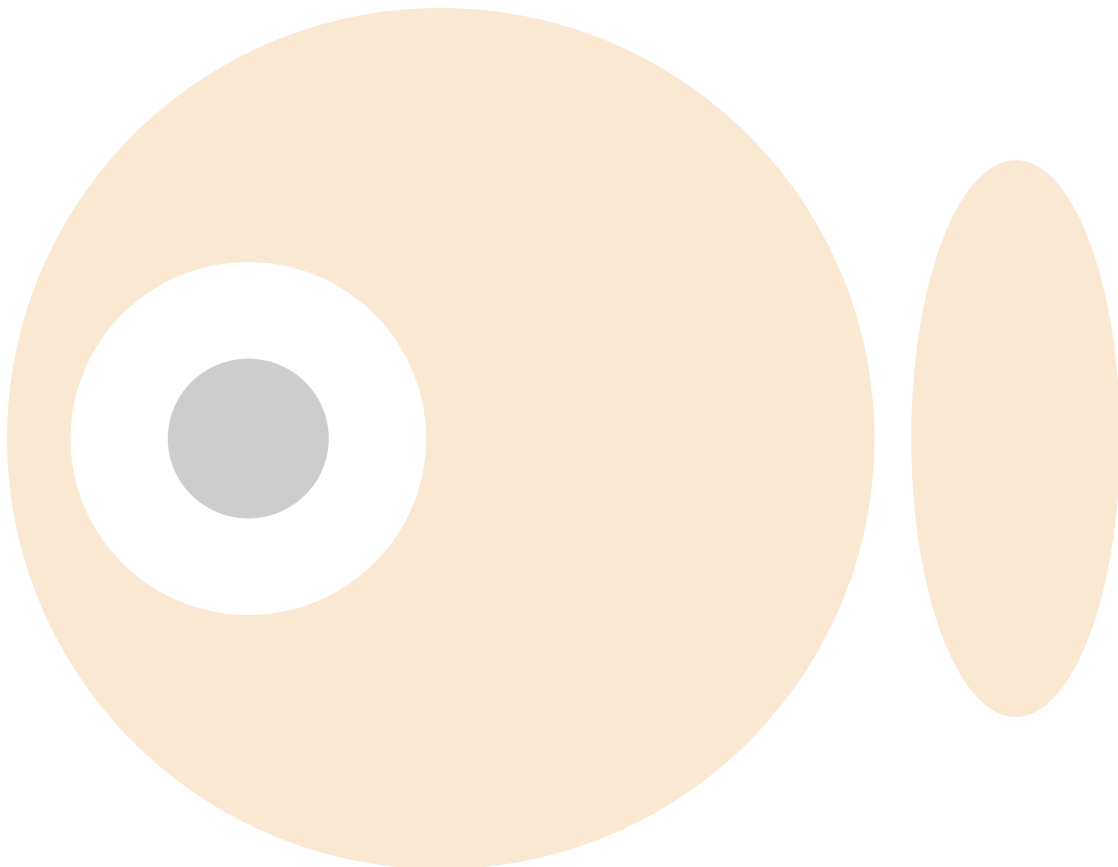
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Joachim Samuelsson is CEO at Crunchfish AB since 2020 and has been a board member since 2012. Joachim is a technology pioneer and a serial entrepreneur since 1996 with successful engagements in ComOpt AB, Actix Ltd and Biomain AB. He worked at Ericsson during 1989–1996. He holds many patents in digital payments and mobile application technology. Master of Science 1988 in Industrial Engineering and Management at Linköping University, Sweden. Born in 1965.

## About Crunchfish

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Crunchfish is a deep tech company developing a device-agnostic generic trusted client application platform for offline payments, tokenized card payments as well as other mobile client / server systems. Crunchfish has been listed on Nasdaq First North Growth Market since 2016, with headquarters in Malmö, Sweden and with a subsidiary in India.



# EMTECH

## Fostering Innovative CBDC Use Cases Through the e-Cedi Hackathon Pilot



*By Carmelle Cadet, Founder & CEO,  
EMTECH*

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EMTECH aims to enable central banks to deploy their CBDC safely and affordably as a digital cash infrastructure, not just as a software application.

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In December 2023, EMTECH successfully delivered a CBDC Hackathon as a strategic pilot for the Bank of Ghana's e-Cedi project. Over a 12-week period, contestants used EMTECH's Central Bank Digital Currency (CBDC) Innovation Kit to develop applications to foster financial inclusion.

EMTECH is a leading provider of award-winning solutions and software for countries and fintechs to develop CBDCs. EMTECH's CBDC Innovation Kit offers an affordable way for organizations to build, deploy, and test fintech solutions and business models using CBDC.



The CBDC Innovation Kit allows organizations to:

- Use public distributed ledger technology and tokenization services to simulate token called “Beyond Cash.”
- Leverage developer-friendly APIs for a “Bring Your Own App” ecosystem model.
- Accelerate testing of digital currency through an easy-to-use pre-built dashboard which provides “at a glance” metrics for users while running their tests.

After receiving 88 applications, the Bank of Ghana ultimately selected 10 participants who onboarded a dedicated hackathon platform, and received Institutional Wallets and 1,000 BYDC-eCedi tokens from the central bank to prototype various solutions. They were then granted access to pre-built BYDC-eCedi APIs which eased the technical integration, as well as standardized how and who can create wallets for end users or how to transact with the tokens. All transactions were performed using Hedera’s token and public ledger services using an ERC-20 token standard. This delivered transparency in transactions, plus the benefit of protecting user information.

*“The e-Cedi Hackathon invitation for proposals targeted innovative ideas that leverage CBDC tokens and APIs to prototype solutions or develop tools to promote the use of e-Cedi across the economy and with diverse payment scenarios,”* remarked Dr. Ernest Addison, Governor of the Bank of Ghana. *“We are grateful to EMTECH for the conceptualization, design, planning and implementation of the Hackathon to develop use cases.”*

EMTECH aims to enable central banks to deploy their CBDC safely and affordably as a digital cash infrastructure, not just as a software application. With digital currency, central banks can drive inclusion, interoperability, and resilience.

The potential use cases included payments, savings, lending, and investments.

By creating a simulator with the generic name “Beyond Cash” and pre-built APIs ready to use, EMTECH makes modern central banking a reality.

By partnering with the Bank of Ghana on the e-Cedi Hackathon, EMTECH provided a platform for the Hackathon developers to easily build use cases for financial inclusion in Ghana. The CBDC Innovation Kit product allows central banks to simulate the tokenization of cash and streamline development of CBDCs using APIs, a unified distributed ledger, and smart contracts.

## About the Author

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Carmelle Cadet, founder & CEO of EMTECH, is a seasoned software executive whose career includes ground-breaking work at IBM as a Blockchain executive. She is a pioneer in the area of digital currency and worked on the first CBDC to be deployed in the world in the Bahamas. At EMTECH, her practical experience includes work on CBDC and Digital Regulatory Sandbox projects with the Central Bank of Nigeria, the Bank of Ghana, the Central Bank of The Bahamas, and the US Federal Reserve System.

## About EMTECH

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**EMTECH** is a modern central bank technology and services company offering an integrated SaaS platform with products such as the Digital Regulatory Sandbox and Central Bank Digital Currency (CBDC). EMTECH's [innovative solutions](#) empower central banks, financial institutions, and regulators to navigate the rapidly evolving landscape of financial services innovation and regulation. EMTECH enables its partners to address local and regional challenges, foster financial inclusion, and drive sustainable economic growth by providing cutting-edge technology solutions and services.





## Central Banking in the Digital Age: A Nationwide Perspective



*By Shadi Dababneh, Chief Commercial Officer, ProgressSoft Corporation*

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While establishing a robust digital payment infrastructure is paramount, addressing regulatory and operational challenges across borders is equally critical.

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Digital transformation presents both unprecedented opportunities and formidable challenges for financial regulators worldwide. The complexity of financial services to evolving financial crimes, the rapid adoption of digital payments, and the rise of fintech all pose significant challenges to the effective oversight and control of the monetary landscape. To thrive and successfully navigate these hurdles, financial regulators are encouraged to embrace regulatory innovation, enhance risk management and promote financial stability through strategic partnerships and advanced technologies.

This article explores how regulators can leverage innovation and technology to navigate these challenges and foster sustainable growth in the digital era. Presented in the article are real-world use cases and an outline of how ProgressSoft has been supporting innovation in central banking.

# Digital Transformation in Payment Infrastructure

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Regulatory authorities are pivotal in establishing future-proof payment infrastructures that foster interoperability among ecosystem partners, driving consumer adoption. Below are components of payment infrastructure enabling digital transformation and efficient business processes:

## 1. Enhancement of Interbank Retail Payment Systems

Upgrading interbank retail payment systems is essential for improving bulk business-to-person, person-to-business and government-to-person payment use cases, thereby enhancing payment processing for governments, businesses and consumers alike. These upgrades lead to increased efficiency in overall service delivery within the country. Key enhancements should encompass:

- Migrating payment messages to ISO 20022 to utilize a richer data structure.
- Implementing support for electronic mandates to facilitate direct debit payments.
- Developing a framework to support the Wage Protection System.
- Establishing an Application Programming Interface (API) framework to foster fintech innovation.

## 2. Facilitation of Instant Payment Utilization

Instant payment networks have been proven to boost e-payment penetration, especially in the person-to-person segment, and have become a viable alternative payment method for merchants and e-commerce transactions in some emerging markets. Designing a futuristic instant payment system involves:

- Creating an inclusive interoperable platform that supports all stakeholders, including banks, merchants and payment service providers.
- Implementing a smart addressing system with multiple addressing methods such as mobile numbers, alphanumeric addresses and other national identification numbers.
- Exploring the viability of separating the account-holding institution from the Payment Initiation Service Provider (PISP).
- Defining a national QR code standard to promote interoperability among ecosystem partners.

### 3. Digitalization of Check Clearing

Traditional check clearing processes entail high operational overheads for operators and participant banks, consuming a significant share of banks' workforce. Therefore, transitioning from paper-based to a public key infrastructure (PKI)-based e-check platform can streamline operations by replicating existing check issuing and clearing processes while eliminating inefficiencies. Importantly, the electronic system should operate alongside the existing paper-based check platform during the transition period to avoid disruption.

### 4. Adoption of Dispute Management Frameworks

Establishing a streamlined dispute management framework is essential to navigate the complex network of interbank retail payment systems and promptly address complaints from diverse stakeholders. An effective dispute management framework should include:

- Facilitating a versatile workflow capable of accommodating different processes associated with various retail payment systems and payment types.
- Ensuring strict enforcement of turnaround time definitions to maintain consistency in issue resolution.
- Implementing an effective arbitration framework to resolve disputes that cannot be resolved through mutual agreement among ecosystem participants.
- Effectively handling adjustment accounting entries among participants, ensuring accuracy and transparency in financial transactions.

The digital transformation of a domestic payment infrastructure requires meticulous attention to regulatory, technological and operational aspects. In addition to addressing these concerns, it must also catalyze broader digitalization within the banking sector and promote a comprehensive upgrade throughout the payment ecosystem.

**“Regulatory authorities are pivotal in establishing future-proof payment infrastructures that foster interoperability among ecosystem partners, driving consumer adoption.**

# Innovative Use Cases in Retail Payment Infrastructure

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Nationwide implementations by central banks empower financial institutions to leverage retail payment infrastructure, driving substantial improvements in business efficiency and service delivery, ultimately enhancing the customer experience. Here are key examples that illustrate how national-level digital transformation can catalyze significant advancements in the banking industry:

## 1. Enhancing Credit Transfer for Salary Processing

The retail interbank payment platform can seamlessly support integrated salary processing, leveraging Straight-Through Processing (STP) capabilities while ensuring compliance with regulatory norms and workforce regulations. This data, with appropriate consent for data sharing, can also be utilized to comprehensively establish customers' credit worthiness within the ecosystem.

## 2. Streamlining Credit Transfer for Government Benefits

Many governments face substantial costs associated with disbursing benefit transfers to citizens through non-digital and non-integrated processes, resulting in inefficiencies and lack of transparency. The retail interbank payment platform can facilitate a central mapper system, utilizing multiple identifiers to initiate bulk benefit transfers by government agencies, thereby offering a cost-effective, fast and transparent solution that minimizes the risk of misuse and misconduct.

## 3. Digitizing Loan Repayment through Direct Debit

Traditional loan repayment methods involving paper-based checks entail high operational costs, inefficiencies and susceptibility to fraud. Implementing direct debit with e-mandates can revolutionize this process, making it fully digital with STP, and eliminating operational hassles for both financial institutions and customers.

## 4. Enabling E-channel Payments

The retail interbank payment platform empowers financial institutions to offer digital banking services to customers, enabling round-the-clock payments and ensuring seamless interoperability across participating institutions.

## 5. Facilitating Instant Peer-to-Peer Payments

Instant payment platforms serve as catalysts for promoting a cashless economy by facilitating instant and seamless micro and low-value payments among individuals and businesses.

## 6. Supporting Peer-to-Business Payments

Instant payment networks are increasingly utilized as alternative payment channels for peer-to-business transactions, particularly QR code-based scan-and-pay methods and in-app digital payments.

## 7. Introducing Secure E-checks

Secure PKI-based e-checks transforms the check processing into a fully digital, secure, and cryptography-enabled process, covering the complete lifecycle of an e-check from issuance to clearing.

## 8. Leveraging Digital Intelligence

Data intelligence emerges as a valuable byproduct of digital transformation within the ecosystem. Properly governed data unlocks numerous opportunities for market intelligence, Buy Now Pay Later (BNPL) services, and other cross-selling initiatives, ultimately driving economic growth.

## 9. Driving Open Banking Transformation

Each future-proof national payment system deployed by the central bank can form the building block for establishing a resilient open banking platform nationwide, driving increased innovation and transformation of business services.

These innovative use cases showcase the transformative potential of digital payment infrastructure, pushing technology boundaries and prompting regulatory frameworks to evolve for enhanced security and privacy. Maintaining balance between innovation and regulation is critical for the success and sustainability of these advancements.

# Regulatory Challenges Across Borders

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While establishing a robust digital payment infrastructure is paramount, addressing regulatory and operational challenges across borders is equally critical. Here are some essential considerations:

## 1. Enforcing Effective Regulation

Effectively navigating digital transformation in payment processing demands adherence to comprehensive regulations, encompassing payment system laws, data protection and localization laws, as well as Anti-Money Laundering (AML) and sanction screening regulations.

## 2. Adopting Impartial Charging Policies

The adoption of new payment rails depends significantly on fair charging policies. These policies should balance the interests of all stakeholders, with regulators and operators ensuring alignment with national objectives.

## 3. Gaining Governmental Support for Adaptation

New systems often require initial support to gain wider acceptance. Regulators and government agencies may need to explore options such as making initial investments or infusing viability funds to ensure commercial viability.

Overcoming regulatory challenges is crucial and requires coordinated efforts and a deep understanding of both technology and legislation. Innovators like ProgressSoft shape the trajectory of digital transactions in central banks as they drive the transition to streamlined and secure payment environments by encouraging institutions to adopt emerging technologies.

“ProgressSoft’s impact extends beyond central banks’ oversight objectives, influencing financial inclusion strategies and fostering innovation within the financial sector.”



# ProgressSoft's Impact on Central Banks

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Since 1989, ProgressSoft has forged partnerships with government agencies, central banks and financial regulators, gaining valuable insights into regulatory challenges. Leveraging this expertise, ProgressSoft has developed adaptable solutions to meet evolving needs.

A cornerstone of ProgressSoft's design and solution architecture is providing powerful oversight capabilities for regulatory compliance monitoring teams at central banks and federal reserves, which has been effectively enhancing financial oversight.

ProgressSoft's impact extends beyond central banks' oversight objectives, influencing financial inclusion strategies and fostering innovation within the financial sector. Additionally, ProgressSoft remains committed to enhancing regulatory capabilities, expanding access to financial services and driving innovation at the national level. These efforts span key areas where ProgressSoft has made a significant impact.

## **Strengthened Oversight and Regulation Capabilities**

In 1989, ProgressSoft launched the world's first national-level Electronic Check Clearing solution, revolutionizing the industry with its support for electronic image-based check clearing. By 2001, the first of nine national implementations of this groundbreaking solution was launched, significantly enhancing oversight through advanced online real-time monitoring and reporting, thereby eliminating delays associated with paper-based reporting.

Expanding its offerings, ProgressSoft has broadened its central banking solutions portfolio to encompass Interoperable Instant Payments, Automated Clearing House, Electronic Bill Payment and Presentment, Salary Processing, Dispute Management, and more. Each solution facilitates instant updates, enabling central banks to promptly respond to urgent situations and support their oversight objectives effectively.

## **Improved Financial Inclusion and Accessibility**

With vast experience in nationwide implementations, ProgressSoft introduced its Interoperable Mobile Payment Switch. This solution serves as both the central bank's regulatory control point and mobile payments switch, streamlining financial processes and promoting financial inclusion by expanding access to banking services. Additionally, ProgressSoft implemented a national registry at the regulatory firm level to enhance trust in the mobile payments ecosystem.

Committed to innovation, ProgressSoft anticipated the need for a 24x7 instant payment solution which led to the development of the Interoperable Instant Payments System, capable of handling over 2000 transactions per second and ensuring transaction finality in milliseconds.

ProgressSoft's latest mission is to consolidate several of its payment instruments into a single, comprehensive platform encompassing credit transfers, mobile payments, microtransactions, low-value payments and large-scale transfers. This initiative is currently underway in multiple countries worldwide, fostering greater financial inclusion.

### **Advanced Financial Innovation Efforts on a National Level**

In the ever-evolving landscape of technology, ProgressSoft strategically invests in cutting-edge advancements in financial technology, encompassing but not limited to, machine learning (ML) and artificial intelligence (AI).

For instance, ProgressSoft's Intelligent Signature Recognition solution leverages advanced ML and AI models to continuously refine signature verification processes. By utilizing extensive datasets and learning from historical interactions, it enhances accuracy and effectively detects potential forgeries of handwritten signatures.

Another notable example is ProgressSoft's latest innovation, Message Depot, which represents state-of-the-art technology in modern extract, transform and load (ETL) practices. Featuring an exceptionally fast full-text search engine, it aggregates data from various database sources and systems. This facilitates ML/AI solutions that improve business operations in numerous ways, including advanced chatbots, real-time anomaly detection and predictive analytics for customer behaviors.

ProgressSoft remains committed to leveraging emerging technologies for pioneering solutions, ensuring that its offerings stay at the forefront of the financial industry's evolving needs, driving innovation and efficiency within the sector.

## **Conclusion**

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In summary, the digital transformation of central banks' payment infrastructure marks a pivotal step towards modernizing the financial ecosystem. By embracing innovative solutions and fostering collaboration with the right technology partners, central banks catalyze widespread improvements in the financial landscape. As central banks continue to embrace digitalization, the potential for innovation in the financial sector is boundless, promising a future marked by enhanced efficiency, accessibility and security in financial transactions.

# About ProgressSoft Corporation

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ProgressSoft has been a leading global provider of real-time payment and financial solutions since 1989, successfully delivering thousands of implementations across over 370 banks, central banks and financial institutions in 25 countries.

ProgressSoft's portfolio includes a range of central banking solutions designed to enhance the financial landscape through digital transformation. Among these, our latest innovation, [Message Depot](#), offers a centralized platform for secure storage, efficient retrieval and comprehensive reporting of over a billion financial and non-financial messages. Additionally, our [Interoperable Instant Payment System](#) supports seamless interoperability for nationwide instant payments, whether account-to-account, account-to-wallet, wallet-to-account, or wallet-to-wallet transactions.

Today, ProgressSoft sets a precedent in the financial industry, dedicated to developing more secure and efficient financial solutions. This commitment is aimed at actualizing financial empowerment and accessibility, elevating the entire payments ecosystem, and building a robust payment infrastructure.

“ Nationwide implementations by central banks empower financial institutions to leverage retail payment infrastructure, driving substantial improvements in business efficiency and service delivery, ultimately enhancing the customer experience.



# ProgressSoft

www.progresssoft.com



## Why Cross-Border Payments in Opportunity Markets are Ripe for Disruption



*By Jarrod Hubble, CEO, RTGS.global*

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At RTGS.global we recently facilitated a series of frictionless cross-border payments and settlements between a group of progressive institutions in three rapidly growing markets: Uzbekistan, Tajikistan and Georgia. This saw five banks, across three separate jurisdictions, conduct multiple payment-versus-payment settlements and immediate cross-border payments in their respective domestic currencies. This serves as a powerful proof point for how instantaneous settlement has the potential to revolutionise the way money moves around the world, while driving financial inclusion particularly in developing markets where there is huge untapped potential.

But why is this important, and so relevant today?

Where currencies are exchanged by parties on a deliverable basis, payment-versus-payment settlement is tremendously important. Put simply, payment-versus-payment (or “PvP”) settlement ensures that the final settlement of a payment in one currency occurs if and only if simultaneous final settlement of a payment in the counter-currency takes place. PvP mechanisms aim to mitigate settlement risk, which is the risk of loss when a party in an FX transaction pays the currency it sold but does not receive the currency it bought. As noted by the CPML,<sup>1</sup> such FX settlement failures can arise due to default events, operational issues, liquidity constraints, or other factors.

This can lead to significant losses for market participants, most famously demonstrated in the failure of Bankhaus Herstatt in 1974. Given the vast notional amounts exchanged daily in the FX market to satisfy physically-settled FX transactions,<sup>2</sup> payment failures can have systemic consequences. As a result, FX settlement risk has for years been a priority for the policymaking agendas of central banks and regulators around the world.

Whilst incumbent PvP arrangements (such as CLS Bank) protect a significant proportion of daily FX settlements from settlement risk, it is well-recognised that such arrangements are not available to all segments of the FX market. Many emerging markets and developing economy markets, for example, do not have PvP solutions available to them, despite trading in their currencies having increased over the years. In addition to mitigating settlement risk, new FX settlement solution providers may also seek to enhance efficiency by offering their settlement rails to further mitigate other cross-border payment frictions, such as slow and expensive movement of funds due to long transaction chains, limited hours of functionality, expensive credit, credit risk, opacity as to the status of a payment, and trapped liquidity, most of which are a direct result of over-reliance on the traditional correspondent bank network.

As prompted by the G20 Roadmap to enhance cross-border payments,<sup>3</sup> the time is right for new initiatives to provide services to an expanded set of markets and industry stakeholders, especially where there are clear opportunities for and from more efficient cross-border payments but a lack of availability of PvP and streamlined global payment mechanisms.

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<sup>1</sup> <https://www.bis.org/cpmi/publ/d216.pdf>

<sup>2</sup> <https://www.bis.org/statistics/rpfx22.htm>

<sup>3</sup> <https://www.fsb.org/2023/10/g20-roadmap-for-enhancing-cross-border-payments-consolidated-progress-report-for-2023/>

# A Need for Regional Solutions

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Bringing PvP solutions to emerging markets opens avenues to regional integration and internationalisation of a wide range of currencies. Creating a framework for reliable and secure exchange of value then becomes the basis for closer integration of their financial institutions.

With central banks becoming more comfortable with entities storing their liabilities on an external computer system, including in the cloud, this potentially enables a technological and regulatory framework that supports faster, cheaper and more secure exchanges of value across borders. This in turn creates the right circumstances and incentives for the development of regional settlement services, supporting regional unification, including of financial markets, and/or extending the currency reach of such regional settlement schemes.

The result? Access to foreign currencies will no longer be the exclusive privilege of the larger banks, thereby directly contributing to efforts for increased financial inclusion and cross-border payment cost reduction.

# Barriers to Adoption and How to Address Them

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There are two main barriers for using an existing settlement arrangement: omission of the currency from that service, or the fact that at least one of the sides to the settlement is not using it.

This is why we at RTGS.global believe there is a need for a new fit-for-purpose common platform which:

- creates a foundational regulatory framework, designed with accessibility and the potential for a truly global reach in mind,
- is underpinned by an agile technical infrastructure that leverages the latest standards, payments, message standards, application programming interface (API) and technological advancements, and
- is overlaid with a comprehensive notification and workflow where finality of settlement is achieved within its rulebook. Settlement will be instant, transparent, predictable and executed with certainty of outcome.

The availability of such a platform across multiple jurisdictions will allow for previously unavailable levels of interoperability whereby currencies can be freely exchanged with peace of mind that local host bank funds are segregated and held at the relevant central banks. This will result in the opening up of previously underserved currency corridors – as recently demonstrated with the successful transaction we facilitated with Credo, Humo, Arvand, Alif and Anorbank.

The certainty of PVP settlement will allow market makers to reconsider offering FX rates between any currency pair supported across the network, removing the need for a currency conversion via a hard, typically USD, currency.

Regional initiatives like Buna and PAPSS are leading the way as great examples of regional integration. We have observed a strong desire for regional integration of trade driving the need for closer integration of financial markets in a wide variety of locations. It is recognised by all stakeholders that the key to achieving this is an open platform, a common standard underpinned by a shared rulebook and support from the relevant regulatory authorities.

## Real-World Impact

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As demonstrated by our recent pilot in Central Asia, enormous progress can be demonstrated without the need for a big-bang introduction of a new global settlement service. In collaboration with the banking community and the wider financial ecosystem, a phased and controlled approach is preferred, with a focus on regional growth and/or proving out individual business use cases first.

With this in mind, we are pleased to be able to share a unique perspective from Eraj Alisherov, Head of International Banking Relationships at Alif Bank, one of Central Asia's most progressive financial institutions, on the challenges faced by those banks operating in the Central Asia region and why efficient cross-border settlement has the potential to be a game-changer for the region.

“ A truly global settlement network backed by central bank funds has the power to open up new currency corridors in any developing and opportunity markets to the rest of the world.



Undoubtedly, the quest for an efficient solution to cross-border settlements in Central Asia is a pressing issue that demands our immediate attention. Traditional methods, such as the utilisation of correspondent accounts, are becoming increasingly outdated. From our perspective, these systems are on the verge of obsolescence.

We stand on the precipice of a new era, one that calls for a groundbreaking approach that can transform our understanding of financial transactions. I recall countless articles I've read on current settlement mechanisms — they struck me as mundane, riddled with bureaucratic hurdles and unnecessary complexities.

I found myself questioning the future of these systems. Will we ever witness the emergence of a more streamlined solution? This question resonated within me, fuelling my curiosity and determination to seek a better alternative. I firmly believe that the answer lies within our collective ability to challenge the existing norms and embrace innovative change.

This is why we are so excited by the solution presented by RTGS.global. They don't just present a solution, but they have demonstrated its effectiveness, and its potential to revolutionise the way we operate. The concept of engaging with central banks is nothing short of groundbreaking. The need for correspondent accounts? Gone, if their vision of global adoption comes to fruition. As an expert in the International Banking Relationships Sector (IBRS), this is a game-changer.

When they conducted their first test involving Tajikistan and Georgia, it was clear this was no mere theory. This was a practical, working solution. That's when I knew I had to act. My mission is to position Alif as the most advanced bank in the Republic of Tajikistan in terms of International Banking Relationships. Signing an agreement with RTGS.global aligns perfectly with this mission.



I've seen the instant settlements with my own eyes. It was a moment of revelation. I could only marvel at the efficiency and say, "It works. It truly works, guys." This isn't just a step forward, it's a leap towards the future of banking. And I'm proud to be part of that journey.

Overlooking the potential of RTGS.global is a misstep no central bank can afford. This isn't just a diamond in the rough; it's a tool capable of shattering the glass ceiling of conventional settlements. Regardless of your country's legislation, it's imperative to find a solution, to carve a path that leads to this transformative journey.

We mustn't stand idle, waiting for others to take the first step. The onus is on each bank worldwide to make this groundbreaking idea a reality, a change that could redefine everything we know about banking.

In Central Asia, this isn't merely an option; it's a necessity that all banks will undoubtedly consider. Our financial market is on an upward trajectory, and we have the vision to see opportunities that others might overlook. We're not just part of the change; we're at the forefront, leading the charge toward a brighter, more efficient future in banking.

- Erj Alisherov, Head of International Banking Relationships, Alif Bank



## A Common Requirement for Interoperability

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Many banks hold few direct settlement memberships, and unless they have a global footprint are often only members of their domestic currency settlement system. While this approach can work efficiently for transactions within a limited range of currencies, it presents challenges when transacting in any of the world's many other currencies. To carry out these transactions, banks typically resort to using multiple intermediaries whereby banks often have to temporarily relinquish control over their funds — a process that amplifies both transaction times and costs and increases the associated risks.

Interoperability has the power to overcome these limitations by encouraging disparate settlement systems, networks and applications to communicate seamlessly, enhancing the efficiency of cross-border transactions. The implications of this efficiency extend beyond mere cost and time savings; interoperability enables smoother and less risky international exchanges, and puts buyer and seller in direct control of their funds, which is integral to supporting the economic activities of our globally connected societies.

In the context of this article, interoperability serves a critical function in fostering financial inclusion, especially in the context of integrating opportunity/developing markets into the worldwide financial ecosystem. These markets, often underrepresented in global finance, can flourish when the barriers between diverse financial systems are reduced — and when greater certainty and standardisation are brought to cross-border settlement across different currency corridors. In these respects, interoperability can act as a facilitator to create a financial ecosystem that can carry a more inclusive and diverse global economy.

## Creating a More Efficient, Secure and Inclusive Future

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We at RTGS.global are passionate about enhancing interoperability in the world's financial system, leading the way towards a more efficient, secure, and inclusive future. As demonstrated by the first-hand account from Alif Bank, a truly global settlement network backed by central bank funds has the power to open up new currency corridors in any developing and opportunity markets — whether that's Central, Middle and Southeast Asia, the Near East, the Caribbean, or the Pacific Islands — to the rest of the world.

Starting regionally, we are witnessing a monumental step forward towards universal interoperability between payment systems and other key infrastructures in the financial markets ecosystem. In time, this will be a major development in the move towards programmable money, moving from certainty of payment to certainty of getting paid, impacting how everyone transacts, does business and lives in a global world.

## About RTGS.global

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[RTGS.global](#) is a next generation settlement service that enables instantaneous movement of funds cross-border between banks. Its vision is to directly connect key market participants from individual countries into a global settlement network. To achieve this, it is creating seamless interoperability across borders and currencies, working towards a single global liquidity pool. RTGS.global – Instant Settlement with Certainty.

“ Instantaneous settlement has the potential to revolutionise the way money moves around the world, while driving financial inclusion particularly in developing markets where there is huge untapped potential.



## Setting Standards — Unifits Helps Shape Next-Generation Payment Testing in the UAE



*By Walter Schmölzer, CEO, Unifits*

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Transitioning to an advanced payment system based on ISO 20022 introduces multifaceted challenges, which are critical to address as they directly impact the operational resilience and interoperability of the payment systems.

## Introduction

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This case study delves into the UAE's ambitious initiative to modernize its national payments infrastructure with the example of the Aani Instant Payment Platform, focusing on enabling onboarding execution of the participants, ISO 20022 readiness, the associated testing challenges, and how they were addressed.

Spearheaded by Al Etihad Payments (AEP) in collaboration with Accenture, which was selected to lead a consortium of companies to help execute UAE's strategy, with companies like Unifits providing pioneering solutions to automate transaction testing, this initiative sets a benchmark for digital transformation in financial services.

Given the emphasis on industry testing within this article, we highlight the corresponding challenges, along with the inventive solutions developed by Unifits to address these challenges and ensure a smooth and effective system implementation.

## Payment Modernization Initiative in the UAE

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The Central Bank of the United Arab Emirates announced large-scale digital innovation through the Financial Infrastructure Transformation (FIT) Programme. Among other key objectives, the FIT Programme focusses on driving financial inclusion, promoting payment innovation, enhancing security and efficiency, and reducing the cost of payments.

As an integral part of the FIT Programme, a new national payments company called Al Etihad Payments (AEP) was established in 2023 as the operator of the national payments market infrastructure in the UAE. AEP's scope includes operating backbone legacy retail payments systems, the forthcoming domestic card scheme, open finance services, and the Instant Payment Platform Aani, which was launched in October 2023.

At the core of Aani's design philosophy lies the adoption of the ISO 20022 messaging standard. This globally recognized standard for financial messaging ensures a common language for diverse financial transactions, enhancing interoperability, and facilitating smoother communication between financial entities. Aani's event-driven data architecture further enhances operational efficiency and lays the groundwork for industrialized analytics and reporting.

Aani's implementation strategy unfolds over three distinct phases. These phases encompass (1) the Core Instant Payment Services, Overlay Services, and Value-Added Services, (2) the Electronic Direct Debit Authorization (eDDA) capabilities, and (3) the introduction of Electronic Cheques (eCheques). This phased approach reduces implementation risk and ensures that participants are able to assimilate changes without significant disruption. Each wave is accompanied by a focused effort on engaging the participant ecosystem followed by supporting the end-to-end onboarding execution of Aani participants and facilitating a smooth transition for the ecosystem.

From a system access perspective, the Aani participant ecosystem includes a diverse group of financial institutions, each operating uniquely. As such, the platform offers both direct and indirect participation models to settle Aani transactions. While the Indirect Participation model provides access only to the payments clearing function, the Direct Participation model facilitates both clearing and settlement, with the Direct Participant having their own Aani settlement account. An Indirect Participant must engage another Direct Participant as its settlement provider to provision liquidity and enable payments settlement.

In addition to these foundational elements crucial for establishing a future-proof, contemporary payment transaction infrastructure, it is imperative to provide comprehensive support to all involved parties during implementation within their respective IT frameworks. Central to this endeavor is the provision of optimal assistance for navigating the intricacies and time-intensive nature of testing in this environment. This case study delves into this pivotal aspect, which serves as the focal point of our discussion in the subsequent chapters, offering more insights into our approach.

## Testing Challenges and Considerations

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Transitioning to an advanced payment system based on ISO 20022 introduces multifaceted challenges, especially around compliance with the respective scheme standards, managing intricate message flows among diverse financial institutions, and maintaining efficiency throughout the testing process. These challenges are critical to address, as they directly impact the operational resilience and interoperability of the payment systems.

*“What we cannot underestimate is the amount of time the financial institutions require building their own back-end infrastructure and also the channels how this instant payment experience gets to the market,” notes Jan Pilbauer, CEO of Al Etihad Payments. “This development phase is something you have to manage very carefully and make sure that the central build which you do as an operator in the center and the builds at the edge are synchronized. So even before the central platform is built, try to find a way how to prototype different things, how to test it with the participants, making sure that these things actually work the way you are intending them to work.”*

Among others, the following are certainly some of the main testing challenges:

**Compliance:** Ensuring that every component of the payment ecosystem adheres to the relevant scheme rules necessitates a rigorous validation of payment messages and transaction protocols.

**Complexity:** Integrating diverse financial institutions with varying legacy systems into a unified modern platform requires meticulous testing of complex message flows to ensure interoperability and seamless integration.

**It is Not a One-Off task; It is for Life:** Financial market infrastructure development is an ongoing journey that requires consistent dedication to testing, particularly in the early stages when advancements occur rapidly. As the project matures, regular testing remains crucial to accommodate necessary updates and version adjustments.

**Efficiency:** Testing involves thousands of test cases and scenarios to ensure that every aspect of the payment system functions as intended. Streamlining these tests to reduce time and resource expenditure while maximizing coverage is a considerable challenge. With the scale of the UAE's payment system overhaul, maintaining an efficient, transparent, and effective testing process is vital. This efficiency is crucial to manage the project timeline and resource allocation effectively.

## UAE Enhances Efficiency with Centralized Testing for Financial Institutions

The payment modernization initiative in the UAE has proactively introduced centralized testing solutions in response to significant industry challenges.

This strategic move streamlines processes and ensures consistency and compliance across all institutions. Centralized testing tools create a standardized environment that reduces complexity and duplicated efforts and allows for the rapid identification and resolution of systemic issues. These enhancements are communicated promptly across all participants, boosting the overall robustness of the financial market infrastructure.

## Unifits Solutions and Impact

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The core of the centralized industry tests are the specialized and proven solutions from Unifits. Al Etihad Payments CEO Jan Pilbauer reflects, *“Unifits has played a pivotal role in ensuring that our testing phase did not just meet but exceeded the high standards required for such a transformative project. Their technology and expertise have been instrumental in navigating the complexities of implementing our Instant Payment Platform and driving us towards a successful launch.”*

Unifits has introduced a trio of innovative testing solutions that streamline the entire testing process, enhancing both the speed and quality of the testing cycles. These solutions — Bank Onboarding Platform (BOP), Virtual Participant (VIP), and Test Engine — are designed to integrate seamlessly. Each solution targets specific aspects of the testing phase, collectively ensuring a comprehensive and efficient testing process. They also include comprehensive reporting features that provide real-time insights into the testing progress and highlight areas of concern, enabling timely interventions.

## Bank Onboarding Platform (BOP)

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This cloud-based platform simplifies the initial stages of bank integration by providing a cloud-based platform where financial institutions can independently validate and simulate message formats as per ISO 20022 standards. This platform is accessible 24/7 and allows for rapid deployment and scalability. By facilitating early detection of non-compliance and discrepancies, BOP significantly reduces the iterative cycles of testing and re-testing that traditionally slow down payment system implementations.

## Virtual Participant (VIP)

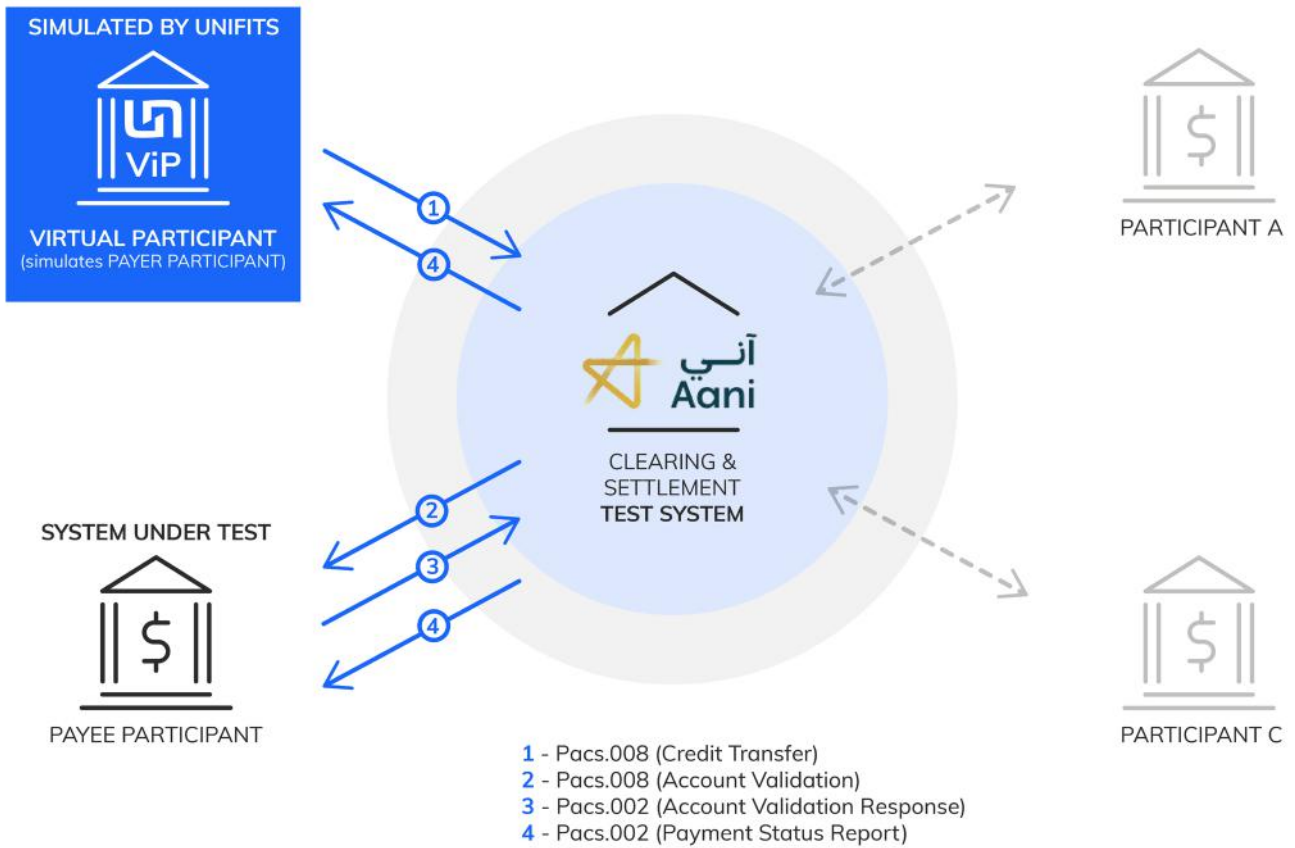
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The VIP solution addresses the challenge of complex message flows by acting as an automated test partner that is available round-the-clock. It simulates real-world interactions and automates the testing of message flows, thus ensuring interoperability between all system participants without the need for manual intervention or coordination. This not only speeds up the integration process but also reduces the dependencies on human testers, who can then focus on more critical system oversight functions.

“Unifits has played a pivotal role in ensuring that our testing phase did not just meet but exceeded the high standards required for such a transformative project. Their technology and expertise have been instrumental in navigating the complexities of implementing our Instant Payment Platform and driving us towards a successful launch.

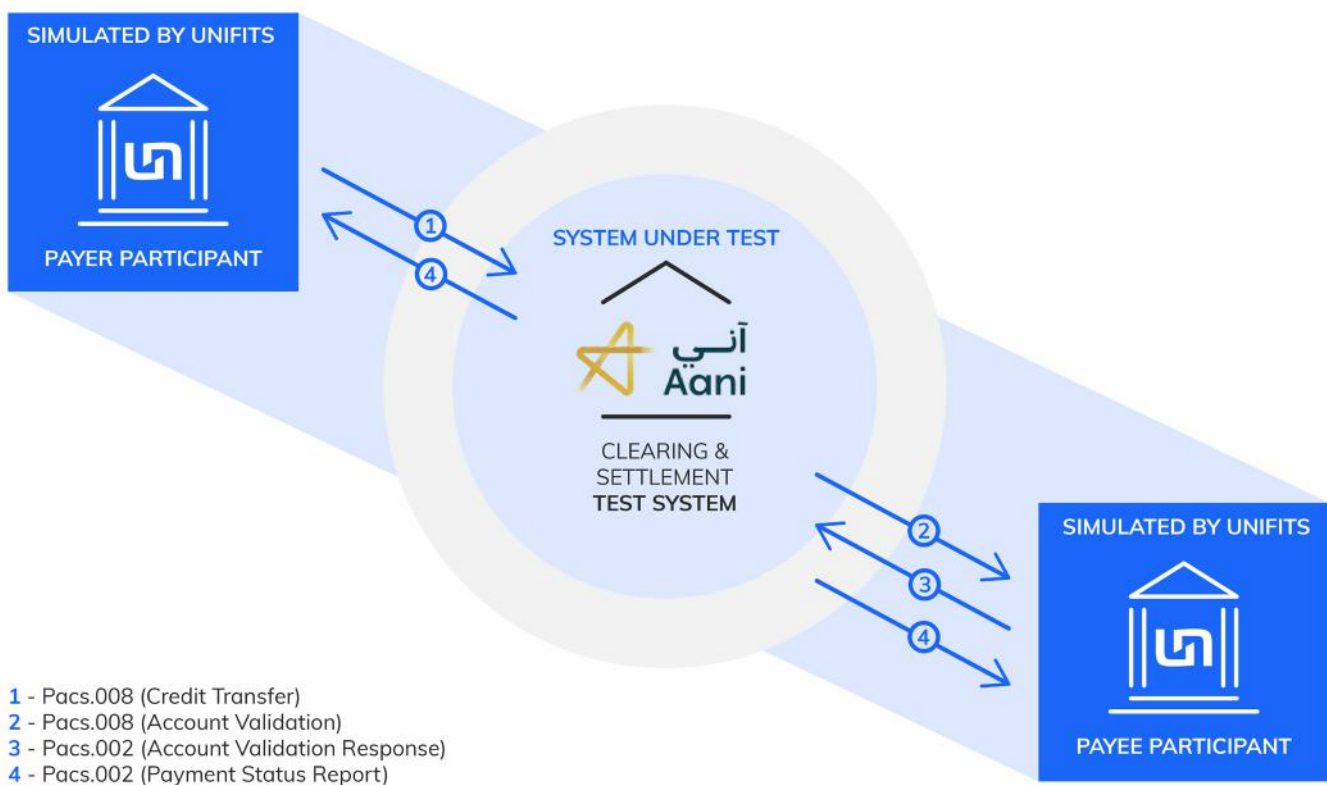
*- Jan Pilbauer, CEO, Al Etihad Payments*





# Test Engine

For the overarching testing of the central infrastructure, the Test Engine provides an automated environment to conduct and repeat detailed testing scenarios. This solution is essential for validating the end-to-end functionality by simulating both the sending and receiving transaction partners.



## Conclusion

This payment modernization initiative demonstrates how a smart strategy, careful planning, and effective system integration services by Accenture, and pioneering testing solutions from Unifits, can work together to create a robust and efficient payments ecosystem. The Aani platform, which is on its way to full operational readiness, is a beacon of technological advancement and a model for global financial innovation.

# About Unifits

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In the heart of financial innovation, [Unifits](#) emerges as a beacon of progress, offering the industry's first tailor-made solution for automating payment testing amidst the global shift towards ISO 20022. This pioneering approach not only addresses the complexities of modern payment systems but also transforms them into opportunities for growth and efficiency.

Unifits test automation for payments is more than a solution; it's a revolution in how financial institutions and their clients approach the challenge of ISO 20022 compliance and beyond. Our technology ensures that financial transactions, no matter how complex, are executed flawlessly, fostering confidence in the integrity and reliability of your payment systems.

As the financial landscape evolves, the move to ISO 20022 represents a significant hurdle for many. Unifits stands ready to turn this challenge into your competitive advantage, ensuring that your business is not just prepared for the future but is actively shaping it.





## What it Takes for a Payment System to Thrive



*By Ezechiel Copic, Director of Digital Asset Policy, and Rami Amin, Director of Innovation and Global Insights, Visa*

As the needs of consumers, small businesses, and other end users evolve, payment systems must respond with innovative solutions to meet these needs. For over 60 years, Visa's network has continually advanced with this guiding objective. Drawing on our global experience, we believe dynamic and innovative payment systems tend to be:

- Focused on **meeting the needs of end users** (such as consumers, small businesses, and individuals sending remittances) to solve real-world problems.
- **Open, accessible, and based on international standards** that support innovation.
- Built on sustainable models that **prioritize continued investments in operational resiliency and cybersecurity**.

While these attributes are fundamental, there are additional factors that can help payment systems truly thrive, like an enabling ecosystem: one that facilitates the development of digital infrastructure and public policies that support innovation and advance public-private partnerships.

# Meeting End User Needs

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*The implementation of user-centric designs is essential for boosting financial inclusion, enhancing livelihoods, and improving adoption of innovative payment solutions.*

As noted by authors of a recent United Nations Development Programme (UNDP) report, intentionally inclusive solutions placing end-users at the center of a thoughtful design process help *“build a more open, transparent and sustainable society.”*<sup>1</sup> The UNDP also notes that *“to be truly inclusive, digital transformation demands a whole-of-society approach”*<sup>2</sup> that favors interoperability over uniformity. This helps create systems that, among other things, bring more firms to international markets and support government efforts to reach more vulnerable populations.

When it comes to end-user payment needs, attributes such as security, integrity, and resiliency are non-negotiable. These foundational attributes are essential to end users across all use cases. Additional attributes such as speed and ubiquity are seen as differentiators that drive unique value to end users for a specific use case and/or context.<sup>3</sup>

Understanding the differentiating attributes motivating end users is especially important as new forms of payment, such as central bank digital currencies (CBDCs), are considered. Indeed, the Transport for London (TfL) system was recently used as an example to highlight the importance of consumer preferences and how this might inform the development of CBDC payment systems.

A London School of Economics (LSE) report suggested there were important lessons for CBDCs in the comparison of pay-as-you-go Oyster cards (electronically stored value cards used on London’s public transport system) and contactless debit and credit cards. It found that the convenience of using a debit/credit card is more appealing to consumers than topping up a pre-funded Oyster card, with contactless credit and debit cards currently accounting for 73% of all pay-as-you-go journeys. Connecting these lessons to new forms of payment like CBDCs, the LSE report concluded that the “simple inconvenience of [having to top up a CBDC wallet] may hamper their widespread adoption.”<sup>4</sup> This example illustrates the importance of understanding the attributes end users are seeking when considering new technologies and payment forms.

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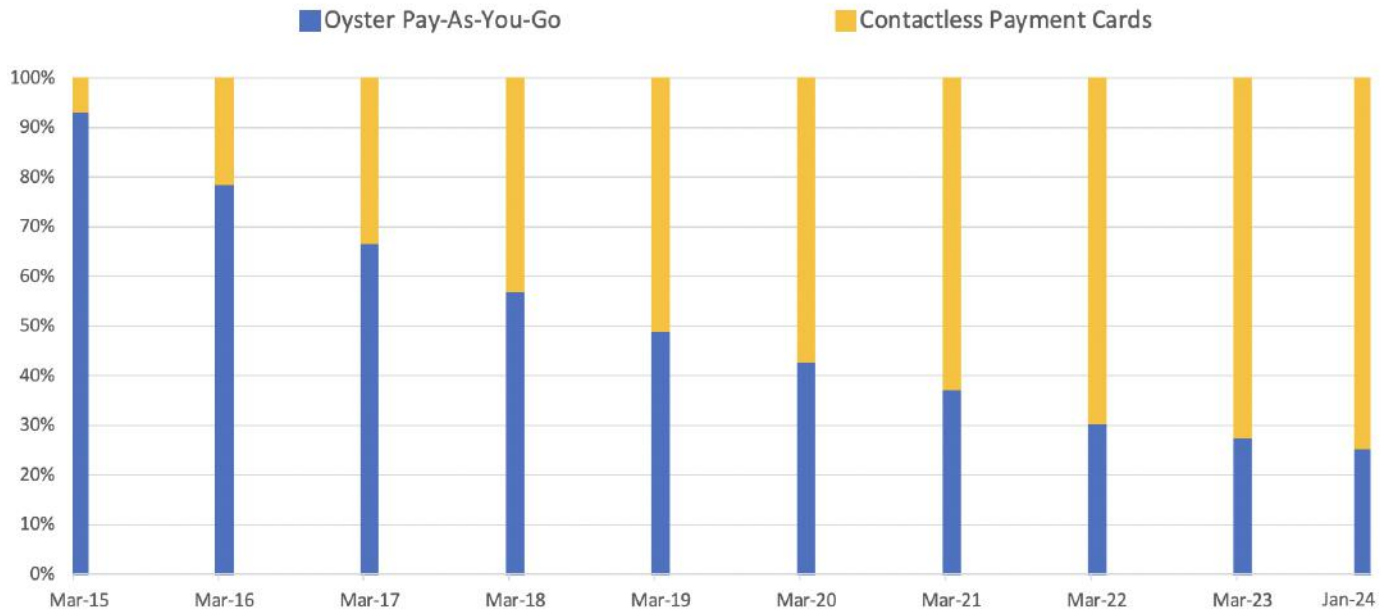
<sup>1</sup> UNDP, [Inclusive by Design: Accelerating Digital Transformation from the Global Goals](#), July 2022.

<sup>2</sup> Ibid.

<sup>3</sup> Harper, Chad and Nasreen Quibria, [Let’s give a voice to end users: cross-border payments, attributes, and use cases](#), Visa Economic Empowerment Institute, January 2023.

<sup>4</sup> Walker, Martin C W, [What London’s Oyster cards reveal about central bank digital currencies](#), London School of Economics, January 2024.

## Percentage of Pay-As-You-Go Journeys



Source: Transport for London

## Open, Accessible, and Based on International Standards

*Payment systems work best when they are open, accessible, and based on international standards that support a level playing field for ecosystem participants.*

As payment solutions evolve to meet end users’ needs across various attributes and use cases, international standards, developed through public-private collaboration and focused on applicable issues such as interoperability, can help ensure an end user’s payment preference works around the world. Furthermore, it is important that commonly agreed standards encourage a level playing field and foster an inclusive environment to bring in new ecosystem participants — all of which help ensure dynamism throughout the payments ecosystem.

Open and competitive ecosystems supported by international standards can also lead to product innovation and solutions that help drive user adoption and provide a powerful tool for improving financial inclusion. For example, by creating global, consistent standards with major phone manufacturers, Visa’s acceptance innovation — Tap to Phone — has turned a mobile phone into a Point-of-Sale terminal so that merchants can receive payments on their smartphone.

With the number of active Tap to Phone terminals steadily increasing — recent data shows over 700,000 active terminals live in 71 countries<sup>5</sup> — this innovative solution will continue to play a key role in driving financial inclusion.

To demonstrate just how much of an opportunity there is for innovations like these to further drive financial inclusion, a recent global survey conducted by Visa<sup>6</sup> found over 80% of micro and small merchants indicating they plan to accept digital payments, while more than 40% of consumers surveyed plan to use only digital payments within the next two years.

## Operational Resiliency and Cybersecurity

*The long-term ability for payment systems to thrive and maintain end user trust requires continued investments in operational resiliency and cybersecurity.*

For any payment network, the more consumers and merchants that use the network, the more value everyone on the network derives. To encourage continued adoption, there must be continued investment and innovation in secure and reliable digital infrastructure in order to develop state-of-the-art technology amid growing security threats.

For some perspective on the magnitude of this challenge, the Visa network is capable of processing up to 76,000 transactions per second, which can travel across 24 million miles of private network cables, throughout 200 countries and territories.<sup>7</sup>

Not only are significant investments required to maintain this network, but with global cybercrime costs expected to hit \$23.8 trillion by 2027,<sup>8</sup> it is imperative that resources are allocated towards operational resiliency and cybersecurity. For Visa, this means employing over 1,000 cyber professionals and investing \$10 billion in technology over the past five years, including investments in tokenization and Artificial Intelligence (AI), to help prevent \$30 billion in fraud per year for consumers and small businesses.<sup>9</sup>

<sup>5</sup> [Expanding payment access, one tap at a time](#), Visa, Data as of August 2022.

<sup>6</sup> [Visa Study: Small Businesses Optimistic, Looking to Digital Payments for Growth in New Year](#), Visa, January 2022

<sup>7</sup> Taneja, Rajat, [30 years of AI and counting](#), Visa, September 2023.

<sup>8</sup> Charlton, Emma, [2023 was a big year for cybercrime – here's how we can make our systems safer](#), World Economic Forum, January 2024.

<sup>9</sup> [New Visa Report Tells Consumers to Stay Alert this Holiday Shopping Season](#), Visa, November 2023.

# Policy Priorities to Promote Secure and Reliable Payment Systems

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*Robust digital infrastructure and a flexible, outcomes-based policy environment are critical for enabling payment systems to thrive in a competitive landscape.*

Payment systems can be most dynamic and valuable when they are able to meet customer expectations, remove friction in transactions, and deliver value in the form of innovation, convenience, security, and trust. For payment systems to continue to provide value to end users in the ever-evolving digital age, they must also be supported by reliable digital infrastructure, ensure payments data remains safe, and benefit end users across all geographies.

There are several infrastructure elements required to host payment systems and their broad-based adoption, such as national broadband internet connectivity and a reliable supply of electricity. For this reason, governments in developing countries may need to set the foundation for digitalization by prioritizing investment and capacity-building for fundamental infrastructure. Private industry stakeholders can support these efforts by providing expertise to help drive digital maturity and expand financial inclusion.

Beyond investment and partnerships, broad digital maturity is also underpinned by a set of robust digital infrastructure policies, such as national broadband plans, universal service obligations, digital identity frameworks, and competition in the provision of internet services.

Policies that promote data privacy, cybersecurity, and user authentication practices are key to facilitating a digital payments infrastructure built on secure data and secure flows of transactions. The trust earned from championing internal data policies, governance, and accountability can be critical for scaling with responsible innovation.

For example, safeguards on cross-border transfers of transaction information can help organizations aggregate and draw insights across global datasets in a secure and compliant manner, with the purpose of detecting anomalous patterns and pre-empting fraudulent attempts. With the emergence of sophisticated AI-powered fraud tools, it is increasingly important for entities to work with relevant and sufficient data to monitor and respond to new fraudulent patterns. Enforcing policies and requirements to safeguard cross-border transfers of information can also help set consistent standards to mitigate risk when exporting data to countries with less stringent privacy and cybersecurity regulations and frameworks.

Governments are uniquely empowered to design a policy landscape in which payment systems can thrive. They can further boost trust and payment system usage by becoming early adopters themselves. Facilitating public disbursements, distributing wages, and tax collection are all powerful use-cases that can bring both citizens and governments into the digital payments ecosystem.



Ukraine's launch of the e-Government platform, 'Diia' — enabling citizens to apply for social assistance and designate payment accounts — is an illustrative example of how one government's pioneering efforts, with support from Visa to implement digital payments technology solutions, enabled more than 16 million Ukrainians to receive social assistance payments by the end of 2022.<sup>10</sup>

To ensure all users can benefit from a payments system, the range of policy priorities should be centered around financial inclusion objectives and ideally mapped to broader national financial inclusion roadmaps. This will not only open accessibility and usability for all, but also help expand and fortify the payments system by bringing in more end users. This will in turn improve lives, boost local businesses, and strengthen economies.

## About the Authors

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## About VEEI

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Economic empowerment is about removing the structural barriers and systemic biases that have made it difficult for all individuals to take part in the global payments ecosystem. [The Visa Economic Empowerment Institute](#) (VEEI) provides a platform for the international exchange of policy ideas that can advance economic empowerment.

VEEI brings together experts in the fields of payments, economic policy, technology, security, international trade and economic development to advance VEEI's mission. These experts share a common purpose: the development of strategies that can eliminate the obstacles to economic success for people and businesses everywhere.

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<sup>10</sup> Figure accurate as of December 2022, Source: Ukraine Ministry of Digital Transformation, Visa internal data.



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