Real-Time Payment Application Program Interfaces (APIs)

Fasterpaymentscouncil.org

December 2023

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Executive Summary

The U.S. Faster Payments Council's Secure and Instant Payments API Work Group (APIWG) presents this paper which endeavors to identify a set of best practices for instant payment APIs and how they can support the evolution of instant payments in the U.S. market.

This research on best practices for instant payment APIs focuses on API connectivity between corporate originators and payment providers (e.g., financial institutions, third-party payment processors, etc.). These insights were used to identify commonalities for API usage across the globe and were reviewed against a variety of stakeholder perspectives to identify best practices for the development and use of secure APIs to originate instant payments in the U.S. market.

For clarity, it was not part of the work group's effort to create API standards as there are already such efforts underway. Rather, the work group focused on providing best practices that could be applicable to support any of the standards and/or proprietary APIs that are being developed in the industry.

KEY INSIGHTS FROM INTERNATIONAL AND DOMESTIC RESEARCH LEARNING

The APIWG's research revealed several key factors that appear to have contributed to, or held back the successful adoption of, instant payments in other markets. General themes which were prevalent across international and domestic markets and deployments included:

- Instant payment APIs can be effective in supporting the development of innovative, value added, instant payment features and use cases.
- The maturity of the instant payment APIs in a market is correlated with the Open Banking maturity in that market. Evidence of this was seen in the UK where PSD2 and the CMA order positively influenced API creation and in Brazil where Open Banking efforts accelerated the growth of PIX.

In markets like the U.S., where the availability of instant payment APIs evolved because of market forces, i.e., not the result of the introduction of mandatory API standards or Open Banking regulation, the resultant fragmented API environment creates additional initial expenses and slows market scalability.

FINDINGS – BEST PRACTICES

Drawing on the observations from the research and collective insights of work group members, the APIWG identified the following best practices for the five core functions of instant payment APIs which if followed, would help accelerate the success and growth of instant payments in the U.S. market:

- Automate registration for all instant payment APIs to make them easier to use.
- Create minimum defined standards for user authentication.

- Include additional payment data to improve payment approval, drive more robust controls, and facilitate development of supporting value-added tools.
- Implement quick look-up directory utilities to expedite efficient transaction initiation set-up.
- Integrate embedded fraud, risk management, and sanction screening controls and tools to protect all parties in the payment chain.

The research findings also underscored the positive impact that instant payment API standards have had in driving consistent definition of instant payment APIs across all markets and bridging the gap to interoperability.

The APIWG views that the revolutionary changes to business models and payment ecosystems seen in other markets can be replicated in the United States by adopting the best practices mentioned in this paper. The result will be a new payments environment inclusive of robust instant payments support that benefits all players in the ecosystem. Corporations will gain more efficient tools to modernize and reinvent their businesses. Payment providers will gain more options to provide their customers with spurring growth and ongoing investment. And finally, consumers will receive better financial products custom-tailored to their ever-evolving needs.

THE CURRENT ECOSYSTEM

Immediate settlement and 24x7x365 availability drove the early use of instant payments in the U.S. Digital wallet unloads and earned wage access were two of the first use cases with broad appeal as they offered immediate deposit of funds into consumer accounts outside of normal banking hours. The immediacy requirement also drove payment providers to seek out new payment origination methods as traditional methods were not equipped to manage these immediacy needs. These providers turned Application Programming Interfaces (APIs) into powerful tools that enable simple and immediate connectivity between corporate originators and payment providers.

Best practices for instant payment APIs focus on API connectivity between corporate originators and payment providers (e.g., banks, third-party payment processors, etc.). Today, most U.S. corporate originators work with multiple payment providers providing critical business functions to the corporation (e.g., third-party core banking system provider, financial institution, payroll provider, ecommerce acquirer, POS acquirer, payment facilitator, etc.). Each of these payment providers has in turn developed proprietary instant payment solutions and corresponding APIs. Financial institutions also struggle to add new services, since many third-party core banking systems do not offer open APIs for the integration of other service providers, having to rely on the core-banking provider's add-ons to innovate.

Corporate originators are faced with significant integration expenses as well as technical debt to participate in instant payments. This fragmented environment lacks the consistency and interoperability needed to rapidly scale adoption of instant payment APIs and instant payments themselves. With network scale still in early growth stages, there has been a slowdown of new use cases and corporate participation which could have a negative impact on the ubiquity and success of instant payments in the United States.

THE PURPOSE OF THE RESEARCH

The APIWG charter proposes to develop industry guidelines and best practices for the use of secure APIs. This research effort is designed to enhance the industry's understanding of APIs and how APIs are used in onboarding/enrollment and the initiation of payments in the United States and in other markets by identifying industry best practices. To that end, a review of the EU Open Banking Initiative and the Brazilian Open Banking and Instant Payment Service (Pix) also provided valuable lessons learned for future U.S. implementations.

The APIWG began creating an inventory of APIs in support of instant payments as categorized by functionality and segmented by channel, and then surveyed stakeholders to validate stakeholder commonalities and distinguished features. This enabled the APIWG to begin building an understanding of various stakeholder perspectives and how secure instant and immediate payments APIs could meet the needs, and desires of relevant stakeholders.

By examining the core functionality for instant payment APIs, the APIWG aims to provide insights on the status of APIs development and opportunities for future build out.

Taxonomy of Payments APIs

A multitude of APIs have been developed for the payments ecosystem, however in this analysis, the APIWG narrowed its focus to APIs that facilitate instant payments – specifically API connectivity between payment providers and corporate originators. These instant payment APIs were categorized into five core functions, namely:

- Registration and Onboarding
- Log In and API Access Management
- Payment Initiation and Payment Processing Related
- Directory Functions
- Embedded and Additional Functions

REGISTRATION AND ONBOARDING

Registration APIs enable corporations to enroll to participate in a provider's instant payments APIs service. Onboarding APIs focus on enabling employees or customers of the corporate to access and use the instant payment service. These APIs incorporate capabilities to simplify and/or automate a variety of tasks including KYC validation, device and IP registration, entitlements, user authentication, preference settings, sanction screening, account opening, and subscriptions.

LOG IN AND API ACCESS MANAGEMENT

Maintenance APIs enable the management of administrative functions related to adding or modifying account settings, such as managing log-in/API access, usernames and passwords, and channel access through various means such as mobile phones, digital wallets, email, and online platforms.

PAYMENT INITIATION AND PAYMENT PROCESSING RELATED

This is a wide-ranging category of APIs that facilitate instant payment processing functions. These may include initiating payments (credit push), request-for-payment initiation, receiving acknowledgement or response codes for payment initiation, querying and reporting payment status and account balances, as well as verifying payee identity and accounts.

These payment processing APIs may be specific to a payment type or capable of handling both instant and other payment methods by sharing common functions. Various payment APIs are designed to support specific features and functionality related to instant payments.

DIRECTORY FUNCTIONS

A directory API provides access to a directory of information related to customers or other entities. This information could include bank routing numbers, account details, aliases, and other data that is useful for processing payments or other transactions.

The directory itself is typically maintained by a central authority or organization, such as a payments network or industry consortium. The directory can be populated with data from various sources, such as financial institutions or third-party providers. It may also contain additional information about each customer or entity, such as geographic location, transaction history, or other relevant data.

The use of directory APIs is becoming increasingly important as the demand for instant payments grows. By providing access to a standardized directory of transacting parties information, directory APIs can reduce friction in the payment ecosystem and help to promote interoperability. Directory APIs can also help to improve security by ensuring that authorized parties only access sensitive customer data that is properly vetted by the regulated directory sources.

EMBEDDED AND ADDITIONAL FUNCTIONS

APIs for embedded and additional functions encompass a wide range of supplementary services that enhance the core features of instant payment APIs. The APIWG identified four common functions in this category:

- Controls built to prevent fraudulent transactions are typically integrated into enrollment, log in, and payment initiation/processing APIs to differentiate instant payment products. Some examples are features such as virtual payment addresses, identity verification, multi-factor authentication, tokenization, and payee confirmation that have emerged globally to combat fraud.
- Sanction screening features ensure that all parties involved in payment transactions are screened against sanctions lists such as OFAC.
- Transaction data reporting API features are crucial for reconciliation and other cash management needs.

Research Methodology

To better understand the state of the instant payments API environment, the work group reviewed instant payment APIs across a variety of international and domestic deployments. The APIWG chose to focus primarily on API connectivity between payment providers and corporate originators as the variability across these APIs was identified as a large impediment to scaling instant payments in the U.S. For the international part of the research, API documentation was not available for these same entities, so the work group reviewed the API documentation from sources available on instant payment rails or from regulatory sources in those markets with a more mature Open Banking environment.

The instant payment APIs reviewed represented a variety of instant payment related functionality across a variety of use cases. Within the five core API functions identified in the taxonomy, the work group focused on common approaches and functionalities. The work group also identified whether the APIs were proprietary or based on an accredited industry standard, the applicable use cases, and reviewed the state of Open Banking in the markets included in the research.

API Documentation Sources

To identify the state of development for the payment APIs in the five core functions, the APIWG researched any documentation or developer reference guides made publicly available. The availability of this documentation varied on a country-by-country basis and the sources that were used for this research are noted in the individual country summaries (see appendix). In contrast, public payment API documentation was limited for the U.S. domestic companies, due to the nascent stage of development of instant payment APIs in the U.S. and/or lack of mandates for API standardization.

These sources were used to identify commonalities and de facto standards for API usage across the globe and were reviewed against a variety of stakeholder perspectives to identify best practices for the development and use of secure APIs to originate instant payments in the U.S. market.

The research findings are presented in two categories - international and U.S. domestic.

INTERNATIONAL RESEARCH LEARNINGS

The international markets researched included the Australia, Brazil, European Union (EU), India, Singapore, and the United Kingdom (UK). Each of these markets were reviewed by the five core API functions.

The research shows that the maturity of the Open Banking environment and influence of regulatory mandates can accelerate the availability of instant payment APIs, as exemplified by the EU, the UK, and Brazil. Having standardized format requirements and removing the need for proprietary APIs improves the user experience and appears to increase the uptake of APIs across the market.

Secondly, the research shows that including controls to prevent fraudulent transactions as part of the payment API portfolio appears to be a fundamental element for all markets the work group reviewed. For example, the Virtual Payment Address (VPA) developed by UPI in India includes safeguards such as identity verification and payee confirmation, so users know they are paying the right person. VPA is also utilized by Singapore's PayNow rail. Similarly, Australia's Instant Payments rail, New Payments Platform (NPP), includes the PayID service which provides similar functionality and NPP also leverages the participating banks' fraud and security protections for internet and mobile payments for added security. Similarly, Open Banking regulation in the UK, EU, and Brazil, i.e., the CMA Order and the 2nd Payments Services Directive (PSD2), Regulatory Technical Standards (RTS) extensively cover fraud prevention and AML measures. Likewise, the Brazilian Central Bank (BCB) Resolution No. 1[1], outlines Pix's operational foundation, emphasizing AML and counter-terrorism financing (CTF). Pix holds a relevant fraud prevention framework, having Strong Customer Authentication (SCA) requirement to ensure users undergo multifaceted verification for transactions and employs a dynamic risk-based authentication, adjusting verification measures based on the perceived risk of each transaction.

Third, the work group found benefits to combining data access and payment APIs as this combination makes the necessary data elements available to instruct the payment as well as support ancillary functions like fraud prevention. In addition, having access to additional data enables development of value-added services to benefit payment users and improve ecosystem transparency.

Lastly, one of the hallmarks of the Faster Payments initiative is interoperability. The APIWG's international research shows that most of the markets reviewed have made efforts to build instant payment APIs with interoperability in mind and the work group believes that the availability and accessibility of instant payment APIs will be instrumental to achieving interoperability and ubiquity of instant payments in the United States.

OPEN BANKING INFLUENCES

The introduction of PSD2 in the European Union and the Competition and Markets Authority (CMA) Order in the UK exemplifies how the regulatory environment can spearhead growth of Open Banking and the rise in API creation across the payment ecosystem. Open Banking API requirements for support of Payment Initiation Service (PIS) APIs and Account Information Service (AIS) APIs have gone a long way to enable account-to-account transfers and third-party data access across bank accounts in the EU and the UK. The UK CMA Order already includes API standardization requirements which has supported the growth of API development and availability in this market. The EU's PSD2 do not currently have API standardization requirements in place, however, one of the expected changes to be made by the European Commission with the introduction of PSD3 is the standardization of these requirements to support the growth of APIs across the market. Similarly in Australia, the four biggest Australian banks were required to adopt standards for allowing secure access to customer data under the Consumer Data Right (CDR) in 2020, and in 2021 all Australian banks were required to do the same supporting the growth of APIs in that market. Payments are currently not part of the scope for CDR, but this is expected to change going forward. Brazil, on the other hand, currently has API standardization requirements in place for Open Banking established through BCB's regulations, which includes security requirements for data access. Open Banking norms require the users' electronic consent for information sharing, which is also one of the legal bases for personal data treatment as established under Brazil's General Data Protection Law (LGPD). The Brazilian Open Banking also has instant payments under its scope, considering its third phase focused on embedded Pix payments. Therefore, just as in the EU and UK, Brazil is also an example of how efforts of the centralized monetary authority led to API implementation.

DOMESTIC U.S. RESEARCH FINDINGS

The survey showed that most of the instant payment APIs already available in the U.S. market today, as well as those being developed, were proprietary in nature[2]. Financial institutions have partnered with fintech's to make traditional financial services (e.g., investments, loans, automated bill payments, embedded finance, etc.) more accessible to customers and provide channel access to innovative processes. Proprietary instant payments APIs provide easy access to the financial institution's payment initiation and payment related services, however, as a result, corporate originators are faced with significant integration expenses as well as technical debt to participate in instant payments. With network scale still in early growth stages, the result has been a slowdown of new use cases and corporate participation which could have a negative impact on the ubiquity and success of instant payments in the United States.

The findings below are listed per the five core API functions reviewed by the work group.

REGISTRATION AND ONBOARDING

The research shows that across the geographies reviewed, automated registration through API is not widely supported. For most of the companies that were part of the review, these functions being performed manually by the companies' relationship management teams. Onboarding processes tended to be more automated but still required some level of manual interaction to complete.

LOG IN AND API ACCESS MANAGEMENT

U.S. company respondents support authentication features, such as OAuth protocols or internally developed authentication methods, for their log in process and/or API access management. Some of the companies – primarily the financial institutions – also support embedded authentication practices; however, this was not a commonality across the included parties since the authentication for the end user (payor) is typically performed by their financial institution.

Log in and access management is primarily performed manually, but OAuth and similar credential frameworks are being leveraged for log in and access once the user has been registered. End user authentication has become a critical part of the overall log in and API access management process where the APIs reviewed support end user authentication in several ways, including authenticating the user by creating and updating user profiles through a web service, as well as synchronizing user applications using features such as unique user IDs and standardized email communications. End User account authentication was addressed via a variety of methods, ranging from simple API checks to validate participation of the account in the network scheme to integration of third-party identity services to validate ownership of the account by the end user.

PAYMENT INITIATION AND PAYMENT PROCESSING RELATED

Credit push payment initiation and related functions were supported across the board for the companies that were part of the work group's research. Request for - and acknowledgement of - payment initiation also is a standard offering. Furthermore, some companies support payee account validation and identity confirmation. Overall, the research indicates that payment features included at the rail level typically are supported by the stakeholders of the payments ecosystem, including participating FIs and payment service providers.

The work group also reviewed whether the available instant payment rails offered rail interoperability. The U.S. instant payment rails, TCH RTP® and FedNow®, do not offer such capabilities today, therefore an entity that wants to access these payment networks needs to support two separate platforms and integrations.

Further, neither of the U.S. instant payment rails currently support international transactions today, although in 2022 The Clearing House (TCH) announced a pilot program for immediate cross-border (IXB) payments that is being launched by EBA Clearing, SWIFT and TCH[3]. The pilot will leverage the existing real-time payment systems (i.e., RTP® (USD) and RT1 (EUR)) for cross-border payments[4]. Similarly, the U.S. company research suggests that the development of international and cross-border payment functions lags domestic priorities, however several of these respondents mentioned that this functionality is in the process of being developed or is part of their current roadmap.

DIRECTORY FUNCTIONS

The U.S. company research identifies that only a limited number of directories are being used today, which suggest there is room to incorporate directory technology into future developments. Some U.S. companies reported that they offer some payor identity registration and verification as well as routing capabilities.[5]

EMBEDDED AND ADDITIONAL FUNCTIONS

Embedded Functionality

The APIWG research suggests that value added services still are in the nascent stage of development in the U.S. where the financial institutions and technology providers are leading the charge to develop AML functions and controls to prevent fraudulent transactions. However, embedded functionality is on the drawing board for many of the API companies surveyed. One respondent said a major initiative is underway in 2023 to offer an embedded payment experience with a full suite of payments and reporting API functions along with a developer portal. Another respondent supports embedded APIs for KYC/KYB and account verification. All companies are supporting transaction data reporting.

Controls to Prevent Fraudulent Transactions

The research shows that some of the companies offer controls to prevent fraudulent transactions as part of their payment APIs or other APIs in their portfolio. Building these types of features into the transaction processing interfaces APIs is a common approach among the API vendors.

Furthermore, at the rail level, The Clearing House (TCH) has launched a service called Secure Token Exchange that issues tokens for financial institutions' account numbers for payments processed on the RTP® network[6]. Participating FIs are not required to issue tokens for their account numbers today, however, all participating FIs are required to verify that their compliance practices (e.g., AML monitoring and reporting) can accommodate tokenized account numbers. With this feature, the person making the payment does not need to share their actual bank account number.

Similarly, the Federal Reserve's FedNow® service will offer fraud prevention tools to participating FIs, including the ability to establish risk-based transaction value limits, the ability to specify certain conditions under which transactions would be rejected (i.e., an account number "negative list"). Both organizations feature message signing to authenticate and validate that message content has not been altered and participants will be required to report fraud and as appropriate, fraud related information will be shared with counterparties to help bolster their fraud-mitigation efforts.[7]

Sanction Screening

Stand-alone APIs supporting AML, sanction screening and other fraud functionality were not commonly available as these types of capabilities were typically incorporated into payment processing services.

OPEN BANKING INFLUENCES

The international research shows that regulatory mandates for Open Banking have made a significant impact on the availability and growth of payment APIs in other markets. But the lack of similar regulation in the U.S. means that no API standardization is enforced today, and therefore U.S. financial institutions may continue to develop their own proprietary APIs rather than ones that are interoperable. Most of the Open Banking APIs that are available in the U.S. market today provide access to consumer information, including details such as personal identifiable information, bank account balances and historical transactional data, however, these APIs only include read access and payment capabilities (write access) are currently not in scope. Open Banking principles in the United States also require a setup where the data holders (i.e., the financial institutions) and third parties are subject to bilateral data access agreements, which further hampers widespread growth and development of standardized payments APIs. In sharp contrast to Europe, Brazil, and other parts of the globe, the Open Banking principles in the United States are not subject to government mandates or API standardization today. Historically, the U.S. market has always been driven more heavily by market competition, and in the current environment, the U.S. market may continue to develop payment APIs in a proprietary manner that best suits their clients' needs in a highly competitive banking environment.

Drawing on the observations from the research and collective insights of work group members, the APIWG believes that implementing the following instant payment API best practices will positively influence the growth of instant payments in the U.S. market.

REGISTRATION AND ONBOARDING

Introduce automated registration for all instant payment APIs to make them easier to use.

Although few of the companies surveyed were supporting automated registration and onboarding through their APIs today, there was a consensus that these processes need to become more highly automated and user friendly to reduce friction and scale.

LOGIN AND API ACCESS MANAGEMENT

Create minimum defined standards for user authentication.

The APIWG research shows that End User account authentication has become a critical feature to ensure a secure instant payments environment with solutions where credential frameworks such as OAuth are being leveraged for log in and access control. End User authentication needs to:

- Validate the identity of instant payments users to prevent unauthorized origination of instant payment credits and requests for payment.
- Support a minimum defined standard for user authentication without unduly impeding participation (e.g., being too slow and cumbersome).
- Satisfy regulatory concerns which can increase confidence in instant payments.
- Expand security controls as instant payment regulations and systems mature and scale to support the acceleration of instant payments API adoption in the United States.

PAYMENT INITIATION AND PAYMENT PROCESSING

Include additional payment data to improve payment approval, drive more robust controls, and facilitate development of supporting value-added tools.

Instant Payment rails in the United States are built upon the ISO 20022 standard which supports the inclusion of robust data in instant payment messages. Leveraging this infrastructure to integrate payments transaction data with other customer information is extremely valuable to ecosystem participants. The inclusion of additional data will support and provide the increased insights needed to develop value-added solutions supporting the continued growth and product enhancements for the available instant payment rails in the United States in similar fashion to the introduction of the IPI in Brazil and VPA and PayID services developed and introduced in India, Singapore, and Australia.

DIRECTORY FUNCTIONS

Implement quick look-up directory utilities to expedite efficient transaction set-up.

The APIWG research shows that directory tools and features are being built into instant payment APIs to improve overall transaction security as more countries and companies find ways to ensure the safety and soundness of instant payments. APIs for directory access and participant lookup must be supplemented with "quick look-up" utilities to expedite efficient transaction set-up and remove friction from the alias process.

EMBEDDED AND ADDITIONAL FUNCTIONS

Integrate embedded fraud, risk management, and sanction screening controls and tools to protect all parties in the payment chain.

Instant payments create new risk vectors that need to be effectively managed to reach full market potential. Risk management learnings from other markets and payment schemes need to be incorporated into instant payment APIs via embedded fraud and risk management, as well as sanction screening and AML tools to achieve the required balance of security, usability, and product differentiation. Additionally, solutions need to be flexible to adapt to new use cases that will emerge (e.g., straight-through processing). Finally, the use of sophisticated technology tools like tokenization needs to be standard API capabilities to ensure the safety and soundness of instant payments.

MARKET ADOPTION ACCELERANTS

The Importance of Standards.

The development of standards by an industry-recognized standards body will drive consistent definition of instant payment APIs across all markets and help to bridge the gap to interoperability. In markets where mandates and/or standards governed the evolution of instant payment APIs there has been clear growth of API creation and evolution of instant payment adoption. The APIWG research indicates that adopting standards have a positive influence on achieving consistency in instant payment API functions, data formatting and reporting which further support the growth of instant payments.[8] Spurring market adoption in the United States, while retaining the competitive framework the market requires, requires API standards that balance consistency with customization necessary to encourage innovation through market investment. The standardization of supporting APIs will also enable greater interoperability between RTP® and FedNow.®

Final Thoughts

The instant payment APIs evaluated in this research study had consistent features, however, the implementation of those features differed significantly by market. The APIWG research indicates that instant payment APIs - and associated features - are deployed more consistently in those markets where API standards are established and the Open Banking environment is more mature, regardless of having been established before or after a nationally relevant instant payment system. Where standards are not established, there is significantly greater variability in deployment. This variability, whether inter- or intra- market, is driving differences in market adoption.

In locations like the United States, which primarily rely on market forces to drive adoption, market adoption of instant payments has been slowed by the need for instant payment originating corporations to adopt different APIs for each financial institution or payment provider utilized. There are a multitude of private sector organizations working on API development and standards, but those initiatives are fragmented. To expedite adoption of streamlined API deployment, many of these organizations may need to coalesce around streamlined options. Streamlined deployment can be found in various regions, including the UK, where the introduction of the CMA Order and the OBIE[9] entity and its associated API standardization requirements has resulted in significant growth of the availability of Open Banking APIs in that market. Similarly, regarding Open Banking in Brazil, BCB established standardized requirements for APIs. For Pix, participating financial institutions and non-bank institutions could create their own Pix APIs but must adhere to the API specifications and operational guidelines set by BCB in their implementation.

The APIWG believes speed of adoption and increased API standardization could be enhanced in market-oriented geographies, such as the United States through the adoption of the best practices for instant payment APIs similar to those mentioned in this paper. Improved coordination and speed of adoption will result in new payments environments inclusive of robust instant payments support that benefits all players in the ecosystem. With the advent of increased industry stakeholder alignment across the public and private sectors, corporations will gain more efficient tools to modernize and reinvent their businesses. Payment providers will gain more options to provide their customers with spurring growth and ongoing investment. And finally, consumers will receive better financial products to keep pace with their ever-evolving needs.

Acknowledgements

About the Faster Payments Council and the Secure Instant & Immediate Payment APIs Work Group

The Faster Payments Council (FPC) is an industry-led membership organization whose vision is a world-class payment system where Americans can safely and securely pay anyone, anywhere, at any time and with near-immediate funds availability. To further this vision, the Faster Payments Council established the Secure Instant & Immediate Payment APIs Work Group to develop guidelines and best practices for the use of secure APIs for enrolling/onboarding users and for the initiation of instant and immediate payments, regardless of the network used.

Contributors

Thank you to the members of the FPC Secure Instant & Immediate Payment APIs Work Group (APIWG), sponsored by Trustly, who contributed to this guideline.

APIWG Leadership

Dean Nolan (Chair), Strategic Resource Management Inc.
Moa Agrell (Vice Chair), Trustly, Inc.
Maria Arminio (WG Facilitator), Avenue B Consulting

APIWG Overall Contributors

Azeem Sattar, Airbnb, Inc.
Joseph Cavanagh, ARC
Steve Mott, BetterBuyDesign
Shane St. John, Corporate America Credit Union
Staff members, Federal Reserve System
Kwun Ng, Fifth Third Bank
Caroline Serejo Cypriano, JJ4Tech
Wesley Cruaia Clemente, JJ4Tech
Irina Singh, Mastercard International
Steve Wasserman, Photon Commerce
Art Brieske, Wells Fargo

AUSTRALIA

API Profile Summary

The work group reviewed the available API documentation for Australia's Instant Payments rail New Payments Platform or NPP.[10] NPP is only available in Australia today and the NPP API is developed using ISO 20022 rich data format. NPP supports P2P, C2B, B2C and B2B payments today.

The API documentation for NPP is a high level, recommended framework for developing (NPP) Instant Payment APIs in Australia. There is no mandate for the NPP participants to apply the recommendations in the documentation, rather the participants are encouraged to follow the framework when developing their APIs. As a result, the APIs offered by the participating FIs are proprietary. Unfortunately, the work group was not able to review the instant payment APIs offered by the participating financial institutions as access to these would require bilateral agreements with those FIs.

The work group's review shows that NPP includes directory capabilities and that all payment initiation related capabilities in scope for the research are included. From a cross-border perspective, the NPP rail is only available in Australia today, however NPP has considered that the rail could be used for sending cross-border payments in the future. NPP also include requirements that address cross-border payments as well as Australia's Anti-Money Laundering and Counter Terrorism Financing Act and will support the domestic leg of inbound international payments from December 2023.

From a fraud and security controls point of view, NPP's PayID service is a payee confirmation feature to ensure the user is paying the right person. PayID information is centrally secured, and participating institutions must have controls in place to monitor activity and shut down misuse of the PayID service. PayID includes safeguards such as identity verification upon the PayID creation as well as payee confirmation. Further, NPP leverages the participating banks' fraud and security protections used for all internet and mobile payments including authentication processes such as biometrics. NPP also requires participating FIs to have real-time fraud protection and detection controls and capabilities in place.

OPEN BANKING INFLUENCES

Open Banking began in Australia in 2019 where the Consumer Data Right (CDR) was introduced.[11] CDR only covers read access today and requires all Australian banks to adopt standards for allowing secure access to customer data. CDR is however expected to include written access, i.e., payments, going forward.[12] In addition, NPP has announced an enhanced functionality called 'Payto' that will enable similar functionality to Open Banking payments.[13]

BRAZIL

API Profile Summary

The work group conducted an in-depth analysis of the API provided by Brazil's instant payment system, Pix.[14] Introduced in November 2020, Pix was established and is operated by the Brazilian Central Bank (BCB). BCB made its implementation mandatory for financial institutions (e.g., banks and credit unions) and non-bank institutions known as "payment institutions" which are authorized by BCB to operate and hold over 500,000 active accounts.[15] Designed for maximum inclusivity, so any non-bank institution, regardless of size, can choose to provide Pix services, even if they do not meet this threshold. Governmental entities, including federal, state, and municipal governments, also have access to the system. Pix supports various use cases, such as G2B, G2G, G2P, B2G, P2G, B2B, B2P, P2B, and P2P payments.

Participating financial institutions and non-bank institutions can create their own Pix APIs but must adhere to the API specifications and operational guidelines set by BCB. For this review, the work group examined public documentation from BCB.[16] Pix offers a variety of features to enhance the user experience. The core function of Pix is its ability to facilitate instant transfers, enabling users to send and receive money immediately. In addition, users can make payments for goods and services by scanning a QR code. There is also the convenience of scheduling payments for future dates. Another key feature is the IPI, which by utilizing a centralized directory allows transaction parties to avoid disclosing their primary bank details. Instead, they use a unique ID, typically the user's CPF (Individual Taxpayer Registry) or CNPJ (National Registry of Legal Entities), linked to their Pix account. The feature termed 'key sharing' allows users to share their unique Pix identifiers, removing the need to know another party's bank information. For errors, the 'reversals feature' allows payment cancellations. These foundational features are built into Pix, so developers do not need to recreate these functionalities but can utilize the provided APIs. The ISO 20022 messaging standard plays a critical role in Pix, facilitating swift and secure payment processing. Concerning cross-border capabilities, while Pix is primarily domestic, there's interest in expanding to countries like Argentina, Chile, and potentially the broader Southern Common Market (Mercosul) region. The prospect for Pix's growth in the Mercosul region is evident, given BCB's interest and financial integration trends within Mercosul. Although Mercosul allows free movement of goods among members, the absence of a unified payment system is challenging. Pix can potentially address this, making cross-border payments more streamlined. However, integrating Pix will require harmonization with the payment regulatory framework of each Mercosul nation. Additionally, varying technological infrastructures may require significant enhancements.

Pix's commitment to regulatory compliance[17] is evident in its adherence to Brazilian and international standards, especially regarding anti-money laundering (AML) and counter-terrorism financing (CTF). The Central Bank of Brazil has established specific regulations that Pix follows. The Resolution[18] BCB No. 1 from August 12, 2020, outlines Pix's operational foundation, emphasizing AML and CTF requirements.

Apart from these national directives, Pix stands out for its meticulous fraud prevention framework. Strong Customer Authentication (SCA) is a cornerstone, ensuring users undergo multifaceted verification for transactions. Pix also employs dynamic risk-based authentication, adjusting verification measures based on the perceived risk of each transaction. These protective standards, significantly inspired by the European PSD2 regulation and regularly updated under BCB's oversight, bolster Pix's security credentials. Additionally, on the global front, Pix's commitment is further accentuated by Brazil's adherence to standards set by the Financial Action Task Force (FATF) and the European PSD2 regulation's influences are evident in Pix's emphasis on user consent and open access. With security measures in place, Pix ensures only authorized entities can initiate transactions, underpinning its dedication to safeguarding user data in harmony with LGPD.[19]

OPEN BANKING INFLUENCES

According to ACI Worldwide March 2023 report[20], Brazil was the second largest and most developed real-time payments market in the world, trailing only behind India. Additionally, it ranked as the second country globally for the highest number of instant payment transactions in 2022. Open Banking[21], an initiative designed to increase transparency and competition in the financial sector, was officially initiated in Brazil on February 1, 2021, marked the beginning of a structured and phased journey where financial institutions began sharing data about their products, services, and rates, excluding consumer data (first phase). By August 13 of the same year, this evolved to the second phase to include consumer-specific information like names, addresses, and details on checking accounts and fees, contingent on consumer consent. By October 29, the third phase allowed for payment transaction services, the 'payment initiators' phase, which allowed the start of a Pix transaction through various apps (integrated transactions), not only the bank app, and it to just be confirmed through a bank app. This allowed transfers through platforms such as WhatsApp (conversation app) and food delivery services such as iFood and introduced the potential sharing of customers' financial histories. At this stage, the possibility of sharing financial history also began for loan offerings. The subsequent phase (fourth phase), starting December 15, encompassed data on foreign exchange, insurance, investments and more. BCB advocates that financial data belongs to the consumers. This approach, based on Consumer Data Ownership, empowers consumers to control their financial information.

Open Banking is expected to heighten competition in the financial sector, leading to diverse business models, an expanded range of choices, and cost-effective products. Internationally, Brazil has drawn inspiration from other countries venturing into Open Banking, notably the UK. Meanwhile, nations such as the USA, Canada, and Russia are delving into possible integrative strategies. In the Open Banking landscape, APIs play a pivotal role by facilitating secure data exchanges, bypassing intermediaries for faster transactions, and ensuring compliance with laws such as the LGPD.

A FEBRABAN (Brazilian Federation of Banks) study indicates that a critical measure of Open Finance efficiency is the success of API calls, which are integral for data integration among different financial institutions. This study[22] notes a 167% increase in successful API calls over 2021, signaling operational advancements in Open Finance. Separately, a PWC study[23] focuses on the financial sector including banks, financial firms, and payment services. It observes that regulatory changes, such as the implementation of PSD2 in Europe, require the sharing of customer data via APIs. Beyond compliance, the sector is also collaborating with fintechs through APIs, thus bolstering trends towards Banking-as-a-Service and Open Banking models. Among surveyed companies, the financial sector was found to be the most mature in its API initiatives, using more advanced technologies and well-defined processes, alongside aggressive API-based strategies. Both studies collectively paint a picture of rapid maturation and efficiency in the application of Open Finance and API technologies in the financial sector.

EUROPEAN UNION (EU)

API Profile Summary

For the EU, the work group reviewed the Regulatory Technical Standards (RTS) of PSD2[24] as well as one of the Account Information Service (AIS) and Payment Initiating Service (PIS) API standards available in the EU offered by the Berlin Group. The use cases for the PIS APIs today are C2B payments. This limited number of use cases today is due to the limited scope in terms of use cases of PSD2. Many European FIs have extended their API offering to also cover corporate APIs, i.e., to also include B2C as well as B2B payments, however the work group was not able to review such APIs as this would require bilateral agreements.

PSD2[25] is the European regulation for electronic payment services designed to drive payment innovation and data security. The requirements for participation are stipulated by PSD2 in the RTS, however, these do not prescribe how the APIs should be designed or any standardization requirements. There are some standards offered by individual companies today, such as the Berlin Group Standard which the work group reviewed, but due to the lack of standardization requirements in the EU, each FI can create, document, maintain, test, and publish their own proprietary API standard. Unfortunately, the work group was not able to review APIs offered by individual FIs since accessing the documentation for these requires bilateral agreements with those FIs.

The work group's review shows that the entity accessing the API and the information needs to be registered as a Third-Party Provider (TPP). Similarly, in terms of login and API access management, the TPP needs to identify itself with the Account Servicing Payment Service Provider (ASPSP), i.e., typically the bank, using a qualified certificate. This is usually done using an eIDAS QSEALCs or

eIDAS QWACs certificate. For directory functions, these are not in scope of PSD2 and thus are not included in the AIS or PIS APIs. All payment capabilities in scope for the research are included and the PIS APIs are scheme agnostic and provide multi-currency support.

In terms of fraud prevention, PSD2 RTS extensively covers fraud prevention and AML measures where several articles in the RTS cover requirements around user authentication and Strong Customer Authentication (SCA) and similar security measures as well as transaction analysis.

OPEN BANKING INFLUENCES

Open Banking has been a significant catalyst of the growth of payment API creation and availability in the EU. The growth of Open Banking in the EU has been driven from a regulatory perspective where Open Banking has been a significant catalyst of the growth of payment API creation and availability in the EU. The European Commission recently published a proposal for PSD3 including clarifications and definitions and introduces API standardization to reduce barriers to entry for third parties wanting to access financial account data and payment initiation.[26]

INDIA

API Profile Summary

The work group reviewed the API offered by India's United Payment Interface (UPI).[27] UPI is a smartphone application that allows users to transfer funds between bank accounts and is developed by the National Payments Corporation of India (NPCI) which is owned and operated by Reserve Bank of India (RBI).[28] UPI allows for P2P, C2B, and B2C.

UPI's participating FIs can build their own UPI APIs but are required to follow the API specifications and operating guidelines published by RBI for enabling UPI based payments. Unfortunately, the work group was not able to find API documentation to review from the participating FIs without having a bilateral agreement in place. The review of the rail API documentation shows that most of the core functions were included at the rail level.

UPI offers a service called Virtual Payment Address (VPA). With VPA the parties included in the payment do not need to share their actual bank account details. VPA in a UPI transaction is a unique ID that is mapped to the user's UPI account, and it is the user's phone number that constitutes the unique virtual address for payments where generally a primary default VPA will be set by the UPI app. Consumers can be registered in UPI by multiple banks and one single bank account can be mapped with one VPA. UPI utilizes a centralized directory of the VPA, and one consumer can be registered in UPI by multiple banks. Authentication of the user is done by their bank.

In terms of interoperability, UPI is offered domestically in India today but is looking to expand to other markets such as Nepal, Bhutan, United Arab Emirates and France. An integration with Singapore's PayNow rail is already in place where the PayNow - UPI linkage provides means for customers of the participating banks and (NFIs) in Singapore and India to perform cross-border transfers.

OPEN BANKING INFLUENCES

India's Open Banking ecosystem has grown to become part of its financial landscape and is one of the most advanced in the world. India has seen a massive growth of Fintech over the last decade and most of it can be attributed to the Open Banking infrastructure and market approach. What distinguishes India from most other Open Banking and broader data policy frameworks implemented around the world is India's provision of extensive public digital infrastructures and protocols, including the development of the so-called "India Stack," which has enabled an ecosystem for servicing data portability and interoperability across the economy based on user consent. 'India Stack' is a platform including UPI and Aadhaar, a national identity database. The main objective of India Stack has been to promise financial inclusion where the growth of UPI has been very influential.[29]

SINGAPORE

API Profile Summary

Singapore's Instant Payment rail PayNow provides a peer-to-peer funds transfer service available to retail customers of the participating banks and non-bank financial institutions (NFIs) in Singapore since 2017.[30] PayNow was later extended to include corporates to send and receive payments in 2018. The PayNow service is integrated into the online banking and/or mobile platform and can link with e-wallets. The use cases for PayNow are currently P2P and C2B.

The work group was able to review the API documentation for the PayNow rail and found that registration with the PayNow API is done manually through a portal. Onboarding and validation of the End user or entity is done by the participating bank where the End user or entity can be registered using their mobile number, Singapore NRIC/FIN, or Virtual Payment Address (VPA). All core payment capabilities are made available except for requests for payment capability. PayNow leverages proxies for payment processing, including mobile numbers and entity registration numbers, as well as an integration with UPIs VPA service where VPA helps individuals distinguish between PayNow registrations that are linked to bank accounts from those linked to e-wallets. VPA allows individuals to link their mobile numbers with an NFI e-wallet while keeping their existing PayNow registration linked to a bank account.

In terms of interoperability, PayNow is already integrated with Thailand's Instant Payment rail PromptPay. This interoperability enables customers of the participating banks in Singapore and Thailand to transfer funds quickly and securely between the two countries by using the recipient's mobile phone number. Both PayNow and PromptPay use ISO 20022 as the message standard which enables them to ensure that cross-border practices are effective. PayNow is also integrated with UPI in India. The PayNow - UPI linkage provides means for customers of the participating banks and (NFIs) in Singapore and India to perform cross-border transfers.

OPEN BANKING INFLUENCES

There is no mandatory requirement for financial institutions to open their data, systems, and services in Singapore, however, the regulator Monetary Authority of Singapore (MAS) has still taken a strong top-down approach to implement Open Banking. In 2016, MAS became the first regulatory body in APAC to publish guidelines on Open Banking as well as to provide a plan for banking data to be made available through APIs. Singapore launched SGFInDex, a platform that leverages the country's national identity system Singpass to let individuals aggregate their financial data for financial planning. MAS has also introduced the collaboration platform API Exchange (APIX) which is a cross-border, open architecture platform that aims to support financial innovation and inclusion in ASEAN and globally. On this platform, fintechs and financial institutions can connect easily and collaborate on design experiences via APIs. In addition, MAS has published the 'Financial World: Finance-As-A-Service API Playbook' in collaboration with the Association of Bank in Singapore (ABS) which serves as a comprehensive guideline for financial institutions and fintechs to develop and adopt open API based system architecture. MAS also operates the Financial Industry API register which tracks open APIs in the Singapore financial industry by functional categories.[31]

UNITED KINGDOM (UK)

API Profile Summary

The work group was able to review the publicly available standardized API documentation made available by the Open Banking Limited company in the UK.[32] This API documentation is detailed per use case and includes both code and response codes.

The use cases for the Open Banking APIs in the UK, i.e., Account Information Service (AIS) and Payment Initiation Service (PIS), APIs are C2B payments. Like the EU, several UK FIs have extended their API offering to also cover corporate APIs, i.e., to also include B2C as well as B2B payments, however the work group was not able to review such APIs as this would require bilateral agreements.

The work group reviewed the UK's Open Banking standards for Account Information Service (AIS) and Payment Initiation Service (PIS) APIs which showed that most of the payment features and functionalities listed in the matrix are included and, in addition, that the Payment Initiation Service (PIS) APIs are scheme agnostic and provide multi-currency support. Onboarding and authentication are all done through the API environment and the API user needs to use a client credentials grant to obtain a token to access the account-access-consents resource, as well as an authorization code grant to obtain a token to access all other resources. A directory does not appear to be in place today and End User Authentication is done by the respective bank.

In terms of controls to prevent fraudulent transactions, Open Banking and PSD2's RTS extensively cover fraud prevention and AML measures where several articles in the RTP® cover requirements around user authentication and Strong Customer Authentication (SCA) and similar security measures as well as transaction analysis.

OPEN BANKING INFLUENCES

The growth and success of Open Banking in the UK shows that regulatory mandates as well as API standardization requirements spur the growth of API creation across the payments ecosystem. Next on the agenda for the UK is a Joint Regulatory Oversight Committee that was created by the Competitions and Markets Authority (CMA), the Financial Conduct Authority (FCA) and the Payment Systems Regulatory where the best model to oversee the future of Open Banking in the UK has been explored. The current plan is to create a new entity to ensure that Open Banking remains competitive, provides the necessary technical infrastructure, and ensures compatibility between industry players.[33]

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