



PAYMENTS MODERNIZATION

OCTOBER 2022

Maximizing the benefits of the next generation of payment systems



Introduction

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Over the course of our in-depth [payments modernization series](#), we've focused on several aspects of modern payment systems. In doing so, we've offered examples from the 66 markets that now have access to real-time payments, and those soon to follow.

But what is 'modern' now may soon become outdated. We must therefore always be looking forward to how payment systems are continuing to evolve and what can be done to maximize the benefits they can offer.

In this paper, we've brought together the key topics that, from our experience and observations across the world's markets, require active and very careful consideration when preparing to upgrade or replace an existing real-time payment system. Or indeed when implementing one for the first time.

Giving appropriate attention to the topics covered in this paper is essential if the benefits of such an upgrade or implementation are to be maximized and the risks minimized.

Payment system modernization involves most participants in the financial services ecosystem, including central infrastructures, banks, fintechs, and ultimately any payments provider offering services directly to governments, corporates, merchants, or consumers. For these entities, modernization is seen through a number of different lenses. These include promoting innovation, increasing resilience, improving efficiencies, reducing costs, enhancing competition, seizing new revenue opportunities, meeting changing customer expectations, and improving financial inclusion.

Although end users, for the most part, care little about concepts or technology, they do care when they're presented with new and innovative services that solve a particular pain point or offer tangible benefits. All of the players in payments modernization must therefore become sharply focused on their end users. They must continuously adapt to unlock new opportunities by delivering enhanced propositions that reflect the thinking in this paper.

Whilst different approaches may be taken to payments modernization, the endpoint should be characteristically the same: an open ecosystem supporting increased financial inclusion, innovation, and economic growth whilst maintaining safety, stability, and resilience.

The growing importance of standardization

"P27 will reduce costs and complexities, as well as improve efficiencies... and ensure the region is aligned to E.U. standards."

As the industry in any country or region moves towards the next generation of payment systems, it needs to maintain a focus on interoperability to ensure the full range of benefits on offer can be realized, whether that's in cross-border payments, additional services for end users, or in using data for fraud solutions – as we'll come onto later in the paper.

Many markets have now moved to ISO 20022 as the de facto global standard for payments messaging. A **Mastercard review of real-time payment systems** around the world found two-thirds were based on ISO 20022 data standards. Several of the markets not currently using ISO 20022 have imminent plans to upgrade to take advantage of the benefits of the structure itself and the data carried – and the future potential for these systems to better co-exist.

ISO 20022 has created a common language for modernized payments. It's how banks and payment systems communicate. It enables several key pain points that exist for both banks and their end users to be addressed. For example, the structure of the standard facilitates the transfer of rich remittance information, which helps financial institutions and their customers improve efficiencies, especially by achieving higher rates of straight through processing. This is highlighted by one recent study that estimated **failed payments cost the global economy \$118.5 billion each year**.

Thinking at a wider level, a consistent message set for real-time and batch-based systems helps to simplify payment exchange across different systems and improve interoperability and the ability to layer on more services in future. The P27 Nordic Payments Platform is a standout example of this new thinking. It's expected to become one of the most advanced, innovative, and efficient payment systems in the world as it centralizes multiple countries around a common set of services.

By unifying the payment systems across Denmark, Finland, and Sweden into a single platform with multi-currency modules (including the Euro), P27 will reduce costs and complexities, as well as improve efficiencies. It will minimize friction in trade, be the vanguard of financial inclusion by providing people with greater control over their money, and ensure the region is aligned to E.U. harmonization and international standards.

"Continuous improvements to cross-border payments are being seen as service providers look to reduce the friction in these payment flows."

Reducing friction in cross-border payments

A progressive and standards-led implementation of an ISO 20022-based real-time service with enhanced payment flows can power the cross-border payments of the future by enabling interoperability between international payment systems.

These standards and rich messaging allow payment-related services, such as corporate enterprise resource planning or small business accounting platforms, to integrate directly into the payment ecosystem, driving innovation and improved services. This is therefore an increasingly important consideration when looking at the standards, design, and technology used, in both a domestic and cross-border context. Continuous improvements to cross-border payments are being seen as service providers look to reduce the friction in these payment flows while increasing their velocity between key trading nations.

This is proving to be transformative, not only in terms of removing barriers and increasing international trade, but also when it comes to easing cross-border payment pain points, including cost, speed, and transparency. This is particularly important for financial inclusion globally given the number of developing markets heavily reliant on remittances from people working abroad and sending money back home.

The international Financial Stability Board's roadmap has identified the interlinking of real-time payments as a key building block for the future of the industry, examining the harmonization of API protocols for data exchange and adopting a harmonized ISO 20022 version for message formats.

Interoperability between payment systems is something that many major markets are now actively discussing, including The Clearing House (U.S.). In 2020, **Buna** launched in the Middle East, a cross-border payment platform that will enable financial institutions and the region's central banks to send and receive cross-border multi-currency payments in a safe, cost-effective, risk-controlled, and transparent manner. Such projects will help to provide certainty of payment, and the ability to better track cross-border transactions.

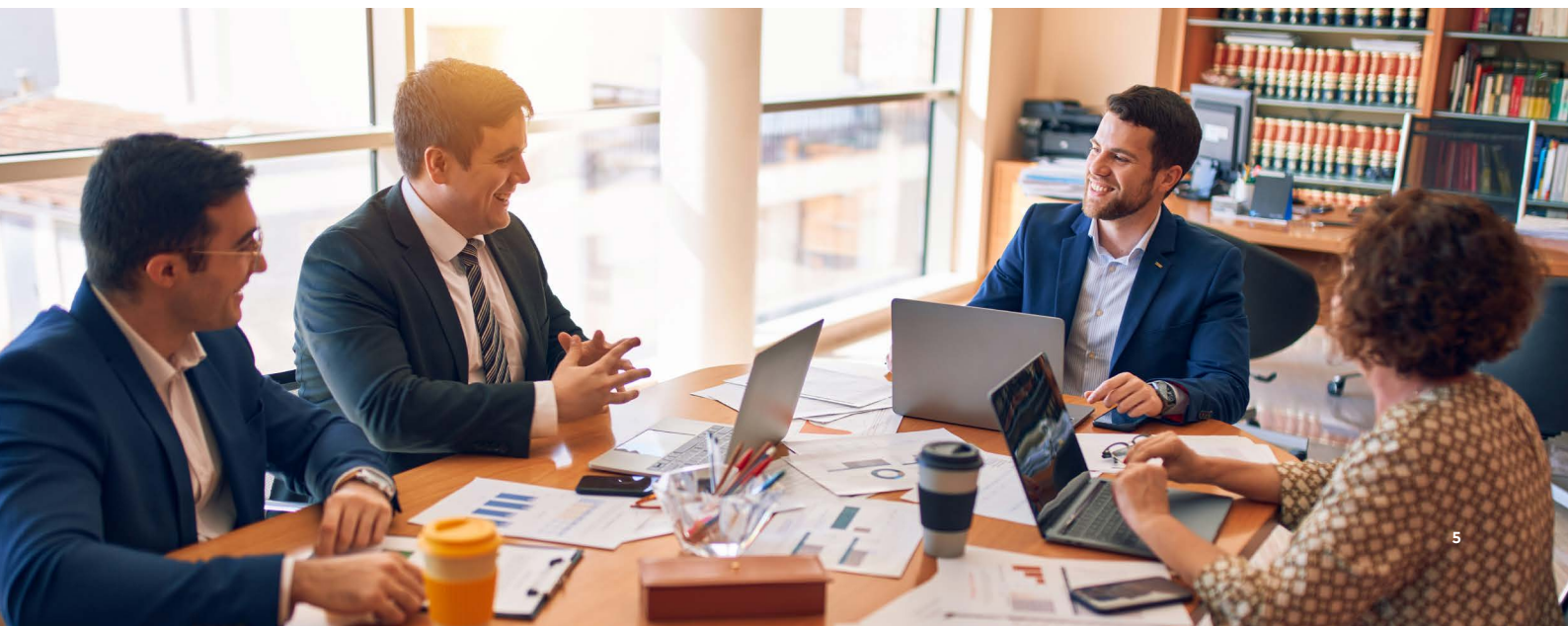
Improving liquidity management

High volatility and the significant growth in electronic payment transactions globally has made it increasingly important for banks, central banks, payment operators, and schemes to adequately predict and efficiently fund the participation in real-time payment schemes. Whether that's when deploying a new real-time payment service or modernizing or replacing an existing one.

During a period of parallel running or migration to new real-time payment infrastructure, there are implications for liquidity efficiency that must be considered carefully. Liquidity is also crucial for end users in that real-time payments facilitate the rapid transfer of funds, particularly when compared to the slower clearing cycle of checks, for example.

Liquidity management has always been a critical discipline for banks. Payments can stay within a single ecosystem, or may cross borders, schemes, and change currency. Traditional liquidity management methods are struggling to keep up. Payment schemes and their customers must ensure each payment system they use has optimal levels of liquidity. Those who don't risk overcapitalizing their settlement accounts with expensive 'high quality liquid assets' or face fines for poor liquidity management.

One solution for the next generation of account-to-account payment systems could be to operate a single pool liquidity model, governed by a central bank, by consolidating multiple supervised schemes' liquidity buffers on to a common platform that provides better management oversight and, ultimately, cost savings. The technology to drive new liquidity solutions is now available, with artificial intelligence (AI) that's able to optimize liquidity by ingesting large quantities of aggregated summary payment data, ideally in real-time. It's also able to provide forecasts of future volumes and values that can be used to optimize the levels of liquidity capital held by banks and to ensure that the supporting infrastructure can handle the expected volumes.



"Many payment systems have adopted a phased transition to introduce a standardized approach across a market."

De-risking migration

While the long-term benefits of moving to a modern payment system are clear, the migration process can be complex. Challenges typically stem from a variety of sources, such as not fully appreciating the scale of the modernization project, changing market priorities, and other supply chain pressures. Those driving the migration want the project to start on time and finish on time, but the participating banks want control and flexibility to move at their own pace. Working with a partner with strong experience of payments central infrastructure migration can allow those leading the project to access various proven approaches that can separate the migration from the readiness of banks, mitigating the risks and costs for banks also.

To ease the burden in the short term, many payment systems have adopted a phased transition from legacy formats and the use of tools that can introduce a standardized approach across a market.

The deployment of proven migration tools can enhance the transition from old payment system to new, achieving reduced levels of risk and delivering earlier benefits realization. A number of countries across the world have employed tools and techniques to achieve effective and on-time migrations to their new real-time payment systems.

For example, having the appropriate tools in place, such as an adaptor layer, helped manage the shift to PromptPay in Thailand, which is part of the Thai government's effort to develop a national digital payments infrastructure. The adaptor layer enabled the country's banks to leverage existing message standards and establish a new platform within an aggressive onboarding and industry test phase. This approach underpinned the rapid adoption of the new system and allowed further evolution to happen for participants over the following period, with strong volume growth and enhanced user experience.

This proven method was later successfully applied in the replacement of the Philippines' real-time payment system. Migration tools have also played a crucial role in Canada's move towards the Real Time Rail, which is set to go live in 2023 as the country's first national real-time payment system that will support faster, data-rich payments and act as a platform for payment innovation and competition. One note of caution is to be mindful that this approach doesn't become 'too' successful, and ultimately detract from the shift to a fully modernized, ISO 20022-compliant payment system.

Maximizing new data capabilities

“It’s crucial the opportunity is grasped to leverage ISO 20022 to its fullest extent.”

ISO 20022 has prompted a new data model fit for the future of payments. One that enables payments to be bound with other digital processes to create the next generation of payment services and use cases. Focusing on how to maximize these new data capabilities to benefit financial institutions and their customers – both individuals and businesses – must be at the heart of payments modernization efforts.

It’s crucial the opportunity is grasped to leverage ISO 20022 to its fullest extent. This can be done by ensuring that upgraded payments infrastructure can support an extensive set of payment and non-payment messages, and the extensive set of new customer propositions this approach can unlock.

The extent of the potential benefits on offer is becoming clearer as connections deepen and use cases evolve. For example, the ISO 20022 catalogue includes a ‘request to pay’ message. This non-payment message allows a business or other entity to issue a payment request to a customer with the remittance information included. The customer can simply and securely respond to this request, and real-time payment systems then process the credit transfer. This can reduce the processing costs and risk of error compared to manual capture and processing of invoices, streamline reconciliation processes, and reduce delays in accounts payable to improve cash flow management.

The Clearing House’s RTP® network is already deploying such data capabilities through its **Document Exchange service**. Document Exchange enhances the Network’s capabilities by providing easy access to documents, such as bills, invoices, and remittances in the same transaction flow with the payment or payment request.

Another example could be applied to domestic or cross-border payments to allow KYC credentials which are stored and persist end-to-end, increasing STP rates, reducing operational risk, and driving down money laundering and other illicit activities.

When opening up this world of new use cases and data, there are new considerations to take into account, such as the need to secure/encrypt payloads across the end-to-end payment flow, including payment and non-payment related data. Yet despite these new considerations, the data capabilities of ISO 20022 and the benefits it can bring are clear to see.

"It's essential to focus on consistent implementation of protective measures across the entire ecosystem."

Advancing the fight against fraud

Fraud is a huge and growing issue globally to the detriment of end users and participants in payment systems. The speed of real-time payments makes it an attractive attack vector for criminals. The central payments infrastructure, working in tandem with banks, has the potential to play a key role in helping to tackle this problem, especially when the industry works in partnership with law enforcement and other government bodies, so integrating modern anti-fraud capabilities into the design of new payment systems is essential.

For example, the richer data carried by the ISO 20022 standard can be used to help combat these dynamic shifts in fraud, with specific attention on certain types where losses continue to grow, such as Authorized Push Payment (APP) fraud, which in the UK recently overtook card fraud losses for the first time. In 2021, **the UK experienced total fraud losses of more than £1.3 billion**, of which £583.2 million (a year-on-year increase of 39%) was associated with APP fraud. This is a global problem, with the European Payments Council (EPC) also noting an increase in APP fraud.

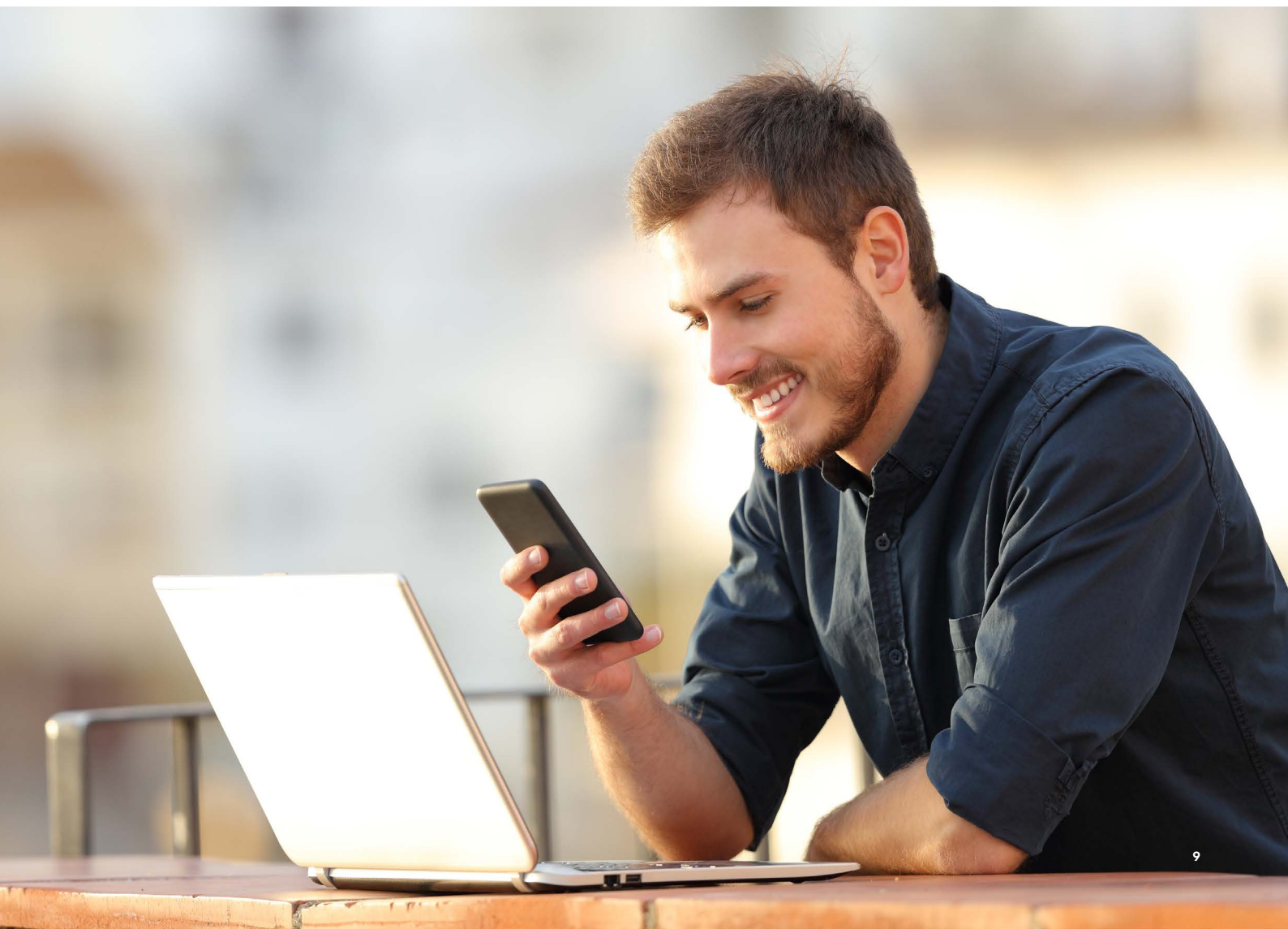
When we consider the challenges associated with retail payments in this evolving fraud context, it's becoming imperative to identify the risk across all parties in the end-to-end payment flow, which now has added complexity due to a myriad of new players in any given flow, such as open banking third-party providers.

With the types of players and flows increasing comes the need for additional security measures that help to protect the underlying transaction and therefore the end customers (be that individual consumers or businesses).

When implementing a new or replacement real-time payment system, it's essential to focus on what can be done to enable the consistent implementation of protective measures across the entire ecosystem, rather than it just being left to individual institutions to drive their own initiatives. One example is Confirmation of Payee, which has proven to be successful in reducing misdirected payments in the UK, using a consistent standard to align participating institutions in the interest of enhanced consumer protection.

More broadly, it's been demonstrated that when collaboration, such as enabling analysis of network-level data, is combined with technological innovations, such as AI, machine learning, or behavioural analytics, the ability to prevent fraud is significantly increased. Accordingly, such topics should be high on the agenda for industry, regulators, and governments when planning for a new or updated payment system. A coordinated and shared innovation agenda focused on protecting the payments ecosystem from fraud will be key, not least as it's very difficult for one institution or solution to solve the problem in isolation.

The introduction of ISO 20022 brings with it the potential to carry more data across the entirety of the payment itself, whether that's the expanded data fields, associated risk score(s), device analytics, or other verifiable metrics that can be combined with the latest technology and used to increase the certainty of a genuine transaction, thus reducing false positives and time handling exceptions.



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payment transactions processed
by PromptPay in 2021

Enhancing the user experience

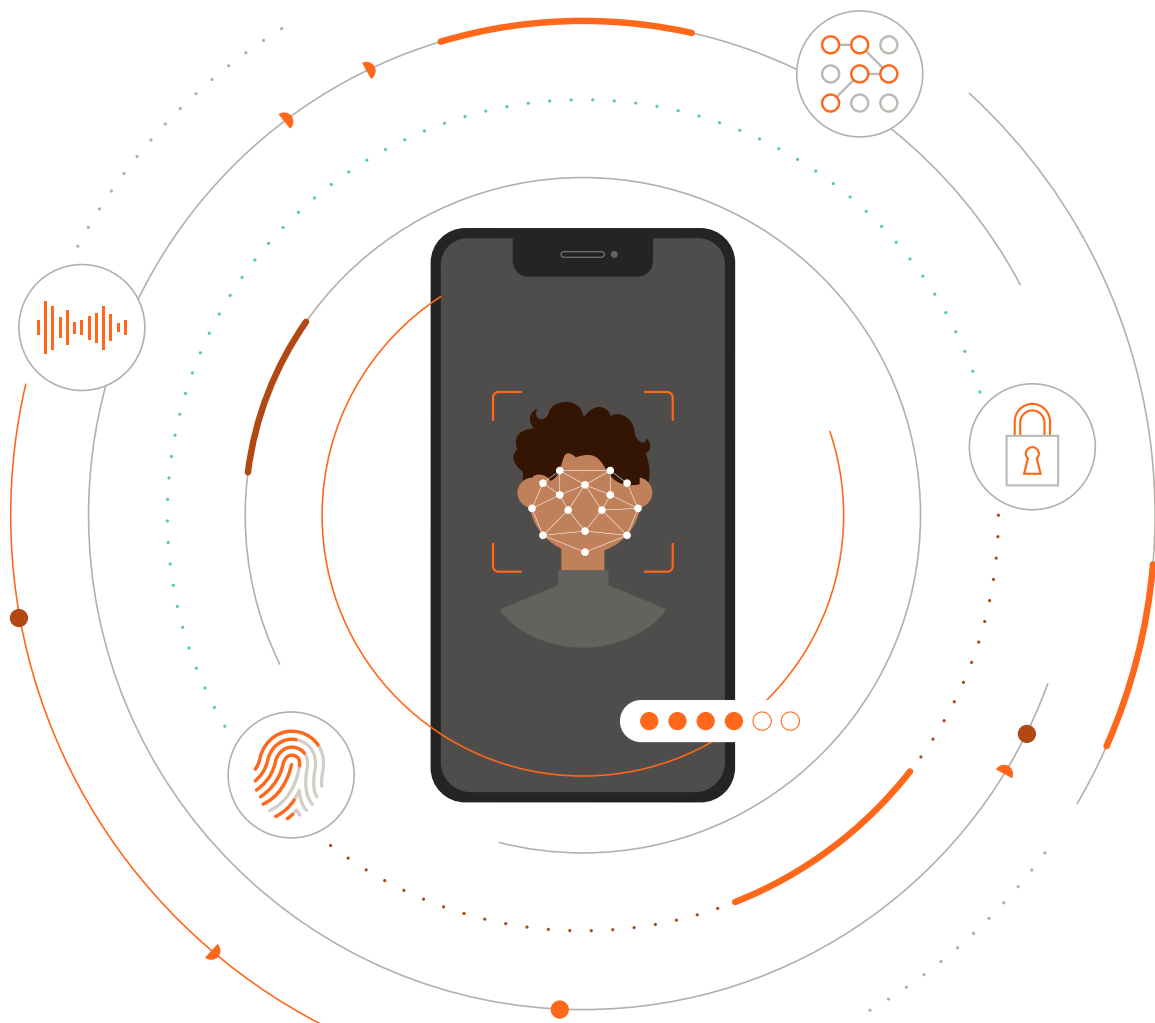
Proxy services allow people and organizations to send and receive payments using an alternative to bank details, such as a mobile number or citizen ID. Modern proxy systems, as well as supporting innovation, have brought with them increased convenience and usability for consumers, businesses, and governments as they support many more linked proxies. These include email address, e-wallet identifier, national identity number, tax identity, biller identity and QR codes.

This can help drive transaction volumes by making a payment system easier and safer to use for payers, providing more certainty of payee identity, and removing the need for payees to share bank account details. Thailand's PromptPay is a leading example of the scale and flexibility of proxies and how use cases can drive adoption of payment methods. The **PromptPay proxy service** maintains **over 55 million registrations** out of a population of 69 million people. These registrations are a combination of different proxies, such as mobile number, national ID and tax ID. In 2021, the system processed over 10 billion payment transactions.

There's a further opportunity to modernize the deployment model of first generation proxy systems. Some early systems were singular, centralized services storing all proxy and account data for each connected bank. By contrast, modern proxy systems support federalization of data, under which customers maintain their own proxy data under a set of common rules. By going further and adopting a federated model that supports interoperability, multiple proxy systems with differing rules can be linked.

Proxy services have an important role to play in relation to the ease and accuracy with which payees can be identified and paid. But there are also broader questions relating to identifying the user or device that wants to access and manage modern payment services. This is particularly pressing in developing economies, where proving who you are can be tough. Digital identity is a key component of financial inclusion but is two-sided in that the market needs trusted IDs and places to use them. The current process of signing up for services and paying for them is often sub-optimal, with consumers juggling hundreds of passwords, leaving personal data exposed, and facing friction to validate their identity.

The creation of a single, secure digital ID providing universal access to various financial and non-financial services, potentially combined with consent and mandate management services, could represent the next step in delivering on the promise of open, inclusive, and innovative payments environments. This is already being rolled out successfully in some places, like the Nordics, where BANK ID initiatives allow users to log on and use bank and government websites. The E.U. Commission also recently laid out plans to take this idea further via a digital passport.



"Consumer protection is required to ensure confidence and trust in open banking payment services."

Integrating with the 'open' environment

Open banking provides the ability for consumers and businesses to share their financial data to access new and innovative financial service experiences. This helps to increase participation in the digital economy through new touchpoints and drive the use of real-time payment systems.

As such, integrating, or ensuring compatibility, with authorized third party APIs to leverage the additional data-driven and payment initiation propositions on offer should be taken into account when designing the payment infrastructure of the future.

Open banking payment capabilities are becoming a reality all around the world. In Brazil and India, for example, open banking is driving financial inclusion by laying the foundations for new payment services for those previously underserved by mainstream financial institutions. In Brazil, 45 million people are currently unbanked but services like **instant payments scheme PIX** show how digital solutions can take off and bring them into the financial system.

There is a host of new open banking-enabled payment services being introduced across different markets. One is **'Pay by link'**, which allows businesses to cut out unnecessary payment steps by creating a simple link that enables customers to pay instantly in any given context. Based on open banking payments, 'Pay by link' will help to overcome existing payment barriers while providing the most cost-efficient payment method in any use given case. It's instances like this, where open banking intersects with real-time account-to-account payments, that make it particularly powerful.

Consumer protection is required to ensure confidence and trust in open banking payment services, such as a framework that looks at account-to-account payments through the same lens as credit and debit cards, where protection measures are in place, as well as returns and refunds.

The next stage in the journey is open finance, which will substantially increase access to the 'open' offering and widen participation in the market. Some countries, such as the U.S., are already there when it comes to data access, while others, such as Brazil and Australia, aren't far behind. This opportunity — combined with real-time account-to-account services — creates the ideal environment for new products and services. This chance for innovation and new revenue streams is as beneficial to the banks as for consumers and businesses — whether that's people being able to use their rent payments to prove creditworthiness or being offered more appropriate (and cost effective) products from insurers or utility companies.

Maintaining future focus

“Barriers to change, such as costs and complexity, are being broken down in favor of efficient, open, and scalable platforms.”

When it comes to creating modern payment systems, it's crucial to stay ahead of the curve and be prepared for the next wave of innovations and developments that can unlock long-term benefits for governments, the financial sector and society in general.

The growing power of cloud technology, for example, has the potential to democratize and simplify payment processes and should be a key consideration when designing next generation payment systems. Research by GFT Financial highlighted **86 percent of bankers have now adopted cloud services** to some degree to harness the cloud's virtually unlimited scalability.

Rapid access to consistent, compliant infrastructure coupled with cloud-native developer tooling has the potential to drive faster time to market for products and services. In this new technology landscape, barriers to change, such as costs and complexity, are being broken down in favor of efficient, open and scalable platforms available to all.

One challenge is the strict requirement in some jurisdictions for payments data to be held and maintained within that jurisdiction. While concerns over security, privacy, and control persist in some areas of the payments industry, they are being addressed through focused collaboration with the financial institutions and fintechs using the technology.

Central banks and regulators that oversee the world's national payment systems are examining whether the cloud can increase resilience, while also realizing the potential of such a flexible technology to drive open, inclusive, and innovative payment system transformation. Demonstrating increased resilience and addressing central bank concerns about managing outsourcing risk and concentration risk will be critical to enabling the wider adoption of cloud in critical payment applications.

"A two-speed approach reduces technology costs by smoothing volume peaks."

A continued role for batch payments

While real-time payments are growing fast, controlled batch payments remain a highly efficient approach and will continue to play a significant role in many payment systems.

As batch processing continues to have relevance and value in many countries, it's prudent to consider a future strategy for supporting and enabling batch payments at the same time as developing an upgraded real-time payments infrastructure. It's important to think about batch to real-time payment interoperability, and at Mastercard we're certainly seeing increased interest in 'batch in/real-time out' approaches.

Many real-time payment systems are built as a separate infrastructure to run in parallel with traditional batch infrastructure. While there's sometimes migration of volumes, for the most part they are considered complementary.

However, there are a few additional possibilities and options to consider. One option is a modular approach to implementation, an increasingly common and favoured approach to IT service delivery which means disruption can be minimized and risks are better managed. In the Netherlands, for example, they are using two speeds over the instant rails – true instant and slower, controlled payments. The migrated batch traffic can use the second option, recognizing that speed isn't essential here, but 24-hour, seven day operations are attractive. This two-speed approach also reduces technology costs for banks and other entities by smoothing volume peaks.

It's also worth noting that modern batch systems have improved settlement models, support ISO 20022 message standards (including non-financial message processing) and are broadening their access to include new financial institutions. There's also a move in some locations towards implementing a single integrated interface supporting multiple payment types and systems. The services being implemented in Canada, Indonesia, and the Nordics, through the P27 initiative, each take advantage of these types of new capabilities and were developed in parallel, expanding upon efficiencies not only in operations but design and implementation.

Batch systems have evolved and continue to have relevance and value in many countries, so it makes sense to consider them as part of any future strategy, while at the same time designing and procuring upgraded real-time payment infrastructures.

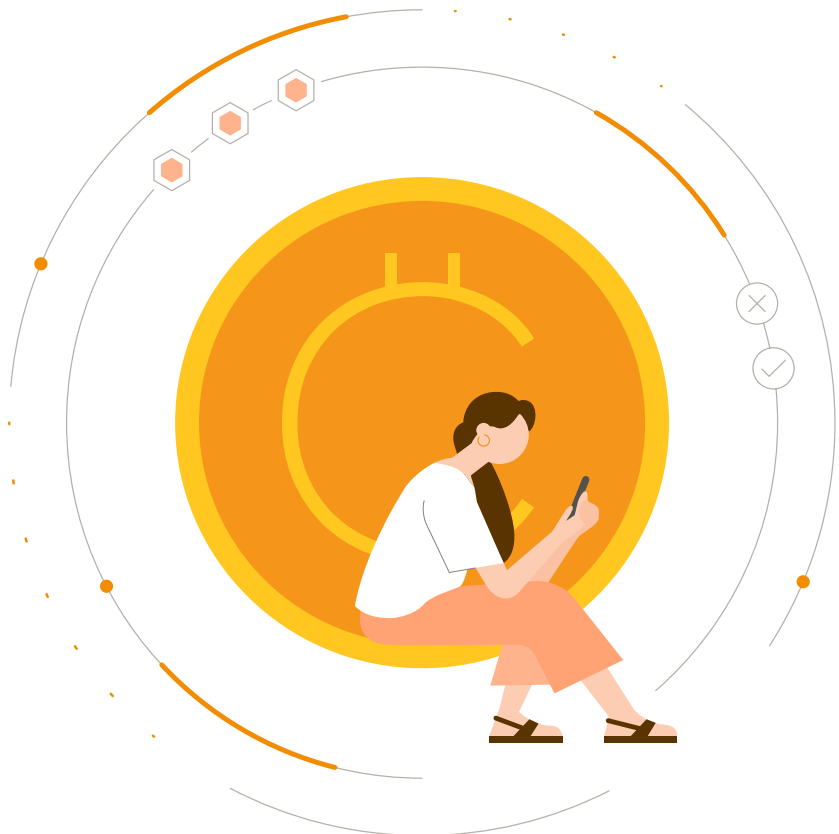
Coexistence with digital currencies

Building in a design assumption of future coexistence with digital currencies presents an opportunity to futureproof the next generation of account-to-account payment systems, to the benefit of a wide set of stakeholders.

In response to global trends and local needs, almost all central banks are now evaluating the benefits and challenges associated with developing and launching a retail Central Bank Digital Currency (CBDC) for public use as one of their day-to-day payment options.

Over the past few years, China has been steadily **making progress towards a digital renminbi** and appears poised to become the first major economy to launch an official CBDC. The focus on digital currencies goes wider than CBDCs, with some markets looking at bringing stablecoins as a means of payment into the regulatory perimeter, and the future regulation of crypto assets.

The potential benefits of modern payment systems supporting a CBDC, as well as other digital currencies, include cost-efficiency, enhanced reach, and the ability to leverage ecosystem-related services, such as fraud prevention capabilities where multiple forms of digital payment flows are supported as an additional currency payment stream on the existing infrastructure.



74%

of central banks and authorities said expanding access of financial products and services is a trigger for payments reform.

Driving the shift towards financial inclusion 2.0

Throughout this paper, we've touched on the idea that the next generation of payment systems must be open and inclusive. In today's digital world, it's essential that everyone can access digital payments in an intuitive and cost-effective manner. This concept is at the very heart of payments modernization and must be a core consideration when designing modern payment systems.

As the **Bank of International Settlements** noted, "financial inclusion starts with payments." In most cases, payments modernization is driven by public policy. Three-quarters (74%) of national and regional central bank and monetary authority representative respondents to the World Bank's **Global Payment Systems Survey** cited expanding access of financial products and services as a trigger for payments reform. For central banks, it's a call to action to improve clearing and settlement mechanisms, the types and availability of payments instruments available, legal and regulatory frameworks, and market arrangements.

India provides a good example. When it launched IMPS, its first real-time payment system, in 2010, just 40 percent of Indians had a bank account, according to figures from the World Bank. Today, well over 80 percent of Indian adults have access to one. In 2016, Universal Payments Interface (UPI) launched, and is now one of the largest schemes globally with 19 billion transactions recorded in 2020. The success of UPI is in part due to its accessibility, with its open banking-style implementation allowing people to pay from multiple bank accounts from a single app.

The world is now moving towards 'financial inclusion 2.0', which is the fast, low cost, digital delivery of financial services for both the unbanked who still require the necessary access and support, but also for the banked population who look for ever increasing capabilities and offerings to support financial wellbeing. Modern payment systems must fit with this ethos.

The financial services industry should also look to support countries in their growing aspirations to achieve net zero. Producing cash requires water, energy, and fuel. Each of these inputs has its own price or can be translated into the cost of carbon dioxide it produces. Payment system modernization can help to reduce this environmental impact of cash processing by contributing to the development of an accessible, digital-first approach.

Creating new opportunities together

“All players across the payment ecosystem must work together to unlock the full potential of enhanced data.”

In this paper, we've outlined the key considerations for governments, central banks, and payment system participants alike when considering upgrading an existing real-time payment system or implementing one for the first time. The topics covered, from the focus on standardization to maximising data opportunities and keeping one eye on future innovations, must all be at the heart of the journey to maximize the potential of real-time systems.

It would be a missed opportunity to not appropriately address these considerations when upgrading or introducing a real-time payments infrastructure. The business case for change will be much weaker, opportunities for innovation and honing a competitive edge missed, and the chance to futureproof payment systems as much as possible will be neglected.

Standardization in the shape of ISO 20022 is a key enabler for payments modernization, and it's crucial the industry uses the appropriate tools to ensure a low-risk migration. All players across the payment ecosystem must work together to unlock the full potential of the enhanced data available in the market, which can be harnessed for value-adding new propositions and use cases, and drawn upon to protect end users by assuring identity and tackling financial crime.

Digital innovation is increasingly made possible by advancements in cloud computing, and such innovation is also essential to financial inclusion efforts as we move towards an age of open finance and the opportunities it presents to help build open, inclusive, and innovative payment systems.

The industry also needs to keep a firm eye on the future when designing payment systems, making provisions for the evolving role of batch payments in a real-time world, integrating digital currencies, and reducing friction in cross-border payments.

The right partner at the right time

At Mastercard, our mission is to modernize payments, supporting people, businesses and economies. Mastercard's multi-rail capabilities underpin this effort, bringing together card, bank account, and alternative digital propositions to cater to a broader range of payment types and experiences.

We've established ourselves as a trusted partner because we don't just talk about real-time payment systems and surrounding services but build and run them too. Mastercard is powering real-time payments in 15 of the world's markets, including 12 of the top 20 countries by GDP.

Our firm belief is that through focused collaboration, we can accelerate the number of world-leading payment systems that will power the digital economy and enhance financial markets around the globe.

To read more about payments modernization, visit b2b.mastercard.com/paymentsmodernization





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