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PayNow-PromptPay / PromptPay-PayNow Linkage White Paper

A Playbook for ASEAN and the World

A real-time cross-border funds transfer service linking retail customers in Singapore and Thailand

Monetary Authority of Singapore

BANK OF THAILAND

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- National ITMX Co., Ltd
- Bangkok Bank Public Company Limited
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- Krung Thai Bank Public Company Limited

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Foreword

We are pleased to present this white paper on the project to link Singapore's PayNow and Thailand's PromptPay fast payment systems. This white paper outlines how this first-of-its-kind linkage was conceived and developed by the Monetary Authority of Singapore (MAS) and the Bank of Thailand (BOT), working closely with industry partners in both countries. The linkage of PayNow and PromptPay ("PPPN linkage") represents a first step toward a broader vision of unlocking multilateral connectivity of countries' fast payment systems. This will establish a comprehensive cross-border transfer network that can enable customers in participating countries to make fast and secure cross-border transfers via their mobile phones or internet devices.

This white paper highlights technical, operational, commercial and governance issues addressed by the participants in the PPPN linkage, including in the areas of anti-money laundering, sanctions screening, data usage and redundancy practices. In doing so, the paper seeks to promote a better understanding of the key considerations for establishing cross-border linkages between two or more national fast payment systems, thereby paving the way for national authorities to pursue more of such linkages in the future. We also take this opportunity to acknowledge the contributions to this project of all the participants in developing this service and in contributing to the project report, including the team from Baker McKenzie.

Executive summary

The PPPN linkage, launched in April 2021, connects the fast payment systems of Singapore and Thailand (PayNow and PromptPay, respectively) through cross-border gateways built and operated by both countries' systems operators (BCS and ITMX, respectively).

In its initial phase, the linkage enables customers of the participating banks in Singapore (DBS Bank Ltd (DBS), Oversea-Chinese Banking Corporation Limited (OCBC), and United Overseas Bank Limited (UOB)) and Thailand (Bangkok Bank, KASIKORNBANK, Krung Thai Bank, and The Siam Commercial Bank) to transfer funds quickly and securely between the two countries by simply keying in the recipient's mobile phone number. The user experience mirrors a domestic PayNow or PromptPay transfer, which generally entails a three-step process of (1) looking up a recipient's mobile number and verifying their identity, (2) keying in and reviewing the transfer amount, and (3) confirming the transfer through real-time notifications sent from their bank. The sender no longer needs to key in the name and bank account details of the recipient, and the recipient will receive the funds within minutes as opposed to the one-to-three working days typically needed for traditional cross-border remittances.

While the initial phase of the PPPN linkage is focused on peer-to-peer transfers and remittances, work to enhance it is ongoing. This work includes expanding participation to include both bank and nonbank transfer providers, increasing the scope of transfer use cases the linkage can support, and raising transaction limits to increase the reach and functionality of the linkage.

We envisage the PPPN linkage serving as a blueprint for Singapore, Thailand and other like-minded countries and as a reference in the pursuit of further cross-border transfer linkages, with the ultimate goal of establishing a globally interconnected network of fast payment systems that enable individual and business users alike to remit funds quickly, conveniently and at very low cost.

In this white paper, we explore key insights and best practices that financial institutions and regulators can consider in establishing cross-border linkages of their domestic fast payment systems. The insights in this paper are based on stakeholders' experiences from linking Singapore's PayNow with Thailand's PromptPay.

PayNow-PromptPay / PromptPay-PayNow product explanations, project objectives, and benefits

Singapore's PayNow leverages the domestic fast fund transfer service, FAST (Fast and Secure Transfers), which enables individuals and businesses to send or receive Singapore dollar funds from one bank or e-wallet account to another in Singapore almost instantly by using just a mobile phone number, Singapore National Registration Identity Card (NRIC) number, Unique Entity Number (UEN) or Virtual Payment Address (VPA). The sender no longer needs to know the recipient's bank details and account number when transferring funds via PayNow.

PromptPay is a fast, local fund transfer service in Thailand that enables users to send or receive Thai baht funds in real time from one account to another using a mobile phone number, citizen identification number (ID), e-wallet ID, corporate tax ID, biller ID or bank account number. Users can send or receive funds via internet banking, mobile banking, ATMs or bank branches, depending on which bank the user selects.

Singapore has offered domestic payments through PayNow since 2017, as has Thailand via PromptPay. Both services leverage smartphone-based mobile banking and transfer applications to facilitate faster, more accessible and more convenient fund transfers.

In recent years, MAS and BOT, together with the banks in both countries, have wanted to expand these services and connect with other countries so they could deliver similar benefits for cross-border transfers. Retail customers have wanted to remit money with quicker turnaround times so that funds arrive immediately rather than a day or more later. Whereas a typical wire transfer requires full account details and funds can take three days to arrive, a linkage between PayNow and PromptPay allows recipients to receive funds almost instantly. The sender avoids having to go to a bank branch or a service provider's office, and the cost is significantly lower.

Objectives

The objectives of the PPPN linkage are threefold.

1) **The linkage enhances the accessibility and convenience of making cross-border transfers.**
    - The linkage leverages the high mobile phone penetration rates and adoption rates of fast payment systems in both countries.
    - The process of making a cross-border transfer mirrors the seamless and straightforward user experience of performing a domestic fast payment. This transfer involves leveraging the existing domestic processes that fundamentally involve the three steps of looking up a recipient's mobile number and verifying their identity, keying in and reviewing the amount, and sending the transfer and confirming its receipt via fast notifications.

2) **The linkage enhances the speed of completing a cross-border transfer.**
    - The linkage enables cross-border transfers to be executed quickly. The linkage aligns closely to the end-to-end turnaround times specified in both countries' fast payments systems (FPS) service level agreements (SLAs). At the same time, it also adheres to both countries' requirements for anti-money laundering (AML) and countering the financing of terrorism (CFT) for both the originator and beneficiary bank to perform name screening prior to payout.
    - Transfers made via the PPPN linkage are completed within minutes, improving on the execution times of solutions currently in the market. At present, competitor solutions still usually require about 1-2 hours for payments to be completed and in many cases can take significantly longer.

3) **The linkage extends these benefits to users at transparent and competitive rates.**
    - Financial institutions participating in the linkage will continually benchmark their fees to existing or new solutions from fintechs and other transfer service providers to maintain competitiveness with market rates for solutions outside the linkage.
    - Fees and charges are transparently displayed to senders prior to their confirming their transfers.

The linkage is thus able to address and reduce cross-border remittance pain points by bringing more accessible and secure, faster, and cheaper cross-border fund transfers to everyone.

Project initiation

Participants in Singapore and Thailand were aligned on the following guiding principles for the linkage:

a) **The linkage should be scalable.** The Project Steering Committee (PSC) agreed that the linkage model should be scalable so that it can encompass further use cases beyond mobile number remittances. MAS and BOT agreed to convene further discussions on facilitating cross-border QR payment interoperability once the linkage has been sufficiently bedded down following commencement.

b) **The linkage should be sustainable.** The PSC mandated that both operators and participating banks ensure that the pricing model for PPPN fund transfers is kept market-competitive and continually calibrated against widely adopted remittance solutions, while balancing the longer-term sustainability of the linkage's operations. The PSC also directed PPPN participants to formulate a joint governance structure to ensure the smooth running of the linkage following its launch. The joint governance arrangement should cater to options for cross-border resolution of issues and ensure the satisfactory upkeep of the linkage while avoiding an excessive drain on either or both countries' resources.

c) **The linkage should be inclusive.** The PSC agreed that the linkage should facilitate the participation of qualifying banks and nonbank payment providers. This agreement would secure the transaction volumes needed to sustain commercial viability of the linkage and foster innovation and competition among linkage participants, with the resultant benefits being passed on to end users through more competitive fees for sending cross-border transfers.

d) **The linkage should be aligned with ASEAN's 2025 Economic Community vision.** The PSC tasked participants with ensuring that clearing and settlement is executed in Singapore dollar (SGD) and Thai baht (THB) currencies, and aligning with ASEAN efforts to deepen economic integration by promoting in-region use of local currencies.

PPPN results

With its launch in April 2021, the PPPN linkage became the first of its kind globally to connect two domestic fast payment systems, allowing fast and secure cross-border fund transfers using existing domestic networks. Connecting these domestic networks enables customers of participating banks in Singapore and Thailand to transfer funds between the two countries in amounts totaling up to SGD 1,000 (approximately USD 743) or THB 25,000 (approximately USD 770) per day.

	Before PPPN	After PPPN
Convenience	Submit forms at a branch or multistep internet banking process	Mobile and internet app with minimal data input
Cost	Fees and FX are a high percentage of the transaction	• Free or lower-cost fees • Low FX markup
Speed	Up to 3 days	Seconds or minutes

The cost of the service is much lower than that of traditional transfers, with no fee for the service in Singapore and a fee in Thailand that is much lower than most alternatives. The foreign exchange (FX) rate incurred by customers is lower than most competing services, and customers provide much less data to transfer money than they would for a traditional transfer, making it considerably more convenient. Banks' data show that the number of transactions has already exceeded expectations.

MAS and BOT as well as the Association of Banks in Singapore (ABS) and the Thai Bankers' Association (TBA) plan to leverage their experience with the PPPN linkage to pursue further payments connectivity efforts with new countries.

ASEAN payment connectivity

The PPPN linkage is a key collaboration under the ASEAN Payment Connectivity initiative. Even though it only connects two countries currently, its success demonstrates the potential for a broader expansion of borderless banking. Furthermore, the PPPN linkage is the first fund transfer service in the world that connects the domestic fast payment systems of two countries with different currencies. Its success serves as an inspiration for other jurisdictions to take similar steps as they strive to offer borderless banking services. The learnings from establishing this linkage are a valuable resource for other countries considering similar initiatives.

Project structure and considerations

The project was structured to optimize development and implementation of the PPPN linkage.

Project organization

Participants from both countries established a PSC cochaired by senior representatives from MAS and BOT to run the project, and appointed a Project Management Office (PMO) from each country, as outlined below. Additionally, there were three work streams, with participants from the banks, network operators and banking associations of each country. Participants also established domestic working groups to resolve issues within their own market. The PSC initially met bimonthly and the working groups met at least monthly, with meeting frequencies increasing as the project neared completion. Participants used these meetings to coordinate activities, track progress, raise and resolve issues, and assist other groups. An international professional services firm also supported the groups.

The three work streams were:

- **Business:** This work stream focused on the establishment of the business model, business rules, business structures, internal and external information flows, settlement model, clearing, pricing, communications, provision of information to the public and the customer journey.
- **IT and Operations:** This work stream focused on the development of the technical design to use as the basis for the setup and implementation of software, hardware, security and network infrastructure to connect the two systems. The design included the primary and redundancy setups. This work stream also established the operational and transactional flows for good, reject and exception processing, including dispute handling. The operational and systems testing of the processes and transaction flows were worked out by this work stream.
- **Legal and Regulatory:** This work stream covered a broad range of legal and regulatory issues, including the establishment of the legal framework for the linkage, setting up of new contractual arrangements, compliance with the laws and regulations in each country, foreign exchange requirements, handling and resolution of disputes or nonreceipt of funds, and practices and safeguards for AML and CFT screening. Legal counsel from banks, operators and Baker McKenzie participated in drafting and negotiating the agreements in this work stream.

In addition, BCS and ITMX, as the domestic payment network operators, set up a side channel dedicated to dialog between the two organizations, tracking implementation and resolving technical, operational, connectivity and interoperability issues.

The roles of the banking associations

ABS and TBA represent the banking industry in their respective countries. Their roles were to coordinate and facilitate the project and to act as or manage the PMOs in their jurisdiction. While their roles were broadly similar, they each performed them differently due to local market differences and nuances. Each participating bank also appointed a separate project manager dedicated to running the project within the bank.

In Singapore, ABS brought the banks into the discussions when the project started and worked with MAS to implement the linkage, including structuring the work streams and governance model with support from the banks and BCS. ABS also provided secretariat support to MAS in cochairing the steering committee.

In Thailand, TBA supported BOT by forming committees and structuring governance for the project. BOT chaired the steering committee in Thailand, and TBA acted as the secretariat. TBA coordinated and facilitated the project, ensuring that deadlines were met and issues were resolved. It also assisted with governance, technical expertise and structuring services from ITMX. TBA placed staff in each working group, playing a significant role in the IT and Operations work stream as well as in the Legal and Regulatory work stream.

The PMOs managed discussions in cross-border meetings between the Singapore and Thailand teams and ensured that participants contributed their expertise, met deadlines and resolved differences through appropriate escalation processes. They also performed a dispute resolution function when there were disagreements between the Singapore and Thailand teams by exploring the issue and facilitating clarification or resolution. When the teams could not bridge the gap, the PMOs escalated the issue to the steering committee for discussion and resolution.

A key difference between the countries was that ABS in Singapore is the scheme owner of PayNow and therefore assumed the role of jurisdiction scheme owner under the PPPN scheme. In Thailand, PromptPay has no scheme owner, and ITMX is the system operator. Therefore, some requirements that a scheme owner imposes upon an operator were not applicable in Thailand. Some of these differences were resolved via a side letter that was executed as an Operator Agreement between ABS and BCS, with ABS appointing BCS as the PPPN network operator.

Participants

MAS and BOT brought together key players in each of their countries for the project, which enabled good coverage of the respective domestic markets for the PPPN linkage. In Singapore, MAS invited the three local banks, DBS, OCBC and UOB, to participate as pilot banks. Similarly, in Thailand, four local banks — Bangkok Bank, KASIKORNBANK, Krung Thai Bank and The Siam Commercial Bank — were invited to participate as pilot banks. The banking associations in each country, ABS and TBA, as well as each country's network operator, BCS and ITMX, also participated.

Systems: Overview of technology challenges and solutions

The cross-border linkage leverages each country's domestic peer-to-peer (P2P) transfer system, PayNow and PromptPay, to facilitate cross-border fund transfers. The domestic transfer system of each country has its own specifications, such as message formats and timings. Hence, a key challenge in facilitating the cross-border fund transfers between participants, was establishing common criteria and formats for the communications, messaging and data exchange between participants in each market.

Framework

Participants that interact with each other in one domestic P2P transfer system, typically through an intermediary, were unable to link to participants in another P2P transfer system. The initiative therefore required technology linkages between the banks and network operators in each country.

For banks, the technology components of the project were straightforward because the transfers leveraged their existing infrastructure and processes.

For BCS and ITMX, the project required considerable time and resources. Despite both organizations using software from the same provider and the structures of their services being similar, there were major differences that had to be resolved.

A fundamental principle for the network operators was to ensure that development of the cross-border linkage did not detrimentally impact existing systems for domestic transfers, which still had to run as normal. The operators had to maintain their domestic standards so that any changes would not have any impact domestically and so that banks could continue to use the operators' domestic services with little or no impact.

The operators participated in the Legal and Regulatory working group, and they contributed to the specifications captured in the legal documentation. They also reviewed the business and operational rules, the operating manuals and the Multi-Party Agreement governing the running of the PPPN linkage.

System development

To facilitate P2P fund transfers between participants, BCS and ITMX developed a cross-border gateway with common criteria for messaging and data exchange in each market. They use the gateway for converting messaging to agreed and harmonized cross-border message formats. This allows each jurisdiction to retain its existing message formats domestically and to convert local data fields to a common message format for the cross-border section of the transaction. Both operators use ISO 20022 as the message standard for the project, which enables them to isolate the versioning and ensure that cross-border practices are effective.

The PPPN connectivity model required the operators on both sides to develop new cross-border gateways. The cross-border gateways perform the following functions:

- Routing of proxy lookup and payment messages
- Translating between the ISO 20022 payment message formats utilized by FAST and PromptPay to bridge the customizations applied by both countries
- Tallying of Singapore banks' cross-border payment flows to facilitate automated addition or subtraction from banks' settlement risk positions in FAST during the twice-daily PPPN settlement cycle. Enhancements were also applied to FAST to segregate these cross-border flows from domestic transactions, and to facilitate settlement outside the FAST system
- Circumscribing usage of the linkage so that only financial institutions in both countries that participate in PPPN can use it
- Ring-fencing PPPN transactions from domestic FAST and PromptPay transfers by rejecting FPS messages that are not intended for PPPN purposes or participants
- Initiating reverse crediting to Singapore banks for outbound payment messages that experience rejection from the Thai cross-border gateway or PromptPay system (e.g., due to timeouts or system outages)

The cross-border gateways also facilitate the routing of enhanced PayNow lookup messages to the PromptPay system. These PayNow lookups contain expanded fields with the Singapore user's full name and account number to enable Thai banks to perform fast screening at the proxy lookup stage. Implementation of the enhanced PayNow lookup message required changes to existing formats, flows and processes by both BCS and the Singapore banks.

Beyond the gateway development, there was also a need for BCS and the Singapore banks to develop a new asynchronous flow to bridge a five-second differential between the system turnaround times of FAST (15 seconds) and PromptPay (20 seconds). This flow was required as failure to do so would result in exposure of PPPN transfers to repeated timeouts and message failures due to the time differential. Key elements of BCS' and the SG banks' asynchronous flows include:

- The insertion of a new confirmation leg showing that a PPPN transfer has been sent and relayed by the BCS cross-border gateway to the Singapore sending bank, just prior to the gateway's successful routing of the transfer message to the PromptPay system. This process enables the Singapore sending bank to transmit a real-time notification to its customer stating that their outbound transfer is on its way to the Thai recipient.
- The development of a new messaging leg for transmitting Singapore banks' screening results separately. While Thai banks elected to perform real-time screening at the proxy lookup stage, Singapore banks elected to screen at the transfer stage (i.e., just before the transfer message is sent to the PromptPay system via BCS' cross-border gateway). The screening process by Singapore banks aligned with how screening is traditionally carried out for cross-border flows, such as the approach used in SWIFT wire transfers. A new message flow therefore had to be catered for in order to convey Singapore banks' screening results to Thai counterparts.

When they started working together in the IT and Operations work stream, BCS and ITMX identified differences in their software, use cases and other practices which they had to overcome. As each network operator had its own approach and specifications, they engaged in a process to find a middle ground while complying with the regulations in each country.

Discussions throughout the project revolved around areas such as data, technical support, networks and the agreements. With respect to data, topics included data field lengths, purpose codes, error codes and reason codes. Both parties used mapping to make sure that they resolved differences and were aligned. The operators also considered practices such as settlement, where they could leverage existing systems, and pricing strategies that factor in which bank receives cross-border and foreign exchange fees and which bank pays for the settlement costs. Any adaptation in flows such as practices for transaction notification or finality of transfers might also require workflow changes in local banks' systems, so BCS and ITMX endeavored to minimize or eliminate requirements for adaptations.

Another key consideration was how to handle transfer failures and ensure adequate redundancy. BCS and ITMX evaluated the number of redundancies needed to ensure that the linkage would work and where the backup would assume the function of the original link in the case of an outage. The project managers and the regulators balanced the need for backups, which came with cost implications, with the time and resources required.

The operators used these considerations in creating functional specifications and in developing changes in the software, hardware and network infrastructure. The significant scope of these changes led to demanding time lines for the project.

System testing

Upon completion of systems development, the operators conducted systems integration tests (SIT) internally and user acceptance tests (UAT) with the banks. In creating a linkage that had never been done before, BCS and ITMX had different approaches toward testing, which increased the complexity of the testing within and between the two operators.

This difference in methodologies was discovered only once they started developing the UAT plans and test cases. Even though both teams were using similar systems domestically, each country had a different treatment and onward processing of the transactions, which required both teams to work on different permutations of exceptional cases. To ensure that the systems are robust, the teams had to test all the exception scenarios that were identified during the design of the system. These scenarios required participation and close coordination between the banks and operators from both Thailand and Singapore.

BCS used its standard testing template and methodology for the SIT, so all banks would participate in two or three cycles for each test. ITMX used an approach with a standard SIT and UAT for system testing to be carried out first, before application testing. The ITMX approach was different from the BCS approach. Close discussion, coordination and agreement on the test cases and testing sequence was essential for resolving challenges and aligning the testing on both sides to ensure comprehensive and complete testing. BCS and ITMX therefore had to align and be comfortable with each other's testing approaches. Both teams had to spend more time to align and understand their different terminology so that the UAT planning could be carried out more fruitfully.

One additional and unexpected challenge resulted from differences in usage of the common language for the project, English. When BCS and ITMX conducted the first rounds of testing, they found that some details did not align due to differing localized norms for usage of the language. For example, differences in the formats for names did not become apparent until testing started. These issues were resolved through discussions and additional testing.

As some of the scenarios were not easy to simulate, the testing phase had to be extended to ensure that all scenarios were covered and fully tested. Both teams also continued the testing over weekends to meet the revised time line.

A key success factor was building relationships so that the operators could overcome technical, cultural and legal differences more easily. Being aware of differences, engaging early and having open conversations were essential for the success of the project.

Network connectivity

One of the key challenges that both BCS and ITMX had to overcome was to decide on the network architecture and establish the connectivity between both operators. Both teams had multiple discussions to finalize the network design to ensure security, resiliency and redundancy before embarking on the selection of telco service providers. Both teams had to agree collectively on the evaluation criteria for the selection of a telco as well as the selection methodology. Each country would then select a telco of their choice and both links would be used jointly. During the discussions, both teams also noted the difference in terms of the security standards in their Virtual Private Network (VPN) setups. In view of network connectivity being an essential prerequisite for the linkage, both teams spent considerable time and effort to design, set up, test and validate the various settings on the respective VPN devices to ensure that the linkage is stable and meets the security standards that both operators agreed upon.

Governance: Governance Committee/Joint Oversight Panel

Project

MAS and BOT as regulators, as well as ABS and TBA as banking associations, established the governance structure for the project. MAS and BOT headed the PSC in their respective jurisdictions. Setting direction, providing guidance, and resolving key issues was the responsibility of the PSC. Strong central bank support was key toward facilitating consensus among participants.

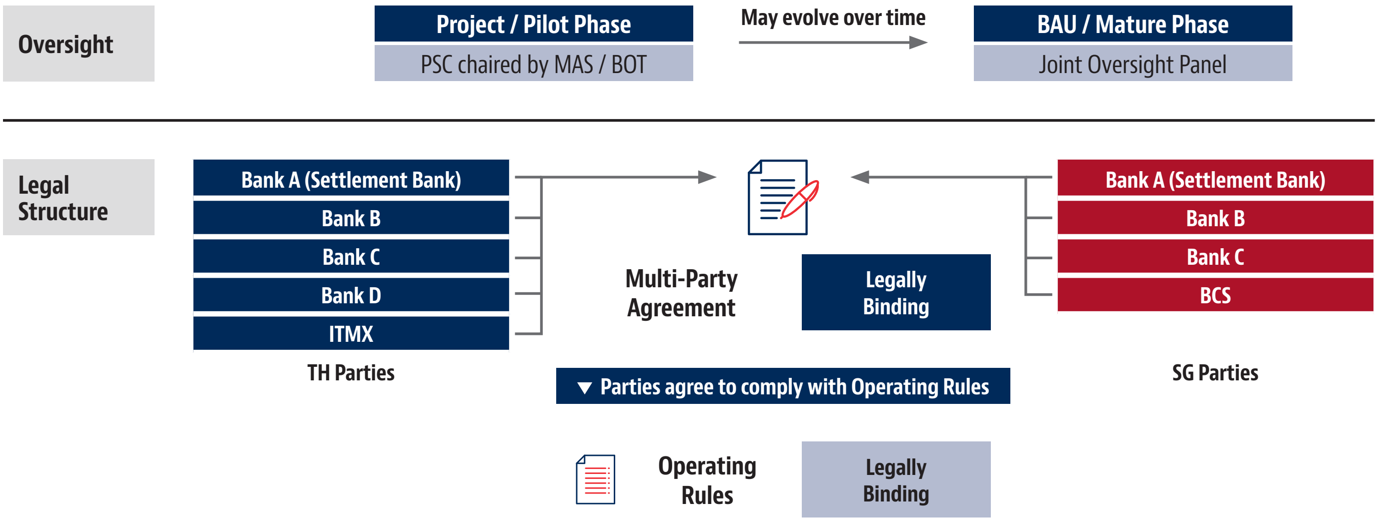
Post-launch arrangements

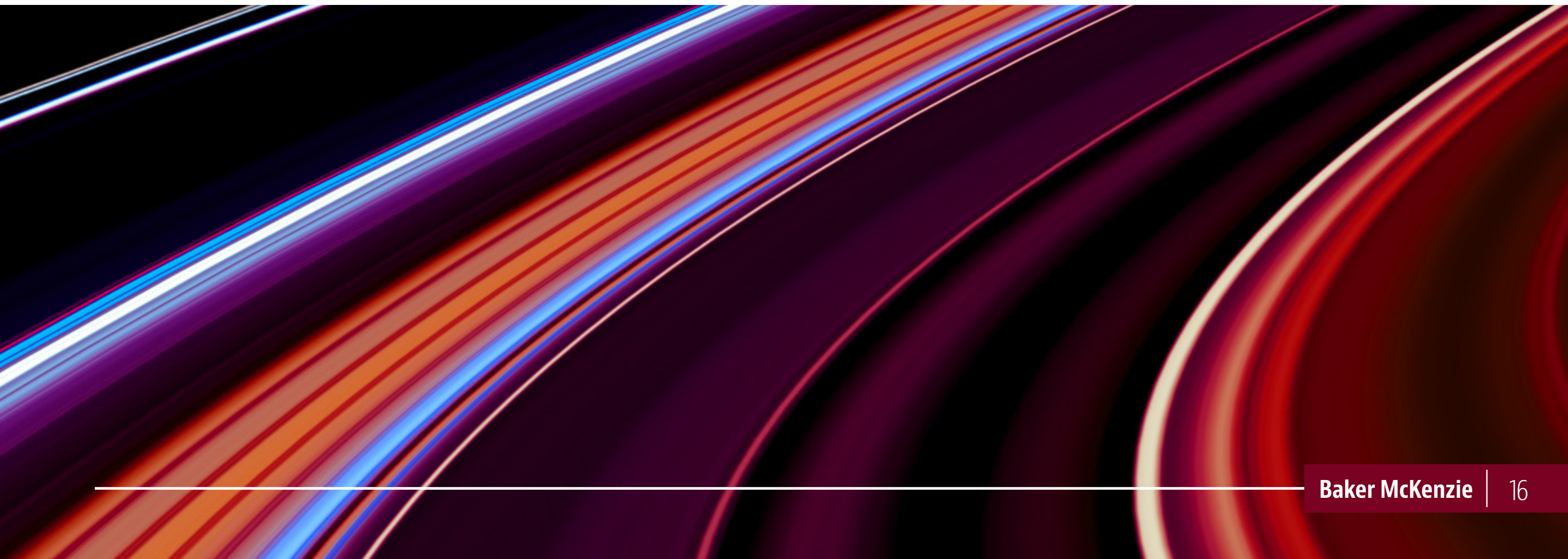
The meetings between the steering committees and working groups continued even after the launch, though less frequently. In the months immediately after the launch of the linkage in April 2021, there were project meetings to manage necessary enhancements and to resolve outstanding issues. By August 2021, teething issues have settled down and the linkage became more “business as usual” (BAU).

Mature phase of BAU

The participating banks and the operators established the Joint Oversight Panel (JOP), with representatives from each of the parties, for the ongoing governance of the scheme and for resolving issues that could not be resolved by the steering committee or the working groups. In the BAU phase, the JOP continued to approve key changes to the PPPN linkage such as enhancements that impact both countries and any applications from banks to join the linkage. The JOP operates with the powers and authority as agreed upon within the Multi-Party Agreement. The Panel operates under a system of "one jurisdiction one vote," which requires participants in each country to consolidate their views into a single vote for any decision by Singapore and Thailand.

As part of the preparations to expand the ecosystem to include more participants, ABS and TBA have begun work to coordinate in-country discussions on the admission criteria for financial institutions (both banks as well as licensed nonbank payment providers) to join the linkage. The JOP is the governance body to review and approve the admission criteria as well as the applications from financial institutions wishing to join the linkage.





Commercial: Fees

A key goal for the linkage was to reduce the cost of fund transfers for end customers. PPPN has largely achieved this objective. In Singapore, banks have offered the service, at least in the initial stage, without a fee. In Thailand, after a promotional period, banks charge a fee that is significantly lower than the amount paid by customers previously for international remittances to Singapore. The linkage also applies foreign exchange rate markups that are often lower than the rate for traditional wire transfers.

The fast execution of cross-border transfers requires participating financial institutions (FIs) to agree on common procedures for generation of FX rates and other service fees. Under the PPPN model, the sending bank quotes the FX rate and fees, and displays them to the sender prior to the confirmation of their transfer. The sending bank will net off these FX earnings when settling its accounts with the receiving bank through its nostro-vostro arrangement with the appointed settlement bank during the twice-daily settlement cycle for PPPN. This arrangement required all PPPN participating banks to enhance their treasury systems to avail 24/7 FX execution for SGD and THB, to enhance their internal FX mechanisms to support the agreed charging model for PPPN, and to automate the collection of service fees that are earned by the receiving bank.

Business: Agreement, contract, rules, procedures and intellectual property

The settlement of PPPN transfers is performed twice daily via a correspondent banking model, using an enhanced "many-to-one" settlement method.
The process has two stages:

1) Both countries' participating banks agree to appoint a single settlement bank on either side and to net their cross-border obligations via nostro-vostro accounts held with these settlement banks.
2) The settlement banks have the added task of executing local interbank transfers to ensure that domestic netting of obligations is performed with all participating FIs in their respective country.

Infrastructure upgrades to operators' and settlement banks' systems were needed to facilitate these PPPN settlements in a swift and efficient manner. From the Singapore perspective:

- BCS needed to develop a new settlement logic within the cross-border gateway to compute the bilateral gross settlement figures and detailed transaction listings for computation of the twice-daily settlement files. This facilitated Singapore banks' execution of PPPN settlement with their appointed Thai bank.

- BCS also enhanced its existing FAST settlement module to segregate domestic FAST transactions from cross-border PPPN transfers and to mitigate the risk of PPPN transfers being commingled with Singapore domestic transfers. These enhancements benefit both the participating Singapore banks and the broader Singapore FAST community.
- As the settlement bank for the four participating Thai banks, DBS needed to develop new systems and processes, which included a new connectivity interface, a batch processor for converting Thai banks' settlement files into transfer requests for channeling through Singapore's real-time gross settlement system (MEPS+), and an operations portal to cater to manual interventions if necessary.

It was essential to establish rules and procedures as well as to draft the agreements and contracts in order to ensure the success of the initiative. Participants met early in the process and continued meeting regularly to discuss laws and regulations, as the structure of the agreements and governance of the project were critical to its creation and evolution.

While various structures were discussed, the primary question was whether to adopt a distributed bilateral approach. Simply put, the issue was whether the operators should have bilateral agreements with each other and the settlement banks should have a separate bilateral agreement with each bank in the other jurisdiction, or whether there should be a single unified multilateral approach. The participants eventually settled on the latter, a multilateral approach, for the following reasons:

- The PPPN linkage required (i) collaboration from all parties involved to ensure that each party's performance is aligned with everyone else's, (ii) putting in place a centralized legal demarcation of the responsibilities and liabilities owed, and (iii) the establishment of the JOP to oversee the project on an ongoing basis.
- As the parties wanted to create a completed ecosystem for the PPPN linkage, one agreement with all the parties ("Multi-Party Agreement") would be more advantageous for the project.

Further details are set out in a diagram in the Appendix.

Legal and regulatory issues

The development of the legal contract, operating rules, settlement rules and other agreements was a time-consuming task due to the number of parties involved, ongoing discussions on various aspects of the scheme's operation and the need to align the interests of the parties involved in the linkage. Besides operational and technical issues, other key issues that participants had to resolve included data protection for customer information, intellectual property (IP), AML and CFT requirements, and how to protect their interests in the case of disagreements. The alignment among the participants on such legal and regulatory matters was important in order to ensure that each party fully understood its roles and responsibilities. This alignment among the participants was then clearly set out in the Multi-Party Agreement and operating rules, which covered the participants' rights and obligations. The participants finalized the details shortly before the linkage went live.

Given the groundwork made in the Multi-Party Agreement for the PPPN linkage, the expectation is that future linkages will be able to leverage the structure and positions taken in the PPPN linkage and adapt a similar structure, save for local variations.

The legal and regulatory issues were not as complex for the banks because they already had domestic, bilateral and international fund transfer arrangements that were not significantly different from the arrangements under the linkage. The banks simply added fast international payments. The banks also endeavored to retrofit existing systems to minimize changes, so they were largely able to reuse their existing policies and procedures.

The fast nature of PPPN transfers necessitated the adoption of specific AML and CFT risk mitigation measures to address the risk of funds being paid out ahead of checks by the sending or receiving banks and to ascertain whether the monies could be associated with illicit activities or persons such as sanctioned individuals. The key mitigating measures include:

- Adopting daily caps of SGD 1,000/THB 25,000 on the amount that each sender may transfer via the linkage
- Development of real-time name screening modules by all participating FIs to ensure that sender and recipient names are screened against all relevant lists prior to the payout of funds
- Banks' BAU transaction monitoring checks to apply for PPPN transfers, and to ensure that participating banks detect anomalous transaction patterns, investigate and file suspicious transaction reports where appropriate, and actively manage the risks emanating from such accounts
- Development of new workflows to handle PPPN transfers associated with a screening hit. When a potential hit is detected, the transfer is rejected and excluded from the twice-daily settlement files. This prevents potentially illicit monies from entering the respective country's financial system, as the transfer message would be canceled and the transaction would not be booked in banks' settlement reconciliations. This process differs from how wire transfers are currently handled, as monies sent via these wires would have already been received by the beneficiary bank upon detection of the screening hit, resulting in the beneficiary bank having to conduct further investigations to determine the next course of action.

Consumer protection/Data protection

The obligations of the participants with respect to the collection, use and processing of the consumers' personal data are explicitly spelled out in the Multi-Party Agreement.

The Multi-Party Agreement stipulates that a customer's personal data collected and processed under the PPPN can be used solely for the purpose of transfer transactions. This requirement aligns with the privacy notice that each bank must provide to its customers under applicable data protection laws. In both jurisdictions, the banks had to review their existing terms and conditions (T&Cs) to ensure that they remained compatible and compliant with local data protection laws and with market practices. As a result, a number of participating banks needed to update their notices, in addition to their existing T&Cs for fund transfer and mobile services, to ensure that they apply to the services provided under the PPPN linkage. Customers and other PPPN users could choose whether to accept the updated T&Cs and therefore make cross-border transfers.

In order to prevent the proxy lookup feature from being abused for name-farming purposes, a prospective receiving user's name is partially masked when displayed to the prospective sender during a proxy lookup request. The Multi-Party Agreement stipulates the party responsible for masking the prospective receiving user's name and sets out the number of characters that are to be masked, based on the length of the prospective receiving user's name.

As a further level of personal data protection, Thai users may opt out of cross-border PromptPay transfers specifically, while still being connected to PromptPay domestically. Currently, Singapore users may opt out of the PayNow service altogether. The Singapore parties are working on an enhancement to the PayNow service that would allow Singapore users to opt out of cross-border PayNow transfers specifically, while still being able to send and receive PayNow transfers domestically.

Intellectual property

Additionally, the parties worked together to manage IP rights, including delineating very clearly the IP rights available to each party. As there was no precedent for such a linkage, the parties undertook extensive discussions to resolve a range of issues arising out of these novel circumstances.

The IP rights needed to balance the interests of the parties that contributed to the PPPN linkage with the overall interests of expansion of the scheme and future linkages. The parties agreed that the IP rights that arise out of the parties' collaborations in the PPPN linkage would be held jointly by the banking association in each jurisdiction (ABS and TBA) as Designated Scheme Owner ("Scheme IP"), unless such IP was specifically reserved

("Reserved Scheme IP"). Otherwise, the banks and operators in Singapore and Thailand generally retained ownership of their individual contributions and provided licenses to enable the proper operation of the PPPN linkage.

In the spirit of expanding linkages and collaborations in fast cross-border transfers, it was specifically clarified that Scheme IP, but not Reserved Scheme IP, could be used by the parties in similar cross-border linkages, subject to the IP rights of the other participants.

Leveraging domestic systems

As the PPPN linkage involved connecting two domestic systems, it was necessary to explore whether and to what extent participants were able to leverage the respective domestic systems to enable the linkage.

For Singapore, the parties maintained a distinction between expanding the existing domestic system for the purposes of the PPPN linkage, and using the system and elements of the domestic system to enable the PPPN linkage. The latter approach was taken so as to retain the integrity and independence of the existing domestic system, while leveraging existing systems and infrastructure for the benefit of the PPPN linkage. This was made possible with the support and continued participation of ABS.

Jurisdiction-specific rules

As the PPPN linkage had both international and domestic aspects, the parties found it necessary to implement some rules that were specific only to the participants in a particular jurisdiction ("Jurisdiction-Specific Rules"). Some aspects of these Jurisdiction-Specific Rules were available to all participants as part of the Multi-Party Agreement, while others were incorporated by reference and available only to participants in that jurisdiction.

Documentation of operational and technical aspects

One of the key advantages of the Multi-Party Agreement was that it established the ability to set out a common ground between initial and future participants in the PPPN linkage. A key challenge was documenting the technical and operational aspects of the PPPN linkage that were being developed by other work streams.

In similar situations for other services, the legal documentation for the technical and operational aspects could often be defined simply by agreement of the technical and operational work streams or by reference to other documentation generated by the other work streams. However, some of the more detailed operational and technical aspects of this linkage were captured in various provisions and parts of the Multi-Party Agreement and some of these were also jurisdiction-specific.

As a key goal of the PPPN linkage was also to provide a template for future expansion, it became necessary for the Multi-Party Agreement to help define and tie in the various technical and operational aspects, both to ensure common ground between present participants and to enable future participants to enter into the arrangement on common ground. These aspects were captured in sets of rules that covered the operation of the linkage and the agreed settlement process.

The operating rules in the Multi-Party Agreement captured the various responsibilities of the participants in their respective roles in operating and using the PPPN linkage. This included topics such as proper use and operation of the PPPN linkage, AML and sanctions screening, responsibilities for various aspects of the linkage, and common technical aspects and requirements such as message formats. The operating rules also captured the transaction flow between the jurisdictions from start to finish, including defined exception handling.

The settlement rules dealt with matters relating to settlement, including the reporting and reconciliation process, timing and adjustments.

Settlement model

To minimize the complexities of settlement, the settlement cycles of the domestic schemes were followed, i.e., FAST settlement windows for SGD, and ITMX settlement windows for THB. In addition, the settlement was on a gross basis rather than netting between SGD and THB.

To facilitate these arrangements, DBS was chosen for SGD settlement and Bangkok Bank (BBL) was chosen for THB settlement.

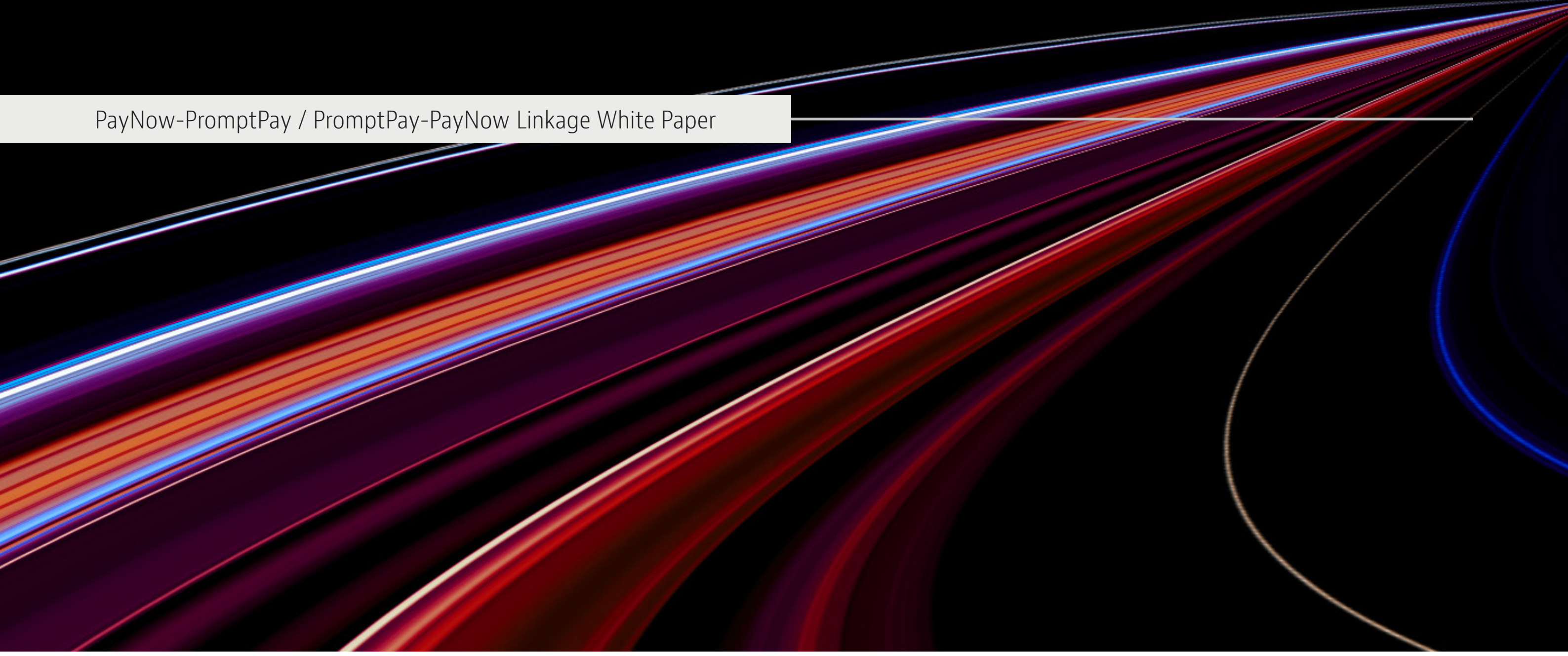
The participating banks need to maintain an account with the settlement bank for settlement. All Singapore participating banks will maintain an account with the THB settlement bank, and all Thai banks will maintain an account with the SGD settlement bank.

All transaction fees applicable by the settlement bank were kept transparent. Credit lines and interest rates remain on a commercial basis.

During the settlement window, the scheme operators generate a settlement report and send it across to the settlement bank, which debits the respective accounts of the participating banks and settles with other banks in its jurisdiction.

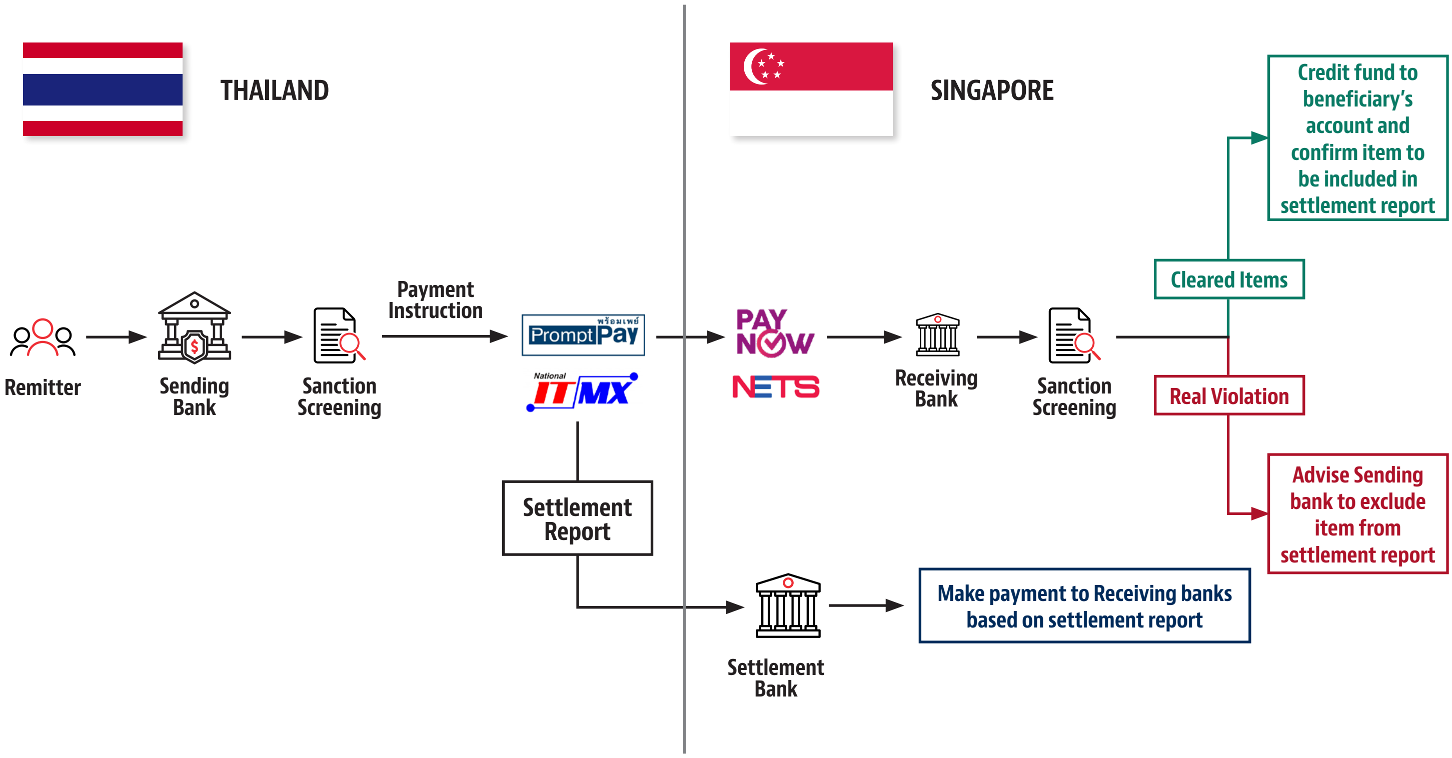
Other than daily settlements, the settlement bank also facilitates settlement for adjustment of exception items and fees owed at the end of the month.

If any of the participating banks fails to settle its account with the settlement bank, the settlement bank maintains the rights to escalate and trigger a suspension of the defaulting bank to help manage credit risks in the system.



As the settlement bank is not a party to each of the underlying transactions, it was agreed to exempt them from any screening requirements of the participating banks' underlying transactions.

The diagram below outlines the settlement and sanction screening process for transfers from Thailand to Singapore. The flow from Singapore to Thailand is similar, in the reverse direction.



Business: Arrangements for the addition of new parties and jurisdictions

Participants structured the formats of the legal documents for the PPPN linkage in anticipation of the adherence of new parties joining in each country, including banks and other financial institutions or nonbank financial institutions, and an expansion to jurisdictions beyond Thailand and Singapore.

The parties took the linkage's potential expansion into account by making the legal documentation flexible enough to support the addition of new parties or jurisdictions. New parties can in principle be added to the existing PPPN linkage by their acceding to the terms in the Multi-Party Agreement.

The PPPN linkage is also nonexclusive, meaning that each jurisdiction may unilaterally collaborate with other jurisdictions to create similar international fast payment linkages. Jurisdictions are permitted to leverage the knowledge gained from their experience with the PPPN linkage to work with new participants and new countries, except for the counterparty's background IP, user IP and operator IP. This Reserved Scheme IP, which is listed in the Agreement, can only be used if the joint IP owner agrees.

Risk management, AML and CFT

A key technical and regulatory challenge for international fund transfers is AML and CFT name screening, which often increases the time required for transfers. While PPPN linkages bring commercial benefits to the participants and consumers, compliance with the stringent rules and regulations on AML and CFT could not be compromised. Although the implementation of requirements such as the internal processes for performing sanctions screening may differ among participants, all participants demonstrated a strong commitment toward building a secure linkage that would minimize the risks of its exploitation by bad actors.

Both Singapore and Thailand subscribe to international standards (i.e. the Financial Action Task Force) for AML and CFT. The laws and regulations of both countries relating to AML and CFT also had to be followed for the PPPN linkage. Regulatory requirements differ between Thailand and Singapore in areas including AML, capital controls, safeguards in screening and encryption standards. These differences range from broader issues such as different practices in their respective domestic systems to detailed issues such as PayNow displaying the receiver's name by using their nickname and PromptPay showing the receiver's full real name. Participants considered and made changes based on factors such as checks on the sender or receiver, the transaction amount, the address, the date of birth or geolocation. The participants used the Legal and Regulatory work stream to discuss issues and find solutions.

The operators also sought to establish requirements to reduce the growing risk of cyberattacks and avoid having the linkage systemically exposed. After discussions that included both technical and security perspectives, the operators continued using closed networks.

Customer screening as a case study

In Singapore, banks screen the individual making the transfer during the transfer phase, instead of the earlier lookup phase, and then confirm the identity of the person and process the transfer. Banks in Singapore use the process for real-time screening at the transfer stage for other products, so it is a “plug and play” model similar to that used for other services. Since banks in Singapore already follow this AML and CFT screening model, they wanted to continue screening at the transfer phase.

In contrast, banks in Thailand screen the customer earlier in the process and wished to continue that practice so that they could identify problems earlier and reduce the resources required if screening showed that they should not complete the transaction.

Catering to requirements relating to screening processes, laws and AML practices in each country was a lengthy process. The operators leveraged the results of discussions to develop solutions to meet operational requirements and to enable banks to meet their regulatory requirements.

Changes in practices

While the banks used their existing practices as much as possible, some institutions also made changes in their AML and CFT screening practices. For example, one bank set up a process to integrate screening as part of the system itself, which enables a better real-time experience. Other banks looked internally to see how their existing systems could be made compatible with the new solution to screen beneficiaries.

The rules for domestic transactions did not change because of the new linkage. Instead, solutions were developed that catered to the new requirements for linking international transactions.

Project solutions and implementation – best practices

The lessons learned from the planning and implementation of the linkage can facilitate and help other jurisdictions in establishing their own transfer linkages. Lessons learned include:

- **Availability of existing networks:** A fundamental first step for jurisdictions intending to create cross-border linkages is to have existing domestic fast payment systems and rails similar to PayNow and PromptPay for transferring funds, which could be leveraged to enable connectivity.
- **Scaling bilateral to multilateral connectivity:** The involvement of only two jurisdictions as part of a bilateral connectivity made it straightforward to ensure alignment. In theory, such bilateral arrangements can shift to a multilateral "federated" model if a group of jurisdictions were to embark on multijurisdiction linkages in the future.
- **Robust communications:** Developing a robust communications process is essential. There are more than a dozen stakeholders in the linkage, each of which has various levels of management to keep informed. Regulators, banking associations, operators and banks have different objectives and concerns. Communications were more challenging in this particular case because individual participants met in person only a few times during the earlier phase of the project before the COVID-19 pandemic forced all communications to become virtual. Not meeting in person meant that stakeholders were unable to use their usual tools such as drawing on whiteboards in the same room to resolve issues. Instead, the PMO circulated documents and established discussion times so that participants could answer questions or give comments. Since it was a substantial project with many teams working on various areas, even small changes to practices would impact other teams. Therefore, participants needed to make sure that each person got the same message. Stakeholders made significant efforts to build trust and ensure transparency so that communications flowed smoothly.

- **Overcome assumptions:** To resolve issues quickly and minimize false assumptions between participants around operating models, transaction flows and how systems are constructed, it is essential to have open and comprehensive discussions from an early stage of the project. It is also essential for participants to set aside any preconceptions or assumptions they may have about how other systems operate and to listen carefully to understand the counterparties' practices.
- **Central bank support:** While bank-to-bank and association-to-association connections are important, government-to-government support is critical. MAS and BOT engaged in the project collaboratively and accepted feedback from the industry, which contributed greatly to the success of the project. Since the PPPN linkage is the first-ever cross border fast payment to fast payment linkage, the central banks also recognized the challenging solutioning process, given that the participants were discovering new problems and issues as the project progressed, and were prepared to accept a degree of associated risk.
- **International standards:** This linkage differed from other projects that participants have engaged in previously because there were multiple parties with diverse interests and no international standards to use as a basis. As more examples of such connectivity are created, processes may become easier. Over the longer term, it would be beneficial to have international standards in order to make connectivity easier.
- **Proxy-based transfers:** Countries' proxy addressing systems may be housed within the same or separate infrastructure as the fast payment rails. This can lead to complications if the systems are managed and operated in different manners or by different parties. Proxy addressing models may also vary. For instance, some countries may opt to maintain a centralized address book that participating financial institutions check in order to obtain the requisite information. Others may rely on decentralized address books maintained across each individual financial institution, which increases the speed and efficiency of performing proxy lookups, and also introduces challenges in reconciling and securing the multiple address books.
- **Messaging standards:** Variations in messaging standards can exist across and within countries as well as between financial institutions. While the global community leans toward the adoption of ISO 20022, the standard itself is not homogenous and countries often apply customizations or tailor the message format to their specific needs. Countries and financial institutions that rely on ISO 20022 convertors as an interim solution while transitioning from an older standard, for example, also run the risk of data loss due to imperfect mapping of fields between different formats. Collectively, addressing these differences may require enhancements to existing message flows and infrastructure to ensure the transmission of necessary data payloads through the linkage such as key customer fields needed for name screening.

- **System turnaround times:** Turnaround times for executing a proxy lookup and faster transfers will vary across countries. These timings are typically enshrined in operators' manuals or SLAs between domestic participants. Differences in turnaround times have to be bridged in order to validate the transactions sent between different fast payment systems. For example, a system running on a shorter turnaround is liable to experience timeouts when routing transfer messages through a system operating on a longer window. Developing new message flows and processes may be a preferable approach to bridging such gaps. Shortening or lengthening a system's turnaround times poses consequential and far-reaching implications for all participants of that system.
- **Settlement:** Domestic fast payment systems typically rely on collateral or prefunding arrangements with a central counterparty such as a central bank in order to determine system limits on how much participants may clear in a given window as well as to offset participants' obligations during settlement cycles. The absence of a central counterparty for cross-border transfers requires both sides to pursue alternative solutions such as replicating the collateral or prefunding arrangements with designated settlement banks on either side. The duplicative nature of such alternatives can result in liquidity inefficiencies for participating financial institutions, resulting in additional hidden costs to pursuing cross-border system-to-system linkages. While blockchain solutions could theoretically provide an elegant and efficient solution, adoption levels have remained low so far because many financial institutions continue to explore how the technology can be used and integrated within their existing business models.
- **Screening:** Financial institutions seeking to participate in cross-border fast payment linkages should invest in the development of real-time screening capabilities to ensure compliance with global regulatory requirements while mirroring the speed of end-to-end domestic transfers as closely as possible. Countries may also wish to align on the stage at which screening is performed, whether during the upstream proxy lookup phase or the downstream exchange of transfer messages, as this decision may have a bearing on the design of the linkage's transfer flows and customer experience.

- **Data protection:** Countries can adopt a variety of safeguards to ensure customers' privacy when participating in a proxy-based transfer system. These solutions range from controls imposed by financial institutions, such as disabling a sender's ability to query the addressing system if an excessive number of mobile phone lookups is performed within a given window, to system-level protections such as controlling the data displayed to the sender following a successful query of a recipient's mobile phone number. For example, the solution could display only the first two to three characters of the recipient's name, such as "TH**** LE*" rather than "THOMAS LEE." Countries may decide to align the safeguards to provide a common experience for linkage customers or to pursue an asymmetric approach whereby each country retains its own practices and communicates the information to customers accordingly. Furthermore, countries may consider developing opt-in or opt-out functionalities in order to allow users to choose whether their proxies may be queried by a foreign sender, and by extension whether to receive and send cross-border transfers through the linkage.

PPPN as a model for cross-border transactions

ASEAN payment connectivity

ASEAN Payment Connectivity is an initiative by Association of Southeast Asian Nations (ASEAN) member countries to connect domestic fund transfer programs, increase the cross-border interoperability of standardized quick response (QR) codes for payments, and introduce other fast remittance programs in order to enhance cross-border fast retail payments or transfers in the region.

The PPPN linkage is one such collaboration. Even though it only connects two countries, its success has led the way in showing the potential for broader expansion of borderless banking to other countries.

Globally

The PPPN linkage is the first banking fund transfer service ecosystem in the world that connects the domestic fund transfer systems of two countries. It is expected that more banks and payment service providers will join the PPPN linkage or increase transaction limits in the near future so as to support businesses using the PPPN linkage.

The learnings from the PPPN linkage can serve as a blueprint for further bilateral cross-border connectivity of fast payment systems and also contribute toward the development of scalable multilateral fund transfer interoperability. One example is the Bank for International Settlements Innovation Hub-led Project Nexus,[1] which is building on such bilateral learnings to develop a central hub that can connect the fast payment or fund transfer systems of multiple countries as part of a 'hub-and-spoke' approach, potentially allowing for rapid scaling-up of fast payment or fund transfer system connectivity.

1 https://nexus.bisih.org/

Baker McKenzie expertise and involvement

Baker McKenzie has long-standing experience in domestic and cross-border financial services involving projects in many countries in various regions, particularly in Southeast Asia. In the payments sphere, it has significant expertise in advising financial institutions such as banks, e-payment firms, payments and money transfers service providers and payment networks, together with technology firms.

Baker McKenzie is active in tracking the evolving regulatory environment to help the sector navigate changing regulatory landscapes by advising on licensing matters; compliance matters; AML, KYC and technology risk; and payments, securities and trading considerations, including the inner workings of the financial markets. We also work closely with our clients to advocate for regulatory positions, especially on new products and services. While promoting innovation, we are conscious of data privacy considerations and have experience in assisting clients on unique and novel financial products and services delivered through financial technology such as private exchanges, robo advisors, and crowdfunding platforms. We counsel clients on privacy issues, given the increasing connectivity that fintech brings. Moreover, we help to identify and implement responses to mitigate the ripple effect of any changes to core processes from innovation, such as by assessing the cybersecurity or data privacy implications of adopting a new payments system. Organizations have different levels of regulatory risk awareness when engaging with fintech. Awareness can vary by both business, department and region. Baker McKenzie works with its clients to map out their business plans and correlated regulatory issues.

Involvement

While supporting the coordination of the project through meetings and discussions in the Legal and Regulatory work stream, Baker McKenzie's Singapore and Thailand offices advised on and drafted the documentation for the legal and governance framework. This being a novel and unprecedented cross-border initiative, for which there were no direct precedents, careful consideration of the legal and regulatory issues was required and novel solutions were necessary, such as a unique governance model.

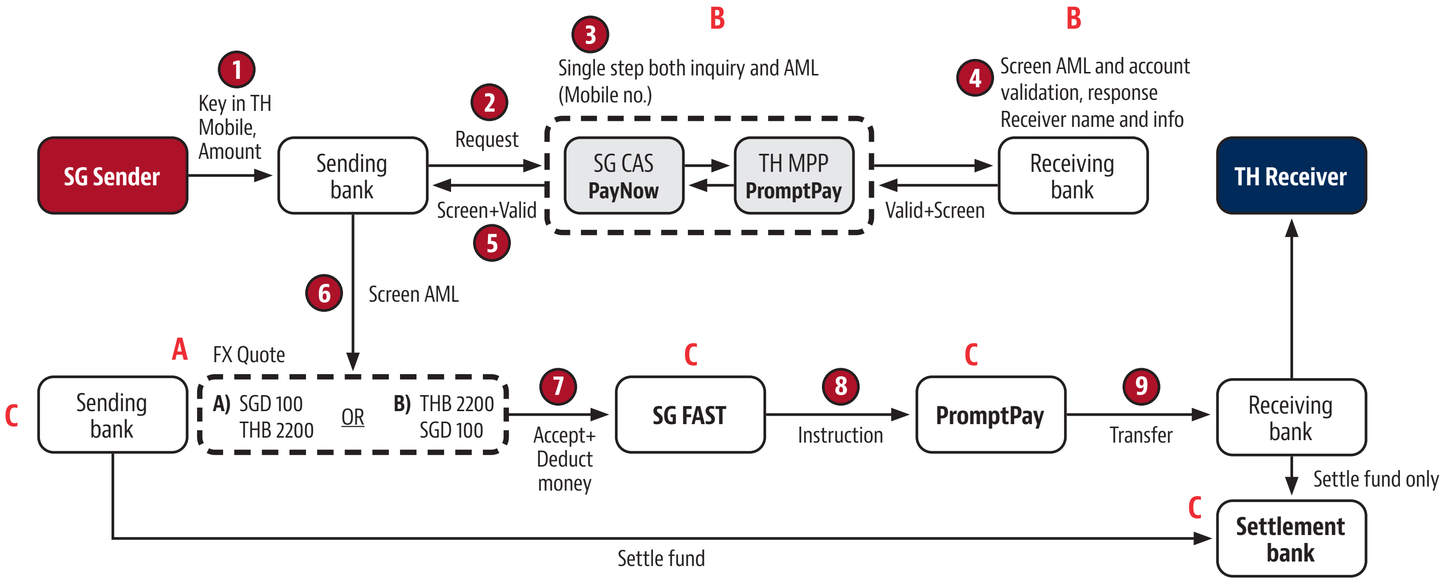
The legal structure included the Multi-Party Agreement, the operating rules and settlement rules. The Multi-Party Agreement and rules covered (1) the operating rules, (2) joint governance matters, (3) the appointment of operators, (4) scheme and settlement rules, (5) roles and responsibilities, (6) commercial terms, (7) SLAs, and (8) dispute resolution. Key challenges included ensuring that this framework was legally binding and compliant with AML and CFT screening requirements in the context of two separate legal systems with different laws and regulations. Additionally, the framework needed to be scalable for new participants and new jurisdictions to join in the future and, by being based on common principles, capable of being mirrored and adapted to similar arrangements with other countries. Baker McKenzie also provided advice on issues concerning tax and intellectual property relating to the Multi-Party Agreement.

Appendix

Transaction flow

Participants carefully documented process flows from multiple perspectives and created agreements relating to the flows. The diagrams below provide high-level summaries of the transaction flows.

Transaction flow: SG to TH



A. FX Quote/Execution

a) Sending Bank quotes and performs FX conversion

b) Sending Bank debits THB funds to THB settlement account with the designated TH settlement bank

B. Data Step

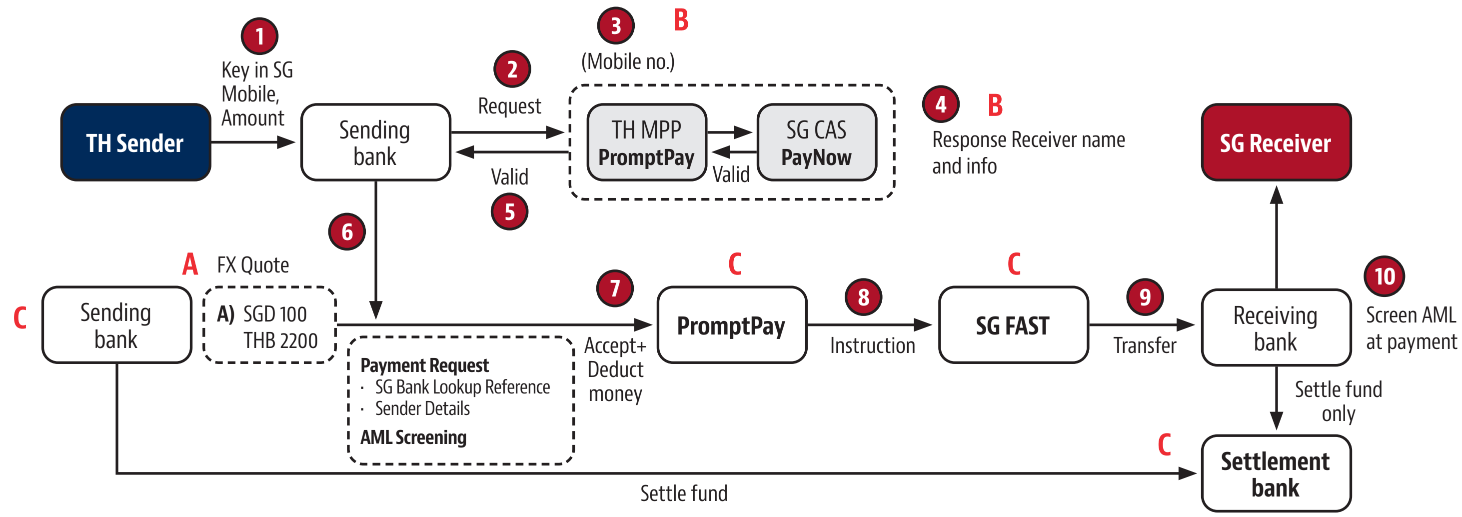
a) Single message for inquiry and AML

b) Receiving bank manage customer consent and AML

C. X-Border Settlement Model:

- Many to one Settlement bank in each country
- Set up credit line and risk controlling
- Settlement bank doesn't involve in reverse/dispute process
- Set up settlement SLA in each country

Transaction flow: TH to SG



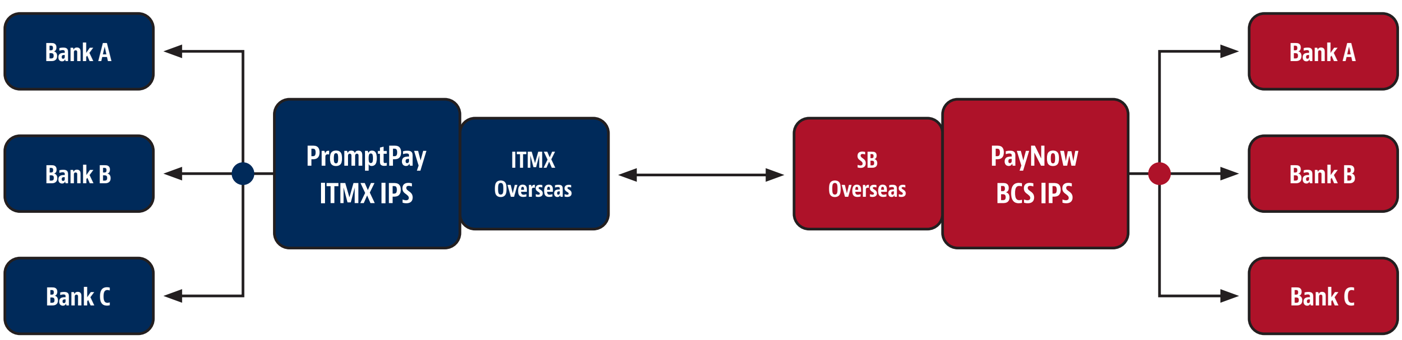
A. FX Quote/Execution
a) Sending Bank quotes and performs FX conversion
b) Sending Bank debits SG funds to SG settlement account with the designated SG settlement bank

B. Data Step
a) Single message for inquiry and AML
b) Receiving bank manage customer consent and AML

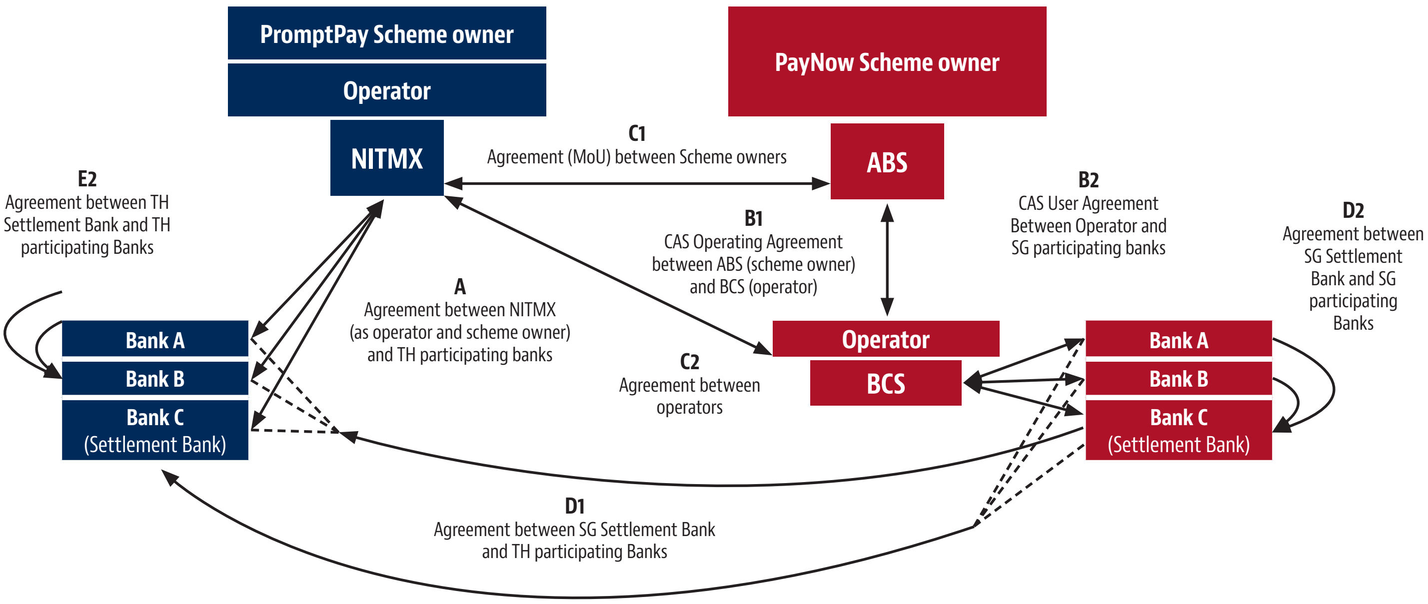
C. X-Border Settlement Model:
- Many to one Settlement bank in each country
- Set up credit line and risk controlling
- Settlement bank doesn't involve in reverse/dispute process
- Request to recall
- Set up settlement SLA in each country

Legal documentation framework

The project required a governance structure both during the project phase and subsequently when complete for BAU. The legal structure was centered around the Multi-Party Agreement, which has legally binding operating rules. Initially, the structure of the Agreement was similar to a traditional arrangement, so that the operators would have bilateral agreements between each other and the settlement banks would have a separate bilateral agreement with each bank in the other jurisdiction, as shown in the diagrams below.

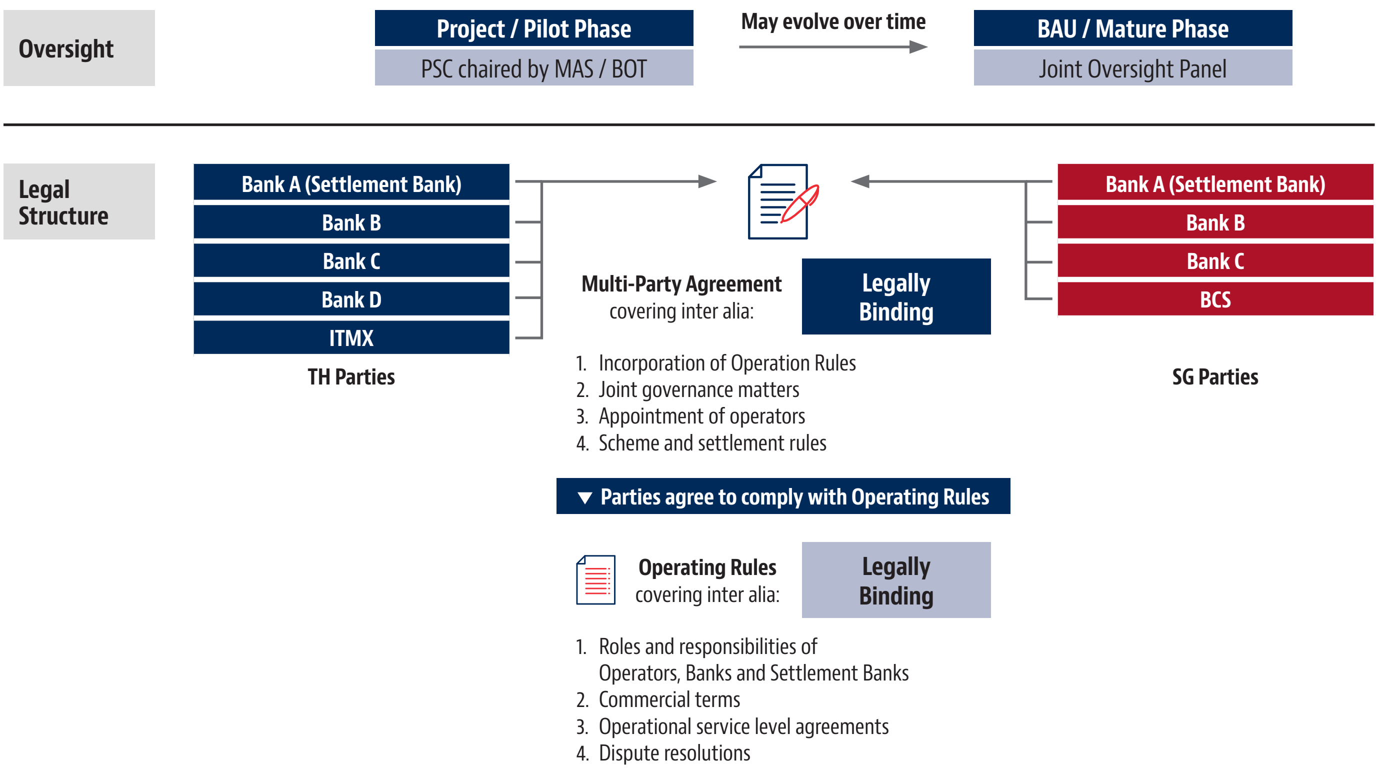


PayNow-PromptPay / PromptPay-PayNow contractual framework



However, the parties subsequently agreed that entering into a Multi-Party Agreement would be more advantageous for the project. The participants adopted the legal documentation framework, as reflected in the diagram below.

Legal and governance framework structure



Settlement

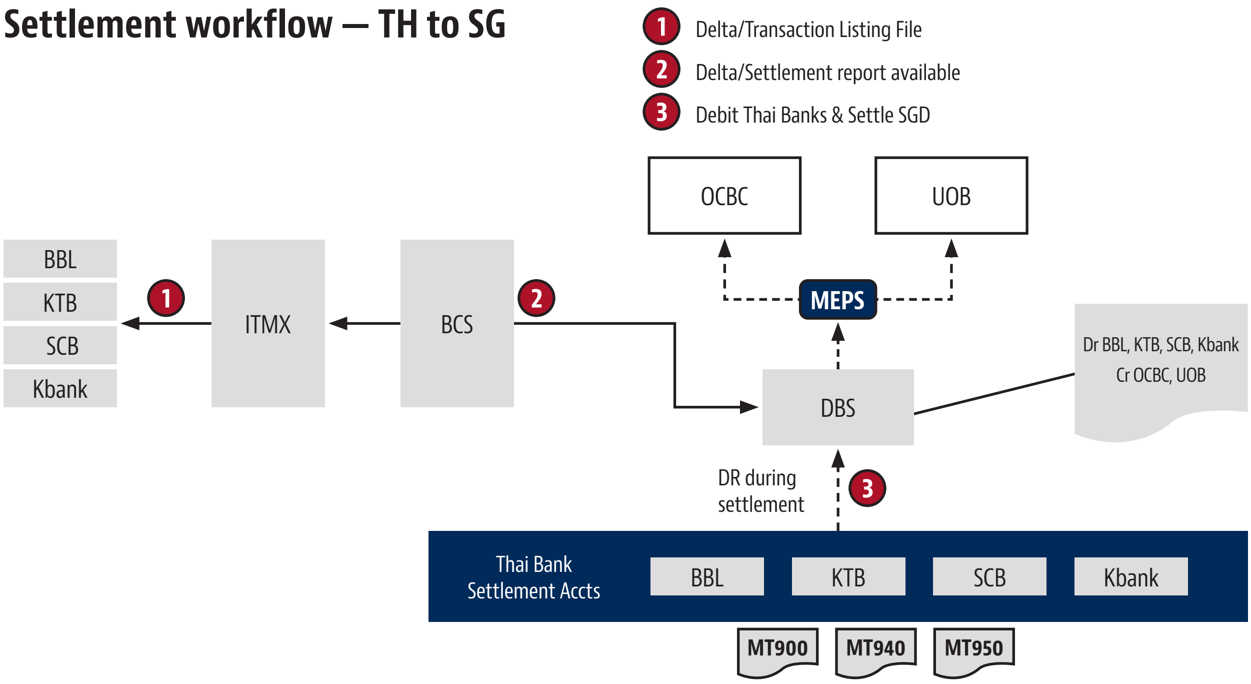
Settlement in Singapore is effected via MEPS by deducting or crediting the sending bank's account that is opened and maintained with the settlement bank rather than with MAS, and crediting or debiting the corresponding funds to or from the receiving bank.

Funds transferred via PromptPay in Thailand are settled using the same procedures as a normal fund transfer via BAHTNET, whereby the settlement is performed via the deposit account that financial institutions or other organizations maintain with BOT.

Given these differences, the participants and stakeholders of PPPN had to reach a compatible solution, including by setting a common standard settlement report and appointing the settlement bank for each jurisdiction to facilitate the process.

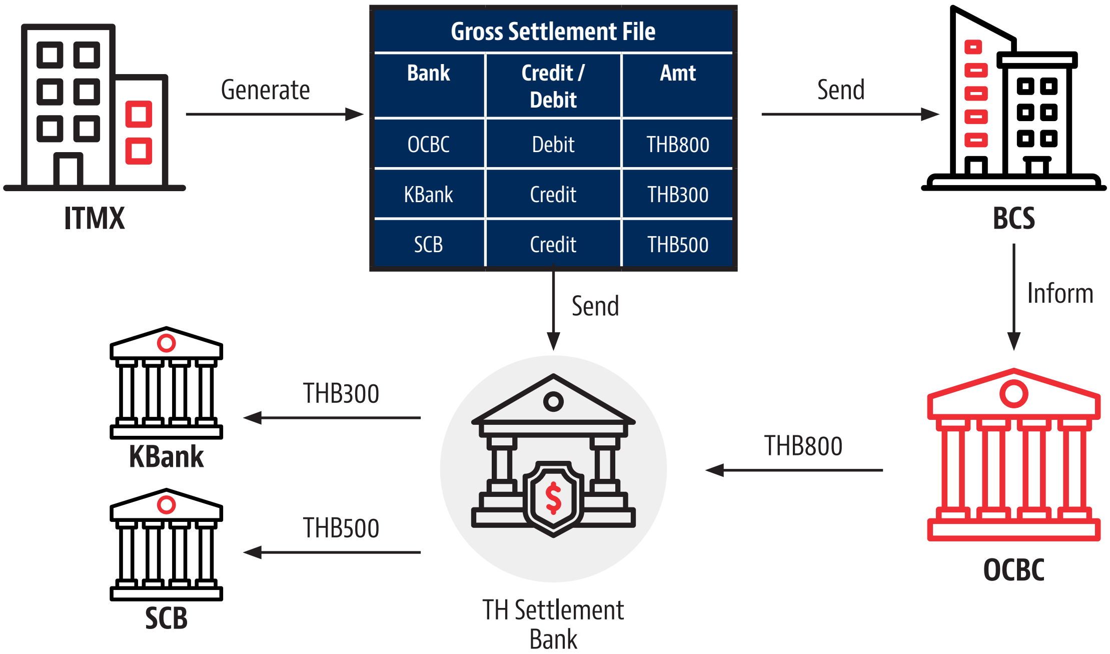
The diagrams below provide high-level summaries of the settlement flows.

Settlement workflow — TH to SG



Settlement workflow — SG to TH

Settlement in TH

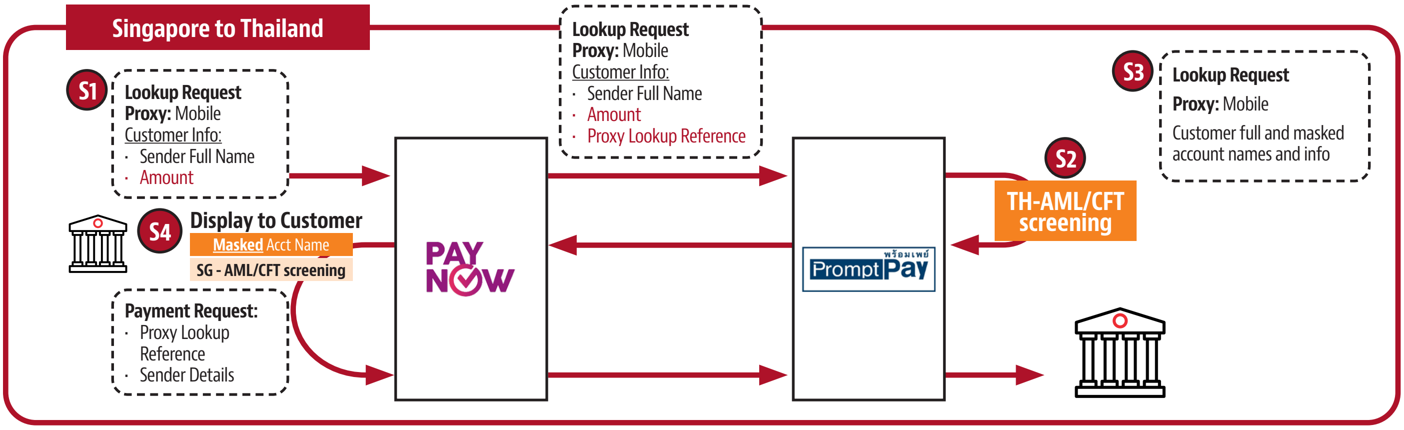


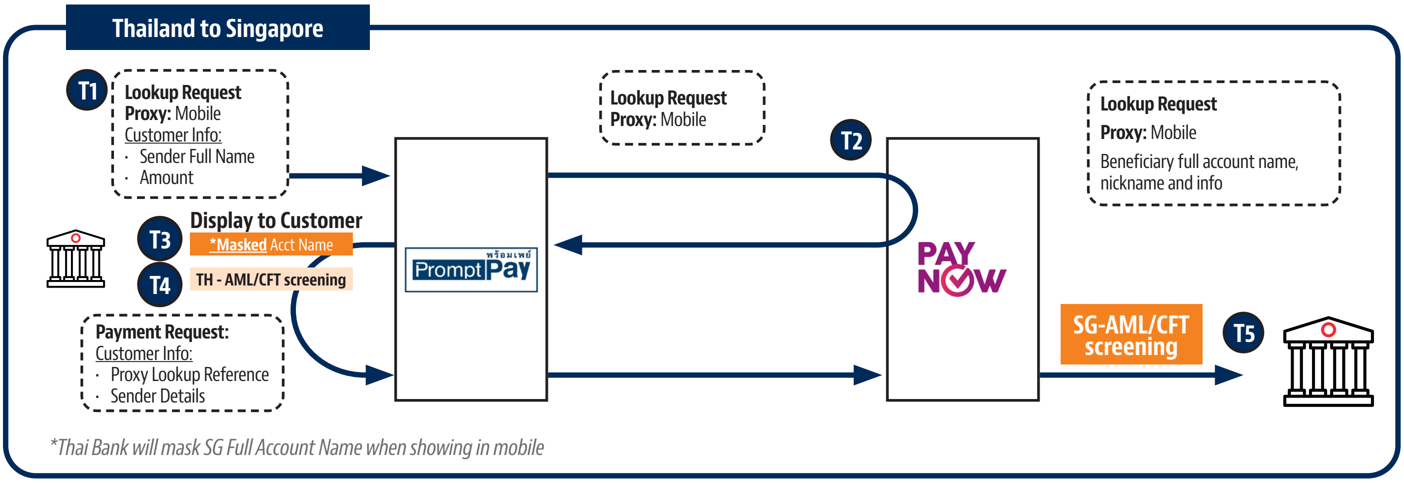
Settlement Cycle	Settlement Cut Off[1]	Settlement Complete[1]
Cycle 1	11:00 THA	15:00 THA
Cycle 2	23:00 THA	Next Business Day, 10:00

[1] *Thailand Time*

AML, CFT and fraud risk management

AML and CFT screening is required under local as well as international regulations, and it is essential for preventing money laundering and terrorist financing. The participants put strong AML and CFT screening processes in place.





Data privacy

Participants developed robust systems and processes to ensure data privacy. Since they were concerned about cyberattacks, BCS and ITMX maintained closed networks in order to prevent systemic risk. The summaries below provide high-level information about processes to help ensure data privacy.

	Thailand (TH)	Singapore (SG)
Inbound	• The automatic opt-in approach revises all existing accounts so that the T&Cs will apply only to the TH inbound transfer. • If the customer opts out of this program, the customer will be unable to receive cross-border fund transfers. In addition, the bank will reject the inquiry request from Singapore. However, the customer is still able to transfer money to the Singapore account (TH outbound transfer).	• There is a default opt-in approach. • If the SG customer opts out of this cross-border platform, they will not be able to receive funds from overseas. When the TH bank performs screening on an opt-out mobile number, BCS will reject the screening. • The opt-out feature is not country-specific. SG customers can either maintain their opt-in status to receive funds from overseas or opt out totally. There will be no impact to domestic transfers unless the SG customer deregisters for PayNow, in which case the SG customer will no longer be able to receive domestic transfers via PayNow. • The SG parties are working on an enhancement to the PayNow service that would enable a SG customer to opt out of receiving cross-border transfers from Thailand via PayNow, while still being able to send and receive domestic transfers via PayNow.
Outbound	• Banks implemented a consent feature (Opt-in/ Opt-out), which requires the customer to opt in and consent for the first time before using the cross-border remittance feature on the mobile application.	• There is no restriction so long as the beneficiary is with the TH participating banks and remains opted-in to the PPPN linkage, subject to sanctions screening.

Participant descriptions

Singapore

- The **Monetary Authority of Singapore (MAS)** is Singapore's central bank and integrated financial regulator. MAS also works with the financial industry to develop Singapore as a dynamic international financial center.
- The **Association of Banks in Singapore (ABS)** is a nonprofit organization that represents the interests of the commercial and investment banking community. As of January 2021, 154 local and foreign banks, institutions and representative offices operating in Singapore were members of ABS. ABS is the scheme owner of the Central Addressing Scheme (CAS), which is used to provide the PayNow service, and it is also the Singapore jurisdictional scheme owner of the PromptPay-PayNow scheme.
- **Banking Computer Services Private Limited (BCS)** manages and operates the clearing and payment infrastructure for the Singapore Clearing House Association (SCHA), including managing an electronic service that allows immediate transfer of Singapore dollar funds between accounts of the participating banks in Singapore. It was set up in 1976 and currently operates core services such as FAST (Fast and Secure Transfers), IBG (Inter-bank GIRO) and CTS (Check Truncation System). BCS is a wholly owned subsidiary of NETS, a leading payment solutions provider in Singapore.
- **DBS Bank Ltd. (DBS)** is a leading financial services group in Asia present in 18 markets. Headquartered and listed in Singapore, DBS is in the three key Asian axes of growth: Greater China, Southeast Asia and South Asia.
- **United Overseas Bank Limited (UOB)** is a leading bank in Asia with a global network of more than 500 offices in 19 countries and territories in Asia Pacific, Europe and North America. Since its incorporation in 1935, UOB has grown organically and through a series of strategic acquisitions.
- **Oversea-Chinese Banking Corporation Limited (OCBC)** is the longest-established Singapore bank formed in 1932 from the merger of three local banks, the oldest of which was founded in 1912. It is now the second largest financial services group in Southeast Asia by assets. It has more than 470 branches and representative offices in 19 countries and regions.

Thailand

- The **Bank of Thailand (BOT)**, which started operations in 1942, is the central bank of Thailand and is responsible for promoting a stable financial environment to achieve sustainable and inclusive economic development.
- The **Thai Bankers' Association (TBA)**, which was registered in 1967, supports Thai banks and its members with operations procedures that enhance banks' businesses and investments. TBA cooperates with the Thai government to build a strong economy and future growth. TBA jointly chairs meetings of the Joint Oversight Panel with ABS. Unlike ABS, TBA is not legally classified as a "scheme owner."
- **National ITMX Co., Ltd. (ITMX)** was established in 1993. Most of its shares are held by commercial banks in Thailand. Its main business is to provide electronic infrastructure for both domestic and international financial transactions. The services it provides include single payment, bulk payment, gateway, local switching and PromptPay systems.
- **Bangkok Bank Public Company Limited (BBL)**, the sixth largest bank in Southeast Asia and the largest bank in Thailand by total assets, was established in 1944. BBL's domestic branches extend to more than 1,100 branches, 117 business centers nationwide and more than 300 international branches, including three major international subsidiaries, in 14 economies. BBL's coverage of international operations spans eight other ASEAN jurisdictions as well as China, Hong Kong, Japan, Taiwan, the United Kingdom and the United States.
- The **Siam Commercial Bank Public Company Limited (SCB)** was established by royal charter in 1907 as the first Thai bank. It is a universal bank, offering deposits, lending and a wide range of other products and services.
- **KASIKORNBANK Public Company Limited (KBANK)** was established in 1945. In 2003, it changed its former English name, Thai Farmers Bank, to the current name, which is the same sound as the Thai name. KBANK is among Thailand's five largest banks by assets. It has more than 1,000 branches nationwide and some overseas branches, mainly in China.
- **Krung Thai Bank Public Company Limited (KTB)** established its first branch in 1966, resulting from a merger between Kaseat Bank Co, Ltd. and Monthon Bank Co, Ltd., the main shareholder of which was the Thai government.

Key Contacts

Baker McKenzie

Ken Chia
Associate Principal
Singapore
ken.chia
@bakermckenzie.com

Stephanie Magnus
Principal
Singapore
stephanie.magnus
@bakermckenzie.com

Alex Toh
Senior Associate
Singapore
alex.toh
@bakermckenzie.com

Thinawat Bukhamana
Principal
Bangkok
thinawat.bukhamana
@bakermckenzie.com

Kullarat Phongsathaporn
Partner
Bangkok
kullarat.phongsathaporn
@bakermckenzie.com

Pattarapon Lerdpipat
Legal Professional
Bangkok
pattarapon.lerdpipat
@bakermckenzie.com

Jiro Toyokawa
Principal
Tokyo
jiro.toyokawa
@bakermckenzie.com

Karen Man
Principal
Hong Kong
karen.man
@bakermckenzie.com

Monetary Authority of Singapore (MAS)

Elicia Chuah
elicia_chuah@mas.gov.sg

Association of Banks in Singapore (ABS)

banks@abs.org.sg

Banking Computer Services Private Limited (BCS)

Kevin Tay
kevintay@bcs.sg

Daniel Lee
daniellee@bcs.sg

Bank of Thailand (BOT)

PSSAD-PSD@bot.or.th

The Thai Bankers' Association (TBA)

PSO@tba.or.th

National ITMX Co., Ltd

bd@itmx.co.th

About Baker McKenzie

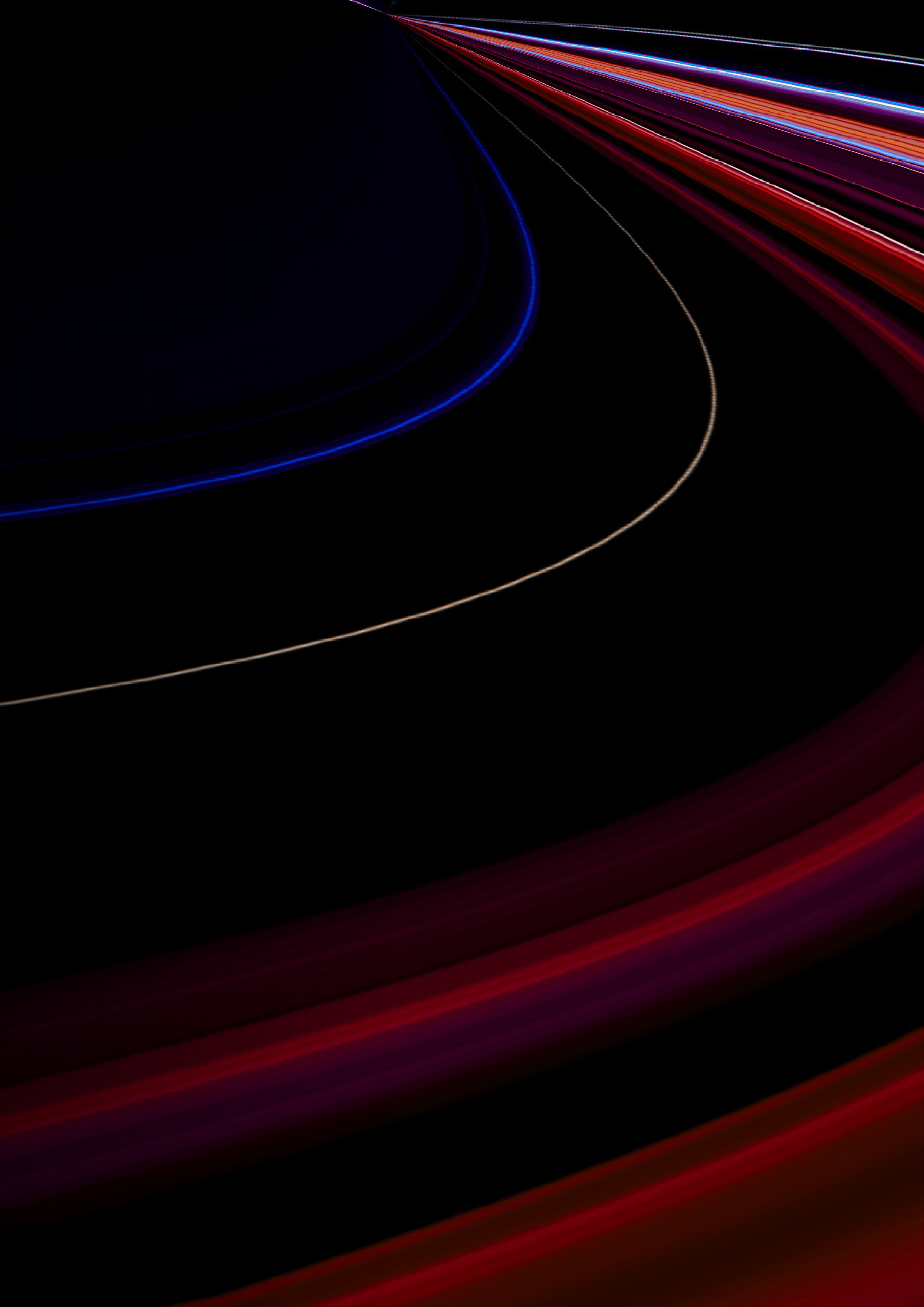
Baker McKenzie helps clients overcome the challenges of competing in the global economy. We solve complex legal problems across borders and practice areas. Our unique culture, developed over 70 years, enables our 13,000 people across 77 offices in 46 countries globally to understand local markets and navigate multiple jurisdictions, working together as trusted colleagues and friends to instill confidence in our clients.

Baker McKenzie is one of the leading firms for cross-border transactions, providing strategic advice on deals involving leading financial institutions and multinational companies.

Ranked as a Band 1 Firm by Chambers FinTech Global, we have been at the forefront of advising the entire value chain of the financial technology industry, including financial institutions, global digital leaders, technology incubators and startups, across a broad range of subsectors, including crowdfunding, e-payments, digital assets, digital banking, robo advice, platforms and exchanges, and peer-to-peer lending. We help clients address issues relating to market entry, product innovation and licensing, and we assist them in spotting and mitigating regulatory, IP and contracting risks that can dilute the value of a company's innovation.

Baker McKenzie's Singapore FinTech Group is a market- and industry-leading practice, with an excellent track record and significant experience advising all kinds of fintechs regulated by MAS. We are an independent team dedicated to fintech: from licenses and registration through audits, investigations and financial services M&A. Our long-standing working relationship with MAS keeps us up-to-the-minute on policy. Since 2016, we have supported MAS in organizing the Singapore FinTech Festival (SFF), the largest and most inclusive fintech event attracting over 80,000 attendees attending from all over the world. Our firm also mentors startups, such as the Legal Clinic Mentorship for the Global FinTech Hackcelerator 2020 and SLINGSHOT 2021, a deep tech startup competition organized by Enterprise Singapore.

Baker McKenzie Thailand has been at the forefront of addressing the legal implications of initiatives in fintech innovation. The firm's standing and prominence in the market has earned it recognition as a "Top Firm for Creating a New Standard" by FT Innovative Lawyers APAC Awards, 2019, from the Financial Times. Baker McKenzie Thailand has engaged on several first-of-its-kind deals and groundbreaking digital transformation projects. Aside from the PPPN linkage, Baker McKenzie Thailand's other landmark achievements include acting as the sole law firm representing the Blockchain Community Initiative (BCI); the successful launch of the Electronic Letter of Guarantee (e-LG) on Blockchain as its inaugural project; advising the National Digital ID Project (NDID) in the development of a state digital identity verification and authentication system; and advising for SIRIHUB, Thailand's first initial coin offering and the world's first real estate-backed investment token.



About Baker McKenzie

Baker McKenzie delivers integrated solutions to complex challenges.

Complex business challenges require an integrated response across different markets, sectors and areas of law. Baker McKenzie's client solutions provide seamless advice, underpinned by deep practice and sector expertise, as well as first-rate local market knowledge. Across more than 70 offices globally, Baker McKenzie works alongside our clients to deliver solutions for a connected world.

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